Building Our Own Bridges: How a Distressed Urban Neighborhood

Bridges the Digital Divide

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Abstract

Prior research on digital divides and inequalities demonstrates that those who have multiple Internet access points engage in broader and more capital-enhancing online uses (Dutton & Blank, 2013, 2014; Zillien & Hargittai, 2009). These capital-enhancing uses, in turn, can serve as one mechanism to help narrow socio-economic inequities in distressed communities. This paper examines highly distressed urban communities in the city of Detroit, Michigan. Based on 525 telephone surveys of Detroit residents, this study uses a path modeling approach to examine the relationship between socio-economic variables, attitudes toward the internet, different points of access and devices, and different types of capital-enhancing Internet uses, such as e-commerce, looking for health information, reading the news and job seeking. By building on studies that identify the impact of access points on social capital and understanding online behavior as it relates to different types of devices, such as desktops, laptops, and mobile phones, policy makers can take steps to narrow digital divides.

Introduction

Access to broadband leads to better labor market outcomes, increased economic growth, access to better health care and increased civic participation (Council of Economic Advisers, 2016). Yet, distressed communities continue to struggle with gaining access to the Internet because of a lack of resources and opportunities. Low-income, non-white, women, inner city and rural residents, and the elderly are among the most disadvantaged in terms of Internet access (Gilbert et al., 2008; Mossberger et al., 2003). These digital divides reinforce existing socio-economic inequities with Internet and ICT access as both a cause and a consequence of other demographic disparities (Council of Economic Advisers, 2015, p.9).

In the United States, the Federal Communications Commission (FCC) reported that all urban neighborhoods have some level of access to broadband Internet infrastructures, either through fixed lines or mobile (FCC, 2018). However, only about 67% of US adults in urban communities have broadband at home (Pew Research, 2018). Among black communities and households making less than $30,000 a year, only 66% have home broadband access, as compared to 79% of white households (Pew Research Center, 2019). By some estimates, the racial divide, in particular, is growing. The difference in home Internet access between whites in 1997 and 2007 was about 52 percentage points increase, as compared to a 43 percent increase in home adoption among blacks over the same time period (Wodajo & Kimmel, 2013).

The Case of Detroit

Detroit, Michigan, is a geographically large city of nearly 700,000 people in a metropolitan area of over 4.3 million. In 2013, the city filed for bankruptcy, the largest municipal bankruptcy in US history. Further, Detroit is among the most segregated cities in the United

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States, with the highest rates of concentrated poverty and violent crime of any major American city (Kneebone & Holmes, 2016; Stebbins, Sauter & Comen, 2017).

Significant swaths of the city are largely abandoned, despite Detroit's 2014 emergence from bankruptcy and a recent resurgence of the economy. About 1 in 4 of the city's homes are abandoned, vacated, or unoccupied. The city has been characterized as "Two Detroits." On the one hand, the business district is thriving with continued investment. On the other hand, 40% of the city is impoverished with 48% of households qualifying as food insecure (Jordan, 2018). By some estimates the city's unemployment rate is as high as 20% (Graham, 2018). With documented inadequacies in regional and local public transportation, Detroiters are lacking access to quality services, products, and employment opportunities.

Inequities begin early for Detroit residents. Detroit school kids are among the most disadvantaged in the country, with only about one in 10 students in third grade proficient in reading and writing (Arellano & King, 2019). Notably, 70% of school aged children have no Internet access at home (Grimes, 2016). In fact, Detroit's digital divide is among the most extreme in the nation with 63% of the city's low-income households lacking a home Internet connection (Wheeler & Clybrun, 2015) compared with 35% of homes lacking home access nation-wide (Pew Research Center, 2018). Many in Detroit rely on free Wi-Fi in public spaces, mobile phone data plans, or computers provided through public libraries (Fernandez, Reisdorf, & Dutton, 2019; Reisdorf, Fernandez, Hampton, Shin, & Dutton, under review; Reisdorf, Hampton, Fernandez, & Dutton, 2018). Reisdorf and colleagues found that Detroit residents who have access to a broad range of access points demonstrate more varied use of the Internet, while no single mode of access was linked to the full range of capital-enhancing Internet activities. This study also found home access primarily afforded activities considered more private, such as

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finding health information and online shopping while those who use a mobile phone data plan are more likely to use social media, download or stream music, access news online and to a lesser extent shop. Internet access in public spaces was associated with an increase in seeking health and medical information, and research activities for school or work projects (Reisdorf, Fernandez, Hampton, Shin, & Dutton, under review). Our study builds on these findings to better understand the role of attitudes and the explore the impact of device choices on capital-enhancing activities such as, social networking, fact-checking, reading the news, looking for health information, shopping and looking for jobs.

Supporting Theories

Our paper examines various aspects of Internet access points, devices, attitudes, and expected outcomes in the form of different types of so-called capital-enhancing uses (Zillien & Hargittai, 2009). Attitudes are closely connected to previous models and theories on the acceptance of technologies, whereas capital-enhancing uses are based on Bourdieu's (1986) theory of capital as forms of inequality, as well as models that are translating this theory into the digital age, such as Helsper's (2012) corresponding fields model.

Capital and the Digital Age

Unequal distribution of different types of capital has been described as an expression of social inequalities in society (Bourdieu, 1986). In his capital theory, Bourdieu (1986) differentiates three different types of capital: economic, social, and cultural. Whereas economic capital can be categorized as anything that is immediately convertible into money, such as real estate, financial assets, or a high-paying job, cultural capital is institutionalized as educational qualifications (institutionalized state) but can also be embodied in the form of, for example, culture and cultivation (embodied state), or objectified, such as paintings, instruments, or rare

books (objectified state). The third form, social capital, encompasses durable relationships, or, as Bourdieu (1986) describes it: membership in a group.

Building on the theories established by Bourdieu (1986), Sen's (1999, 2004) capabilities approach, and van Dijk's (2005) work on resources, Helsper (2012) developed the "corresponding fields model of digital exclusion" that establishes an interrelation between offline and digital fields of everyday life and their associated resources. The economic, social, cultural and personal offline fields are connected inextricably to their corresponding digital fields, and vice versa, through social impact mediators and digital impact mediators respectively. For example, an increase of resources in the digital social field will have an effect on the corresponding offline social field. In a highly connected society such as the United States, these fields do not exist separately from each other.

From this perspective, the different types of online activities that someone engages in would be affected by their corresponding offline fields, or in other words, their offline capital, capabilities, and resources. Attitudes, skills, and access are all part of this framework, which affect what access points and devices someone has available and, in turn, what kinds of potentially capital-enhancing uses they engage in (Zillien & Hargittai, 2009).

For this study, we test the following model for three Detroit neighborhoods.

Figure 1: Theoretical Model
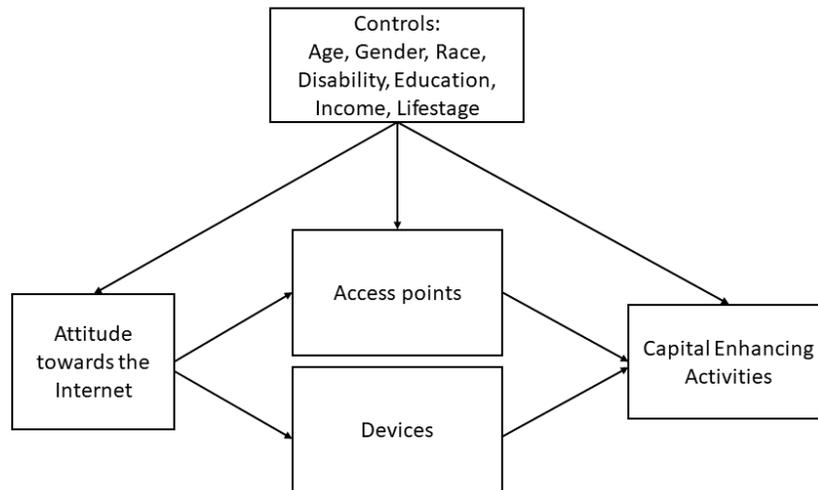
Role of Attitudes

A number of studies have shown that attitudes play an important role in Internet adoption, as well as the depth and breadth of activities that Internet users engage in (Dutton & Blank, 2014; Dutton & Reisdorf, 2019; Reisdorf & Groselj, 2017; van Deursen & van Dijk, 2015). Those who have more positive attitudes toward the Internet and technologies in general are more likely to have an Internet connection at home, whereas perceptions of problems or worries about privacy are associated with a lower likelihood of connecting in the first place, and, once online, engaging in a lower variety of online activities (Reisdorf & Groselj, 2017). This also relates back to the perceived usefulness of a technology, which is related to adoption of home Internet access (e.g., Vitalari, Venkatesh, & Gronhaug, 1985; Fairlie, 2004).

Devices

Research indicates that non-white and lower income Americans are more likely to access the Internet solely through their mobile devices (Marler, 2018). Overall, 23% of Americans who are black and 26% of those who earn less than $30,000 a year are smartphone dependent, meaning they own a smartphone but do not subscribe to broadband internet service at home. This

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is in contrast to only 10% of white residents (Pew Research Center, 2019). This reliance on smartphones also means that the less affluent are more likely to use cellphones for tasks traditionally reserved for larger screens, such as applying for jobs (Anderson & Kumar, 2019). Further, users type slower, enter less text, and create less complex documents on mobile interfaces relative to PCs (Yesilada, Harper, Chen, & Trewin, 2010), underscoring and explaining the tendency of mobile users to consume rather than produce content (Ghose & Han, 2011).

Napoli and Obar (2014) coined the term "mobile underclass" considering the range of ways in which mobile Internet access offers lower levels of functionality and content availability. Beyond screen size, there are a number of other limitations to solely using a cellphone to access the Internet. Memory, storage capacity, and connection speed are limited on mobile devices (Finamore et al., 2011, p. 345). All of these factors help explain diminished levels of user engagement, content creation and information seeking among those who are dependent on mobile Internet access.

Another important limitation of mobile dependence is articulated in Gonzales' (2016) explanation of technology maintenance. Based on interviews with low-income residents of New York City, Gonzales (2016) describes cycles of dependable instability experienced by low-income mobile phone users based on affordability of devices and services. More specifically, devices are often secondhand, shared, or government-subsidized models, subject to faulty batteries, cracked screens, and unreliable service. In terms of affordability, low-income Americans experience frequent loss service due to inability to pay their phone bill, or the loss of devices that are particularly vulnerable to damage or theft (Gonzales, 2016).

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Cellphones are not the only alternative to PC-based Internet access. Albeit to a lesser extent, Internet users may also rely on tablets (Zickuhr & Smith, 2012). For example, Xu and colleagues found that tablets mainly act as substitutes for computers and as complements to smartphones (Xu, Chan, Ghose, & Han, 2017). However, most research does not make a distinction between cellphones and tablets and instead focuses on either mobile or computer.

Mix of Devices

Previous studies suggest that mobile devices are often used to augment or supplement PC use (de Reuver, Ongena, & Bouwman, 2013). In general, people typically engaged in more activities when using a computer versus a mobile for access (Jung, 2009). Nation-wide, broadband subscriptions are on the decline, while tablet sales now exceed desktop and laptop computer sales. Yet, desktops and laptops are thought to be more conducive to news consumption than mobile devices. For example, Mossberger and colleagues found that high speed internet in the home leads to higher engagement of online news seeking (2013). Social networking, on the other hand is higher among cell users (Pearce & Rice, 2013).

While the mobile underclass is characterized by a reliance on a single device, specifically a mobile device, the term Next Gen users refers to those who accesses the Internet from multiple locations and devices. Dutton and Blank (2014) point out that such users go to the Internet first for all kinds of information and are more likely to produce content. Similarly, Horrigan (2002) found those who possess both desktop/laptop Internet and mobile Internet engage in a broader range of online activities than people who only use mobile Internet or desktop/laptop Internet. Of course, these outcomes do not happen in isolation. Van Deursen and van Dijk (2019) conclude that diversity in access to devices and the ongoing expenses required to maintain the hardware,

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software, and subscriptions affect existing inequalities related to Internet skills, uses, and outcomes.

Access Points

In addition to devices, points of access are an additional factor in how much and how broadly someone can utilize the Internet. In addition to access at work or school, which we are not investigating in this paper, other points of access include on the go through a data plan, at home through an Internet Service Provider (ISP), or in public places, such as libraries, community spaces and free public city Wi-Fi. Each of these access points affords different types of uses and advantages as well as limitations. Based on the data set used in the current study, Reisdorf and colleagues (under review) found that those with a data plan were significantly more likely to use social media, to download or stream music, to access news online, compared with those without a data plan. Those who used the Internet in public spaces were significantly more likely to use the Internet for health and medical information, to get information for school or work projects, and to look for or read online news. On the other hand, those with an ISP were significantly more likely to shop online. These findings illustrate how no single mode of access afforded participation in a full range of activities (Reisdorf, Fernandez, Hampton, Shin, & Dutton, under review).

Home Internet (ISP)

Home Internet access through an ISP has often been touted as the gold standard in policies tackling the digital divide, as this type of access allows a wide range of uses in the comfort of one's personal, private space. It has also been reported as the most desirable place to access the Internet (Dixon et al., 2014). However, home access is unequally distributed with people of color, low-income communities, as well as urban and rural communities having less

home access than those who are white, have higher incomes, and live in suburban communities (Pew Research Center, 2018). Although Detroiters reported fairly high access to the Internet at home (78%, Reisdorf et al., 2018), when asked about having an ISP contract, only 62% said they had one. This shows that a considerable number relied on less stable home access, such as accessing the Internet through a neighbor's unsecured Wi-Fi network or through a data plan (Fernandez et al., 2019).

Stable access to the Internet at home allows people to engage in private uses of the Internet that many may not feel comfortable to engage in in public places or on open networks, such as looking for information about health issues, logging into a health platform, online banking, or buying goods and services using a debit or credit card. Past studies indicate that home computer users are more likely to read online news (Pearce & Rice, 2013), particularly among disadvantaged groups who are less likely to read news and information on cellphones (van Deursen & van Dijk, 2014).

Data plan

Low-income communities have been shown to rely more heavily on mobile connections through their cellphone, leading to a more precarious type of access that can lead to outages due to data overages or lapsed data plans (Gonzales, 2016). Almost two thirds of Detroiters (65%) reported having a data plan on their mobile phone, and about one third reported that they previously had to stop their data plan at some point (Reisdorf et al., 2018). These kinds of disruptions in access can lead to serious consequences, such as missing out on employment or health benefits (Gonzales, 2016). Despite offering a greater flexibility and mobility than home access through an ISP, reliance on a data plan as the only access point also brings with it the potential throttling of services when a certain data limit is reached, which impedes the ability to

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engage in a number of different types of online activities. Therefore, and in addition to device limitations, an overreliance on data plans as the primary access point potentially limits what Internet users can and cannot do.

Public Access

Public access has been reported in previous studies as the least desirable way to access the Internet, with the exception of libraries (Dixon et al., 2014). We include libraries, community centers, free Wi-Fi in town-squares and malls, as well as stores, such as McDonalds or Starbucks, in this category of public access. Due to lack of home access, people of color and low-income communities are the most likely to rely on public access (Dailey, Bryne, Powell, Karaganis, & Chung, 2010; Rhinesmith, 2012). In Detroit, more than one third (37%) reported using public access to get online (Reisdorf et al., 2018). Although the availability of public access is a critical part of the Internet access ecosystem in low-income communities (Daily et al., 2010; Rhinesmith, 2012; Strover, 2019), it also brings with it a number of issues, such as reduced levels of privacy when compared to home access, a less secure Internet connection (Watts, 2016), and potential time limitations of the connections (Rhinesmith, 2012).

As a crucial component of access points in low-income communities, public access allows some critical uses, such as looking for information, applying for jobs, or connecting with others through email and social media. Its relative lack of privacy may hold people back from making full use of the Internet for more personal or risky types of uses, such as the ones afforded by a home connection through an ISP.

Capital-Enhancing Activities

A key question for digital divide research is whether devices and access points are put to use in ways that enhance the status of their users. This is particularly relevant to discussions of

inequality in distressed urban environments, considering cellphone use is more prevalent than computers in poor and minority communities. The "usage gap" refers to the extent that Internet users of higher socioeconomic status engage in productive activities more than disadvantaged users, thus amplifying already-existing inequalities (van Deursen & van Dijk, 2014; Zillien & Hargittai, 2009). Previous research demonstrates that higher income individuals use the Internet for "information-based" and "transaction-based" activities, while disadvantaged users tend toward social and entertainment uses (Zillien & Hargittai, 2009). Diversity or total number of activities indicates wider engagement in Internet use and thus possibly broader benefits (Helsper & Eynon, 2010, p. 507; Wei, 2012). Activity breadth is significantly higher for computer users, and those who use a mix of devices as compared to mobile phone users (Pearce & Rice, 2013). This study looks at the following capital-enhancing activities: Social networking, fact-checking, reading the news, looking for health information, shopping, and looking for jobs.

Seeking Health Information

Low-income and racial/ethnic minority populations are disproportionately affected by chronic disease, have less access to quality care, and experience worse health outcomes (Agency for Healthcare Research and Quality, 2017). While mobile Internet users generally use the Internet for social rather than instrumental activities (Marler, 2018), seeking support and health information might be one exception. Previous studies have found that 62% of smartphone owners have used their phone to look up information about a health condition (Smith, 2015). Smartphone users most frequently used the Internet as a source of health information while non–smartphone owners most frequently consulted their providers (Khoong et al., 2019).

Social Networking

Having a network of close social relationships promotes health and the ability to cope with adverse events (Hampton, Sessions, & Her, 2011). The idea is that the use of social networking sites (SNSs) benefits disadvantaged groups in particular as a potential remedy to the social isolation that results from socioeconomic marginalization. Mobile phones, therefore, offer a chance to expand social networks and break out of physical boundaries through greater Internet access, which leads to relatively more social activity on the devices (Tsetsi & Rains, 2017).

Job Seeking

Online job-seeking is thought to improve overall efficiency of the job-matching process, by increasing the number and quality of potential matches between employers and job seekers (Lindsay, 2005). However, large sectors of the population, especially young African Americans, are largely detached from the mainstream economy, "often outside of the labor market altogether" (Sugrue, 2005, p. 4; see also Katz, Stern, & Fader, 2005). Additionally, employed individuals who use the Internet to search for a new position are more likely to be successful in that endeavor than those who do not use the Internet (Council of Economic Advisers, 2016).

Online News and Fact Checking

Fact checking, searching and reading online news are associated with factors such as social status, Internet device limitations and users' skills. Studies have linked news media consumption to political knowledge (Scheufele & Nisbet, 2002), voting, particularly during election years (Mossberger, Tolbert, & McNeal, 2008), and political or civic engagement, (McLeod, 2001) and social capital (Norris, 1996). This is especially the case among those who are otherwise least exposed to news (Donner & Walton, 2013). Devices seemingly impact the extent to which people engage with news, considering that searching for and reading news is more time consuming and costly to access through mobile devices. Thus, mobile devices are

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thought to reduce exposure to current events and reduce political engagement (Campbell & Kwak, 2010; Shah, Cho, Eveland, & Kwak, 2005). However, the 2016 State of the News Media report found the top 50 news sites had higher time rates per visit for desktop than for mobile, whereas the large majority of the top 50 sites had more visitors through mobile than through desktop (Mitchell & Holcomb, 2016).

Online Shopping

Although shopping may appear, at first glance, as a luxury activity, rather than a capital-enhancing activity, being able to purchase goods and services online often allows saving money as well as time. Especially in the context of low-income communities, which are often lacking grocery stores and other important services, online shopping may allow residents to avoid long trips to the store, relying on public transport, which can be very time consuming. When looking at instances of device switching, Xu and colleagues found that propensity to shop online increases when users go from a more mobile device to a less mobile device, whereas a negative effect is found when people switch from a larger (less mobile) to a smaller (more mobile) device (Xu et al., 2017). In addition, mobile devices are not ideal for making purchases, when consumers want to reduce purchase risk and take more time to check the details of a purchase (de Haan, Kannan, Verhoef, & Wiesel, 2018).

Research Questions

We derive a number of research questions from the previous literature. Based on prior studies of digital inequalities, we ask:

RQ1: (How) Are attitudes toward the Internet and technologies related to a) what types of devices Detroiters use to go online, and b) what points of access Detroiters use to go online?

RQ2: (How) Are different types of devices and different points of access used to go online related to engagement in capital-enhancing Internet uses?

Methods

The data used in this study were gathered as part of a mixed-methods study on Internet access and use in three neighborhoods in Detroit. Whereas the original study used both telephone surveys and focus groups (Reisdorf et al., 2018), in this paper, we will only utilize survey data. In collaboration with Wayne State University's Urban Research Center Survey Research Unit, we conducted phone surveys with overall 525 residents of three Detroit neighborhoods, Cody Rouge, Milwaukee Junction, and 7/8 Mile, and Woodward, between October and December 2017. The neighborhoods were chosen as they represent some of the economic and racial disparities in Detroit. To entice participants to call in to take the survey, we sent three waves of postcards to all occupied households in these three neighborhoods. The postcards provided a brief overview of the study and a unique participation code linked to the address to ensure that participants would only call in once, and it offered participants an incentive: a $10 gift card to be used at a local store, as well as an opportunity to be included in a random drawing for one of five $100 Visa gift cards. In tandem, interviewers at the Survey Research Unit called potential participants using a list of landline phone numbers. The resulting sample consists of 525 completed interviews (92% call-in, 8% call-out).

Sample composition

A total of 525 participants passed the quality checks for surveys (e.g., largely incomplete or same answer through sections) and were included in the final analysis. Table 1 outlines control variables used to test our theoretical model (See Figure 1). Our sample represents predominately older, black, female heads-of households. Nearly 35% had children eighteen years

old or younger living in their home, and 30% were married or living in a committed relationship.

Three-quarters of the sample reported an annual household income at or below the Detroit

average income of $26,000. Nearly half (48%) had a high school degree or some college

experience (but no degree) while 18% had a two-year associates degree, and roughly one-third

had a post-secondary degree.

Table 1: Demographics*

Factor	Percentage	n
<u>Age</u>		
18-117 (mean=53)		
<u>Gender</u>		
Female	81.3%	(n=417)
Male	18.5%	(n=97)
<u>Race</u>		
Black	81.9%	(n=430)
White	7.4%	(n=39)
Mixed	2.9%	(n=15)
Native American Indian	1%	(n=4)
<u>Committed partner</u>		
No partner	68.6%	(n=360)
Partner	29.7%	(n=156)
<u>Children in household</u>		
No children	63.8%	(n=335)
Children	34.7%	(n=182)
<u>Education</u>		
Less than high school	2.5%	(n=13)
High school/ GED	21.9%	(n=115)
Some college	22.5%	(n=118)
Associate's degree	17.7%	(n=93)
4 year college degree	20.6%	(n=108)
Some post-graduate	1.5%	(n=8)
Post-graduate/		
professional degree	11.8%	(n=62)
<u>Disability</u>		
No disability	62.7%	(n=329)
Disability	36.4%	(n=191)

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Lifestage
Employed	33.1%	(n=174)
Self-employed	6.3%	(n=33)
Retired	27%	(n=27)
Unemployed	9.5%	(n=50)
Disabled	17.9%	(n=94)
Student	2.5%	(n=13)

Income
Far below	16.6%	(n=87)
Below average	30.9 %	(n=162)
Average	26.1%	(n=137)
Above average	19.2%	(n=101)
Far above average	4.4%	(n=23)

some sections do not add to our total due to preferring not to respond to a specific question.

Of these, 433 were included in this path analysis as they reported how they accessed the Internet and what devices they used. A slight majority (55%, n=237) primarily used their cellphones to access the Internet, while 7% (n= 34) used desktops, 9% (n=40) used laptops or tablets (n=38). Nearly 20% (n=84) used a mix of devices. Since the type of device used by an individual is critical to the ease of performing certain functions, the users were grouped by the devices that they used for this analysis. The constructs that captured the attitudes towards the Internet are reflective and the construct of capital building is formative, so to analyze a mixed model we used SmartPLS to do our path analysis. This method allowed us to not only do a multi-group analysis, it also is recommended for testing models that include a mix of reflective and formative constructs as it reduces misspecification and error (Lowry & Gaskin, 2014).

Results

This study looks at the role of attitudes in relation to device choices and access points. Similar to previous studies in this area (e.g., Dutton & Reisdorf, 2019), we found three patterns of attitudes anchored around (1) perceived efficiency of the Internet, (2) perceptions of the

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Internet causing problems, and (3) perceptions of the Internet as being too costly. These perceptions, we assumed, will be associated with the types of access points and devices that Detroiters use to go online, and, in turn, the types of activities that they engage in.

The constructs were analyzed using bivariate correlations to check constructs for model integrity (see Table 2). Further model analysis indicated a good fit. The Standardized Root Mean Square Residual (SRMR) was 0.044, models with a SRMR lower than .08 considered an acceptable fit (Hu & Bentler, 1999).

Table 2: Pearson's Correlations of Constructs

	Controls	Efficient	Costly	Problem	Capital Building
Controls	1				
Efficient	-.181**	1			
Costly	.106*	-.032	1		
Problem	.066	.294**	.115**	1	
Capital Building	-.422**	.330**	-.123**	-.036	1

*p <.05, **p < .-1, ***p<.001

### *Impacts of Device Type, Internet Access Point, and Capitol Building*

Among our sample of three Detroit neighborhoods, about 30% of cellphone users reported having stopped service at some point due to cost (Reisdorf et al., 2018). Almost four-fifths (79%) said they access the Internet on handheld devices, at least sometimes and nearly half (48%) said they primarily use a cellphone to access the Internet. Moreover, 10% reported that they primarily rely on cellphone to access the Internet, have no home Internet connection, and do not own another device (Fernandez et al., 2019).

All Device Types

This analysis looks at how device type and subsequent choice of how to go online impact capital-enhancing activities. Using a data plan to go online was positively related to enhancing

capital (b= 0.097, p < 0.05) but those who used public Wi-Fi were even more engaged in capital-

enhancing activities (b= 0.106, p< 0.01; see Figure 2). The complete sample yielded several

significant paths from those who saw the Internet as efficient were more likely to use a data plan

to connect to the Internet (b=0.175, p<.0.001) and the total effects for enhancing capital was

significant but not strong (b=0.017, p<.0.001). Those who saw the Internet as costly were much

less likely to have home Internet service (b= -0.138, p<.0.01).

Figure 2: All devices: Impacts of attitudes and access point on capital-enhancing activities
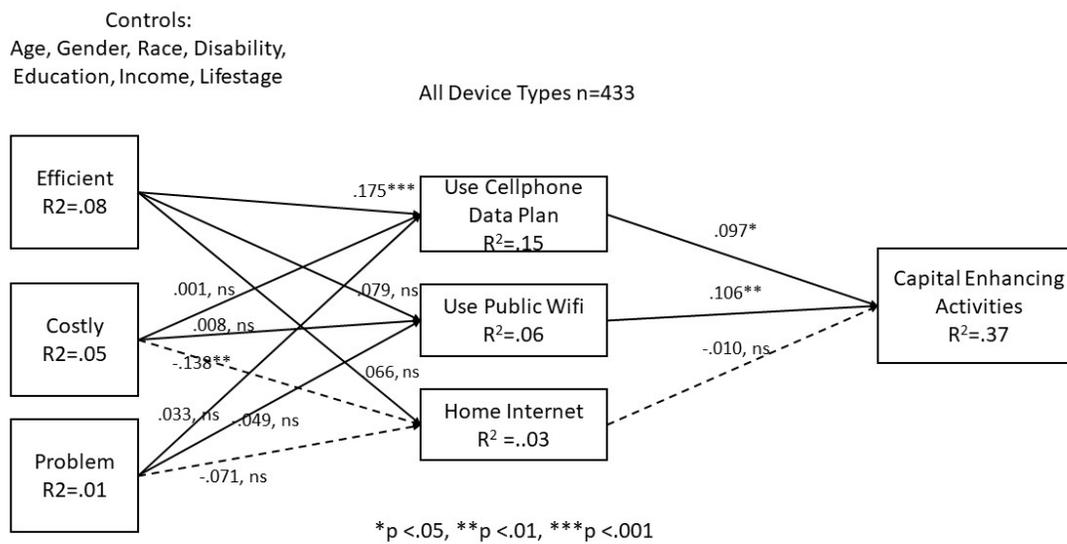
Notes: N=433. Solid lines are positive values; dashed lines are negative.

Our results suggest that attitudes play a limited role in choices for points of access across

devices. We find a significant relationship with perceived efficiency and having a data plan.

Having a data plan, in turn, is positively associated with capital-enhancing activities. However,

affordability, as captured in cost concerns remain a barrier to home Internet service.

Table 3 shows the item loadings for all devices. Items often associated with greater disadvantage

increased the impact of the controls.

Table 3: Item Loadings on the Control Construct

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Survey Item	Mean (M)	SD	T Statistics
Children in home (yes=1, n=2)	0.57	0.06	9.585***
Gender (male=1, female=2)	-0.09	0.08	1.265
Race (white=1, black=2, mixed=3)	-0.14	0.08	1.631
Highest Education in household	0.04	0.09	0.457
Comparative income (higher=higher income)	-0.12	0.10	1.295
Age	0.92	0.03	30.826***
Disabled	0.30	0.08	3.972***
Partner (no partner=1, partner=2)	-0.17	0.07	2.409**

The controls also had an impact on all of the paths (Table 4).

Table 4: Impact of Control on Model Items

	Path Value	T Statistics (|O/STDEV|)
Controls -> Costly	0.225	4.559***
Controls -> Data Plan for Cellphone	-0.309	7.262***
Controls -> Efficient	-0.277	6.453***
Controls -> Home Internet	0.105	2.076*
Controls -> Problem	0.028	0.507
Controls -> Use Public Wi-Fi	-0.226	4.723***
Controls -> Use for Enhancing Social Capital	-0.423	8.462***

Using Cellphone to Access the Internet

Building off Reisdorf and colleagues' (under review) findings that points of access impact the capital-enhancing activities individuals engage in online, we looked at the role of attitudes in terms of device choices and the impact on online capital-enhancing activities. Figure 3 illustrates the impacts of attitudes and access point on capital-enhancing activities for cellphone users.

Figure 3: Cellphone user attitudes, access points and capital-enhancing activities

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Controls:
Age, Gender, Race, Disability,
Education, Income, Lifestage

Those who primarily use cellphones to access the Internet
N=237
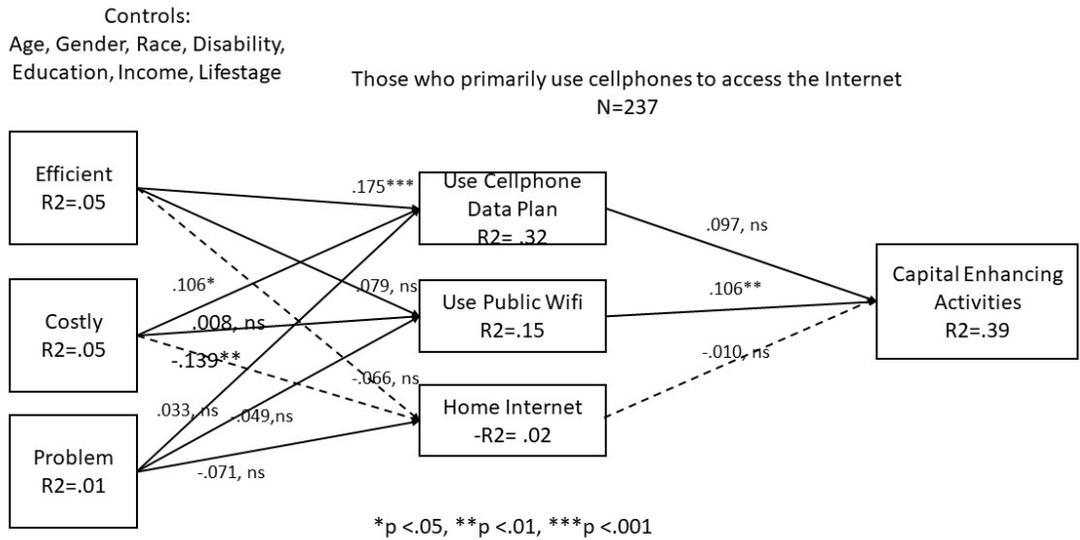
Notes: N=237. Solid lines are positive values; dashed lines are negative.

Those who used their cellphones to access the Internet primarily saw the Internet as efficient. Capital-enhancing activities were fairly limited for those who used cellphones as their primary device to access the Internet, except for those who were accessing public Wi-Fi.

Using Laptops to access the Internet

As there were only 34 participants who used primarily desktops, we were unable to conduct a multigroup analysis. The number of cases who used laptops (n=40) was sufficient for path analysis, but not for statistical significance tests. Figure 4 illustrates the impacts of attitudes and access point on capital-enhancing activities for laptop users.

Those using laptops as their primary way to access the Internet and who saw the Internet as efficient were far more likely to use public Wi-Fi or home internet (Figure 4). If their view of the Internet was that it was costly, they were less likely to use home Internet access and more likely to use public Wi-Fi. Those who saw the Internet as a problem and were using laptops were less likely to use home Internet. Cost appears to be a strong motivator for those who use laptops

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to seek out public Wi-Fi (b=0.272) and a reason that individuals didn't have home access (b= -0.182).

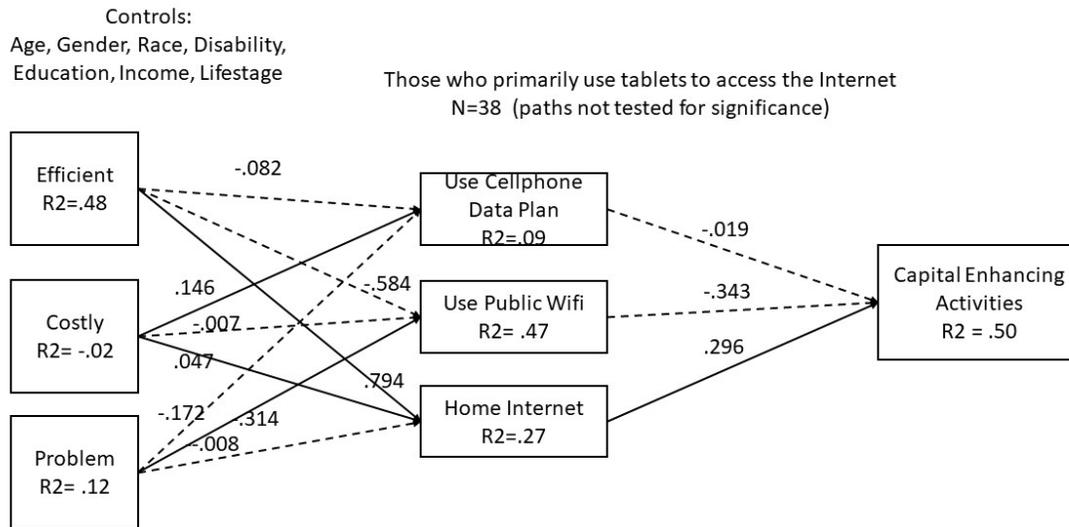Figure 4: Laptop user attitudes and access points
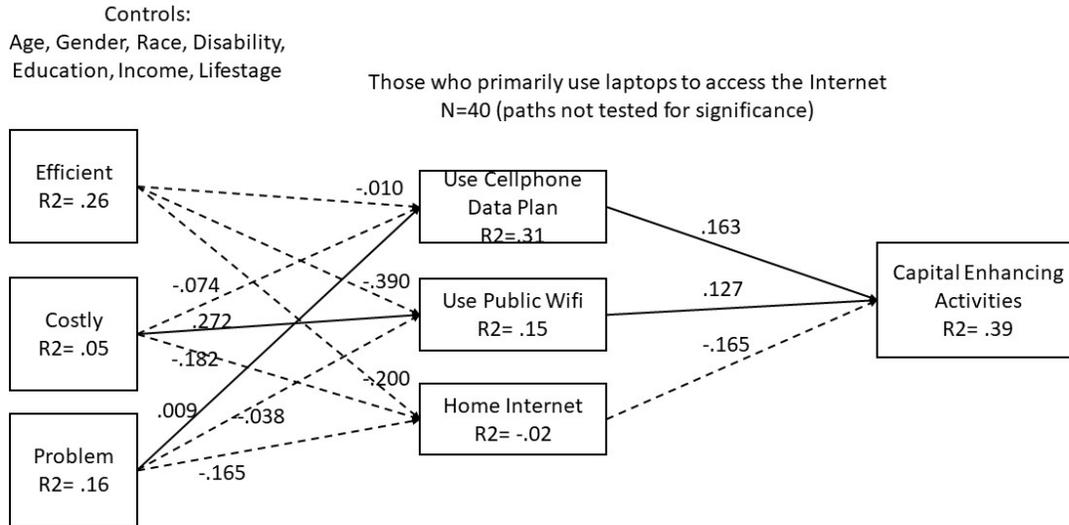
Notes: N=40. Significance testing not possible due to low N. Solid lines are positive values; dashed lines are negative.

For those using laptops, capital-enhancing activities were much higher than those using cellphones. Those logged in to hotspots through a cellphone data plan and those who used public Wi-Fi were more likely to be doing capital-enhancing activities. Compared to other devices, a laptop is harder to use for many functions even though it offers more power for computing and space for creating text and graphics. Thus, even those who use a laptop at home have a lower view of its efficiency (b= -0.200). Taking a laptop to a public Wi-Fi location would entail a lot of planning and inconvenience; therefore, it is easy to imagine why it is inversely seen as efficient for those who use public Wi-Fi (b= -0.390). Those who saw the Internet as a problem generator were also less likely to have home Internet access (b=-0.165).

Using Tablets to access the Internet

Some individuals preferred to use tablets to access the Internet. These devices have a larger area than cellphones and are easier to use than laptops. Figure 5 illustrates impacts of attitudes and access point on capital-enhancing activities for those who use tablets.

Figure 5: Tablet user attitudes and access points

Notes: N=38. Significance testing not possible due to low N. Solid lines are positive values; dashed lines are negative.

This group had the most dramatic difference for those who saw the Internet as efficient, they were far more likely to access through home Internet (b= 0.794) and less likely to use Wi-Fi (b=-0.584; Figure 5). Those who had a view that the Internet was costly were not very likely to access through a home Internet plan (b= 0.047) and more likely to use a cellphone hotspot for access (b=0.146). Those who saw the Internet as full of problems were more likely to use public Wi-Fi (b= 0.314) and less likely to use cellphone data (b= -0.172). There were also large differences in access points for capital-enhancing activities for those using tables. Those using tablets on public Wi-Fi were less likely to be doing capital-enhancing activities (b= -0.343) than those using tablets on home Internet (b=0.296).

Using Multiple devices to access the Internet

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Many individuals report that they utilize multiple devices to access the Internet with no particular preference on device type. This would require them to have access to multiple devices (e.g., laptop, desktop, tablet, and/or cellphone) and have the skills to use these devices. Figure 6 illustrates impacts of attitudes and access point on capital-enhancing activities for those who use multiple devices.

Figure 6: Multiple device user attitudes and access points
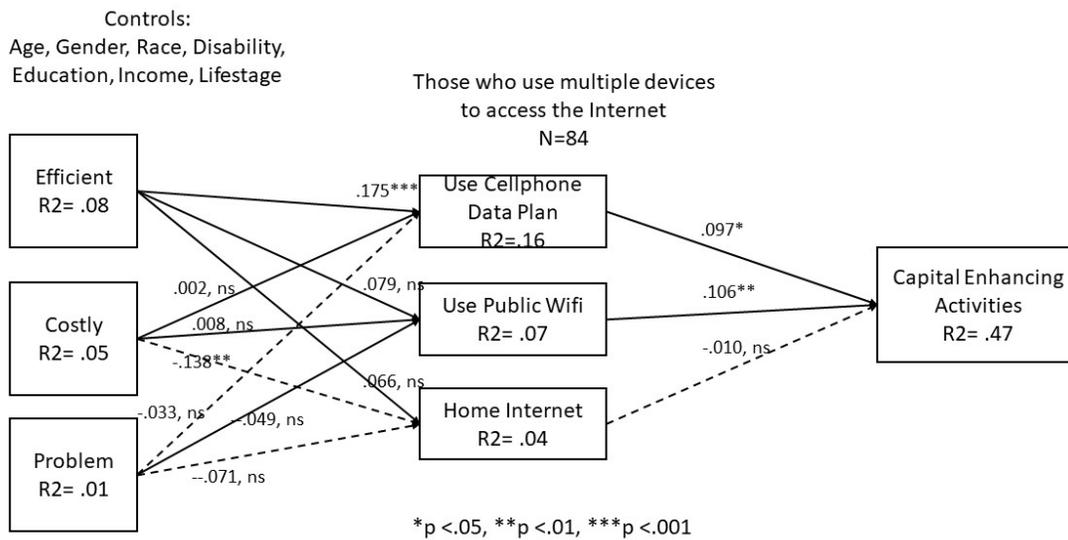
Notes: N=84. Solid lines are positive values; dashed lines are negative.

Those who viewed the Internet as efficient were much more likely to use a cellphone data plan (b= 0.175, p<.001), whereas those who saw the Internet as costly were less likely to have home Internet access (b= -0.138, p<.01). Those who sought out public Wi-Fi were the group most likely to engage capital-enhancing activities (b= 0.106, P<.01).

Our findings suggest that for those who use multiple devices and those with a cellphone, perceptions that the Internet is efficient is positively associated with having a data plan. These paths were not significant for tablet and laptop users due to sample size. Having a data plan predicted higher levels of capital-enhancing activities for those who use multiple devices. Only cellphone users who perceive the Internet as costly were more likely to have a data plan.

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Perceptions of cost were negatively and significantly related to home Internet access for cellphone users and multiple device users.

Using public Wi-Fi was positively and significantly associated with capital-enhancing activities for cellphone users, and those using multiple devices. While not significant because of sample size, there seemed to be an association for tablet users who opted to use public Wi-Fi, in particular.

Discussion

Our participants showed creative and diverse methods of accessing the Internet, often overcoming a number of challenging barriers. However, as we see from the results above, not all access is equal. The design of computing devices varies widely, as does usability for performing different tasks. Some online tasks, such as browsing through social media posts is easy to do on a mobile device, while others, such as filling out a job application, are very challenging. Tablets stood out in our study as they were frequently used for capital-enhancing activities. This was especially true among those who were older, had lower incomes, and lower education levels. This is in line with previous research, which found that older adults were more confident in performing tasks on tablets due to the larger screen area and the apps allowed for easy access to common tasks (Tsai, Shillair, Cotten, Winstead, & Yost, 2015).

Those who used cellphones for Internet access were less likely to engage in capital-enhancing activities across device types. Although there is growing use of cellphone data as a personal hot spot (Sharma, Navda, Ramjee, Padmanabhan, & Belding, 2009), our sample did not use this technology for capital-enhancing activities as frequently. This may be not only due to usability issues of the device, but also due to concerns about data caps or slower speeds if data use goes over a certain level. Prior research found that concerns over data caps caused a lot of

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uncertainty as users were concerned about running balances and not sure of how much data different processes used (Chetty, Banks, Brush, Donner, & Grinter, 2012).

Our participants often "built their own bridges" by using devices that were moderate in cost and high in usability to access the Internet in places where it was convenient and most secure. Even though most of our participants primarily used mobile phones to go online and even more used their mobile phones as a hot spot to access the Internet with other devices, this access came at a cost of fewer capital-enhancing activities.

Policy Discussion

The 2015 Mapping the Digital Divide report characterizes Internet access as a fundamental service, concluding that "Policies that aim to close the divide are pursued in recognition of the fact that the opportunities afforded by internet access should be accessible to every American, much like other universally available utilities such as water and electricity" (Council of Economic Advisers, 2015, p.9; see also Gilbert & Masucci, 2018).

Section 706 of the 1996 Telecommunications Act requires the FCC to determine whether broadband is being deployed to all Americans in a reasonable and timely fashion. In the event that such advanced telecommunications capability is not deployed quickly, the agency is required by law to take immediate action to accelerate deployment by removing barriers to infrastructure investment and by promoting competition in the telecommunications market. In 2019, current FCC Chairman Ajit Pai proposed to cap the funding going into the Universal Service Fund (USF), which is used to fund high-cost programs, at $11.42 billion. The FCC voted yes on the proposal and it is additionally backed by the GOP[1]. The proposal was criticized by the

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[1] Brodkin, 2019. "Ajit Pai works to cap FCC funding for poor people and rural areas. Ars Technica. https://arstechnica.com/tech-policy/2019/06/fcc-funding-for-poor-people-and-rural-areas-ajit-pai-says-lets-cap-that/

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Schools, Health & Libraries Broadband (SHLB) Coalition[2] as well as the Benton Foundation[3], as there is a risk of being unable to fund all of the important initiatives that are needed if a spending cap is enforced. Our study demonstrates the importance of continuing to fund home Internet access in addition to public access, as mobile-only access is still a divide that inhibits equal access to important services and capital-enhancing online activities. A spending cap for the USF may inhibit necessary digital equity initiatives, which would hinder digital inclusion efforts and leave behind those in society who are most vulnerable, such as low-income communities and communities of color.

Another area of necessary continued funding are libraries, who have been at the center of digital equity efforts for a long time. In addition to providing public access—a crucial part of the digital ecosystem in low-income communities—new programs, such as library hotspot loans could provide a potential remedy to missing home Internet connections (Strover, 2019). Strover's (2019) study of New York City library's hotspot lending program demonstrated that the majority of those who borrowed these hotspots used them at home. These hotspots created greater digital capabilities, as they helped families with children do homework, allowed job seekers to find and apply for jobs, and it allowed those who were older not having to travel to the library to get access, which saves time and money and is a big advantage for those with reduced mobility. This is another area where a USF spending cap may have unintended consequences. At the same time, costs for libraries have been increasing at the same time as expectations of patrons. There is support for libraries through the e-rate program, but a spending cap may prevent libraries across the country from rolling out hotspot programs similar to the one in NYC, due to costs. We do not

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[2] SHLB, 2019. "SHLB Disappointed Over FCC Proposal to Cap USF".
http://www.shlb.org/news/shlb/2019/06/SHLB-Disappointed-Over-FCC-Proposal-to-Cap-USF
[3] Benton Foundation, 2019. "Benton Foundation Opposed Proposal Cap Fund Close Digital Divide"
https://www.benton.org/content/benton-foundation-opposes-proposal-cap-fund-close-digital-divide

suggest focusing solely on libraries and their programs, but to address both public access and home access in tandem. As Sharon Strover (2019) put it so eloquently: "Libraries' digital inclusion possibilities hinge on the type of internet-related services – both access and assistance – they can provide, and both require resources. In this sense, library hotspots may be another manifestation of a national predilection to helpful Band-Aids that barely cover a deeper problem of equity" (p. 201).

Our study shows that using the Internet on a number of different devices and having various access points affords more capital-enhancing Internet uses than relying solely on one device or one access points. The over-reliance of low-income communities on cellphones and public access prevents full engagement with all the capital-enhancing uses that the Internet has to offer. We therefore argue that a focus on providing more affordable home access options in addition to improving public access and providing affordable device purchasing options, such as refurbished laptops (see e.g. E2D's program in Charlotte, NC), all need to be looked at in tandem.

Limitations

As any study, our research comes with a number of limitations. The focus of our study was on Detroit, one of the most disadvantaged communities in the United States. In our analyses, we relied on a sample of 525 Detroiters from three Detroit neighborhoods who were mostly older, female, and African-American. This means that we cannot generalize to all urban U.S. populations. However, our results provide an important snapshot of how residents of extreme disadvantage access and utilize the Internet in various innovative ways. Providing more affordable home access as well as continuing to improve public access will help communities who are at such extreme disadvantage as well as other communities. Our case study gives an

important account of why making devices available at lower cost and improving various types of

access is so important to reducing digital inequities.

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