

**HOW CONCENTRATED POVERTY
MATTERS FOR THE “DIGITAL DIVIDE”:**

MOTIVATION, SOCIAL NETWORKS, AND RESOURCES

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Research supported by the Northeast Ohio Research Consortium, Ohio Urban University
Program

Our thanks go to partners on the Northeast Ohio Research Consortium project from the Center for Public Administration and Public Policy at Kent State University, Center for Urban and Regional Studies at Youngstown State University, and the Center for Policy Studies at the University of Akron. We gratefully acknowledge the consortium for its support.

Prepared for delivery at the 2006 Annual Meeting of the American Political Science Association, August 30-September 3, 2006. Copyright by the American Political Science Association.

What experiences do residents of poor communities have with information technology – what are the barriers they confront and the resources that they use for participating in an increasingly information-based society? Recent national research has demonstrated that place matters for the “digital divide.” Living in a high-poverty area decreases technology access and use beyond the influence exercised by an individual’s education, age, income, race, and ethnicity (Mossberger, Tolbert and Gilbert 2006). In fact, race is no longer a significant factor in predicting technology access and use once we control for the median income or educational attainment of an area, although Latino ethnicity is still significant. Lower rates of access and use by African-Americans can be explained, therefore, by racial segregation and the greater likelihood of residence in high-poverty neighborhoods.

These findings merit a closer look, at the level of the neighborhood. While the national study yielded generalizable results on the importance of “place,” more research is needed to understand how place matters. Community poverty is a significant determinant of technology access and use for residents of low-income communities of all races. One reason may be the availability or the quality of public and nonprofit institutions that foster technology use, including schools, libraries, and community centers. But, the interaction between race and poverty that characterizes urban neighborhoods of concentrated poverty stands out in the national study, and bears further investigation at the neighborhood level as well. Are there differences between such areas of concentrated poverty and other poor communities?

This study builds on the prior national research by using a random-sample telephone survey conducted in three Northeast Ohio communities in 2005: East Cleveland, which is majority African-American and characterized by concentrated poverty throughout the city; Youngstown, which is a larger, poor, and racially-mixed city; and Shaker Heights, which is an affluent Cleveland suburb that is racially diverse. This sample allows us to explore race and other community characteristics for their influence on respondent attitudes and behavior, including residents’ perceptions and use of public institutions. By focusing on the community level, we can explore various contextual factors for each individual – including distance to the neighborhood library, and socio-economic and demographic factors within a half-mile radius of each respondent.

We find that individuals in majority African-American neighborhoods who lack Internet access at home or at work are more likely than other respondents without access to go online – at schools, at libraries, and the homes of friends or relatives. Segregated areas of concentrated poverty are different in this regard from other low-income neighborhoods. There is clear effort and motivation to go online on the part of these individuals, but the infrequent use that results may be a barrier to gaining familiarity and skill with technology. The availability of public access is therefore an institutional element that is critical in these communities. Drawing on our survey and interviews with library officials, we also present some evidence on the availability of technology and support services libraries and schools in these three communities. The educational attainment of a community has an even greater influence on technology use than the

racial composition of a neighborhood, and poor communities are clearly still at a disadvantage, despite some of the optimistic results we discover.

PRIOR RESEARCH: DIGITAL INEQUALITY, RACE, AND POVERTY OF PLACE

The term “digital divide” refers to systematic disparities in information technology access and use based on age, income, education, race, and ethnicity (U.S. Department of Commerce 2002; Norris 2001). Early research showed that urban and rural residents were disadvantaged as well, but place effects seemed to fade over time (U.S. Department of Commerce 1995; U.S. Department of Commerce 2002).¹ A number of reports using descriptive statistics have demonstrated that African-Americans and Latinos have lower rates of technology access and use than white Americans (Fox 2005; U.S. Department of Commerce 2002 and 2004), and these differences are statistically significant even when we control for income, education, and other individual-level factors (Mossberger, Tolbert, and Stansbury 2003; Fairlie 2004). African-Americans and Latinos are also statistically less likely than white respondents to report that they have the skills they need to use computers and the Internet, controlling for other factors (Mossberger, Tolbert and Stansbury 2003).

But, the effects of race and ethnicity are contradictory. At the same time that people of color are more likely to have lower rates of access and skill, they are also more likely to believe that technology is important. African-Americans, and to a lesser extent, Latinos, are even *more* likely than similarly-situated whites to express positive attitudes toward information technology. This is particularly clear for African-Americans when asked about technology’s importance for economic opportunity – to get a job, to get a raise, to start a business, etc. These differences are expressed in behavior as well as attitudes; despite lower rates of access and skill, African-Americans are also among those who are most likely to search for a job online or to take an online class, all else equal (Mossberger, Tolbert and Stansbury 2003; see also descriptive statistics from the U.S. Department of Commerce 2002). Finally, African-Americans are more likely than similarly-situated whites to report willingness to use public access for computers or the Internet, or to learn new technology skills in a variety of ways (Mossberger, Tolbert and Stansbury 2003). Research by the Pew Internet and American Life project also found that among those who are currently offline, African-Americans were likely to say that they expected to use the Internet in the future (Lenhart 2003). How, then, can these more positive attitudes be reconciled with persistently lower rates of access, use, and skill? Even as the universe of Internet users has expanded in recent years, African-Americans (Madden 2006) and Latinos (U.S. Department of Commerce 2004) continue to lag behind in access and use.

¹ More recently, studies have shown that rural residents are less likely to have broadband access because market providers have not undertaken the expense of building the necessary infrastructure in sparsely-populated areas (Horrihan and Murray 2006).

² For frequency of use at each place, respondents were given the choices “1-10 times, 11-30 times, 31-100 times, more than 100 times.”

³ Interviewing was conducted using Computer Assisted Telephone Interviewing technology, which improves the context of the interviewing process itself. In addition, by virtue of the use of computers, data is captured immediately. This facility offers the opportunity to carefully monitor all aspects of the data collection process. Since the technology itself permits evaluation of the validity of incoming input and reflects in literal format the selected responses entered by the interviewer, there is rigorous quality control and data validation immediately upon entry. Interviewers at the Center for Policy Studies are professionally trained personnel who have completed a comprehensive training program, which concludes with both a skills assessment and screening exam. A quality control system, consisting of silent monitoring protocols and dedicated monitors, ensures the collection of high quality data.

⁴ See, for example, the January 2006 report from the Pew Internet and American Life Project, “The Strength of Internet Ties” (Boase et al. 2006). The response rates for the two random-digit surveys used in the report and conducted by Princeton Survey Research Associates International were 35% and 30%.

⁵ The samples for the research were generated by a nationally-known supplier: Survey Sampling, Incorporated of Fairfield, Connecticut. Using a Random Digit Dialing protocol, the initial sampling procedures generated a representative sample of each of the areas to be sampled. In addition, further sample screening for disconnects was conducted in order to provide more accurate and efficient samples. Included in this sample were both listed and unlisted household telephone numbers. Each household was given an introduction explaining the purpose of the survey. Residents outside of the designated area were screened out of the sample. The respondent from each household was chosen at random, ensuring a representative sample of the population. The survey instrument was tested prior to the interviewing phase. The interviewing process took nearly two months, beginning June 15, 2005 and ending August 12, 2005. Most calling took place between the evening hours of 5:15 p.m. and 9:30 p.m., but some interviews took place during daytime hours to accommodate respondent schedules. Interviews lasted 8 minutes on average. Interviewing was conducted using Computer Assisted Telephone Interviewing technology, which improves monitoring and validity.

⁶ A total of 962 interviews were completed with 300 respondents in East Cleveland, 360 in Youngstown, and 302 in Shaker Heights.

⁷ Respondents were coded 1 in the mutually exclusive category, African-American, with all others coded 0 as the reference group.

Because African-Americans and Latinos are more likely than whites to live in areas of concentrated poverty, Mossberger, Tolbert and Gilbert (2006) hypothesized that racial segregation and concentrated poverty constrained the opportunities of African-Americans and Latinos who lived in such neighborhoods. Using hierarchical linear modeling to compare individual-level and community-level factors in a national random sample, they found that the median income and educational attainment of the zip code had a statistically significant effect on technology access and use. Controlling for these “place” effects, race at the individual level is no longer significant. That is, the racial dimension of the “digital divide” is an echo of the unequal opportunities available in poor neighborhoods, especially areas characterized by concentrated poverty and racial segregation. Segregation and concentrated poverty do not entirely explain differences between Latinos and other Americans. Both place effects *and* ethnicity are significant predictors of lower rates of access and skill for Latinos (Mossberger, Tolbert and Gilbert 2006). These findings are theoretically important because they contribute a spatial dimension to our understanding of the “digital divide.” Existing inequalities in poor communities— in access to education, jobs, and other resources – are being transformed into new disparities in the information age.

The cost of limited technology use and skill may be restricted mobility into well-paying jobs (Mossberger, Tolbert and Stansbury 2003; Autor, Katz and Krueger 1998; Goss and Phillips 2002). In 2003, 56 percent of American workers used computers on the job, and 75 percent of those workers used the Internet or email as well (NCES 2004a). Employees who use the Internet at work enjoy higher incomes than those who do not, even controlling for education, occupation, demographic characteristics, and type of

employer. This is true even for less-skilled workers – those who have a high school education or less. Minority employees enjoy a relatively higher wage “premium” for Internet use at work, because Internet use confers a larger percentage gain for those who have lower wages (Mossberger, Tolbert, Johns and King 2006).

Internet use also encourages inclusion in the political community. Using two-stage models, Mossberger, Tolbert and McNeal (2006, Chapter 4) found that online news consumption increases civic engagement through greater political knowledge, interest, and discussion. There is now a body of research demonstrating that Internet use or online news is associated with higher levels of voting and political participation (Bimber 2003; Tolbert and McNeal 2003; Graf and Darr 2004). Again using two-stage models, Mossberger, Tolbert and McNeal (2006, Chapter 5) discovered that chat rooms and listservs, as well as online news, all increased voting across three elections.

The Internet can also connect individuals to crucial services. Health information oriented toward consumers is now available through commercial sites such as WebMD, providers such as hospitals, HMOs, and nonprofit research organizations. Use of such sites for health-related information has grown in recent years (Fox and Fallows 2003). E-government is one of the fastest-growing uses of the web, and virtually all governments at every level have some presence online (Larsen and Rainie 2002; Norris, Fletcher and Holden 2001; West 2005). As residents of poor communities are more likely to depend upon public services and to suffer from health problems, the need to find information online may be higher still in these communities.

Those who are unable to access and use the Internet regularly and effectively bear higher information costs for political participation, government services, and health, and are further disadvantaged in the labor market. Beyond these individual costs are implications for local economic development, and the human capital available to areas to attract businesses across many industries that increasingly rely upon the use of information technology (Litan and Rivlin 2002).

THE IMPACT OF PLACE: SOCIAL NETWORKS AND ATTITUDES VS. INSTITUTIONS

Concentrated poverty, where 40 percent or more of the population live below the poverty level, is a primarily urban phenomenon and it is coupled with racial segregation. African-Americans are much more likely than other racial or ethnic groups to experience such conditions, and a number of scholars have argued that spatial concentration magnifies the disadvantages of poverty (Wilson 1987 and 1996; Quane and Rankin 1998; Massey and Denton 1993, Orfield and Lee 2005; Jargowsky 1997). While the 2000 census marked a modest reversal in the rapid growth of concentrated poverty, more than 8 million Americans continue to live in very poor urban neighborhoods such as the ones we examine in East Cleveland and parts of Youngstown (Pettit and Kingsley 2003, Jargowsky 2003). We are most interested, therefore, in further exploring the conditions in poor urban communities that might limit or enhance opportunities for learning about and using information technology.

What are the possible causes for the impact of poor communities, especially those characterized by racial segregation and concentrated poverty? Some, scholars, like Wilson (1987), contend that one consequence of the spatial and social isolation of the poor is estrangement from the larger society, reflected in dysfunctional norms and behaviors (see also Lewis 1968 on the culture of poverty). The especially positive attitudes expressed by African-Americans (and in some cases, Latinos), suggests that residents of poor communities do not have fundamentally different views of technology than other Americans, and that technology inequalities are not based on apathy. We turn, instead, to structural causes as possible explanations. The spatial concentration of poverty often produces inferior schools and neighborhood services because of resource constraints and higher needs (Massey and Denton 1993; Orfield and Lee 2005). Information technology use may be affected by the quality of public institutions such as schools and libraries, because of their role in providing instruction and support for technology use as well as access. Such areas also experience chronic unemployment and isolation from the labor market, and loss of neighborhood businesses (Holzer 1987; Kain 1968; Kasarda 1993). Diminished employment opportunities may limit technology use as well.

Unequal educational opportunities in poor communities may be an important factor in technology disparities. The Internet is a reading-intensive medium that requires the ability to search for, understand, evaluate, and apply information (Mossberger, Tolbert and Stansbury 2003; Hargittai and Shafer 2006). These skills are rooted in fundamental educational competencies such as literacy and critical thinking. There are marked disparities in resources and educational achievement between poor and affluent districts, and inequalities in resources and outcomes are often most pronounced in neighborhoods suffering from concentrated poverty (Orfield and Lee 2005; Kozol 1991; Bahl et al. 1992; Bahl 1994). While the literature on the “digital divide” has focused on physical access to technology, the greatest hurdle may be limited literacy and cognitive skills. The independent effect exercised by place may partly reflect differences in the quality of education not measured by individual educational attainment. The federal No Child Left Behind act and numerous attempts at urban school reform have highlighted lagging achievement in poor urban communities. It is also clear from national studies that at least 20 percent of American adults function at the lowest level of literacy, barely able to do more than sign their names to a form or read more than a few simple lines (Kaestle et al. 2001). The quality of schools affects current students and their prospects for going online and also adapting to changing technology in the future.

It is also important to understand whether public institutions such as schools and libraries are filling a gap by providing access and experience with technology, especially in communities where many homes lack computers or Internet connections. At first glance, poor communities now have many institutional supports for technology. The E-rate program, which was created by the passage of the Telecommunications Act of 1996, was established as a \$2.25 billion annual fund to provide discounts to schools and libraries for connections to the Internet. Eligible costs include wiring, phone lines and Internet access, but do not include computers, staff training, or support staff (McClure

and Bertot 2002; Carvin, Conte and Gilbert 2001). As a result of the E-rate program, nearly all schools in the United States have Internet access. Ninety-nine percent of the poorest schools (those with 75 percent or more of their students eligible for free or reduced-price lunches) have Internet access, and 100 percent of other schools have Internet connections (NCES 2004b). There are challenges that remain for all schools, but low-income schools in particular. Schools are faced with maintenance demands, including the replacement of aging equipment over time. Just as critical is the need to integrate information technology into the curriculum, as a way of developing student skills. A 2002 survey of 811 school districts by the National School Boards Foundation (NSBF) found that even though a majority of teachers were found to be using the web for activities such as lesson planning, relatively few integrated it into the classroom (National School Boards Foundation 2002). This limits the ability of schools to provide experience with technology and to promote information literacy online, especially in neighborhoods where students do not use the Internet at home.

Libraries have been an important point of public access for computers and the Internet, as well as potential sources for training and assistance in locating information online. Libraries also serve adults as well as children. A recent Florida State University study showed that nearly 99 percent of public libraries now feature free Internet access, and library visits have doubled over the past dozen years, primarily due to information technology services (Gates Foundation 2005; Bertot, McClure and Jaeger 2005). The authors cite “high levels of public access computing in public libraries but signs of cracks on the quality of service and the ability to sustain programs.” (Bertot, McClure and Jaeger 2005, 2). The expansion of public access is not always sufficient to meet demand, for 85 percent of libraries report that resources are insufficient for traffic at certain times of the day. Patrons in high-poverty urban areas have high levels of connectivity and bandwidth, but libraries in these areas also report that they “cannot consistently meet the demand for public access workstations” (Bertot, McClure and Jaeger 2005, 2). A five-year series of studies conducted by the University of Washington underscored the importance of libraries for maintaining access for all. Surveys revealed that thirty percent of library patrons have no other Internet access, and 37 percent of patrons in high-poverty areas had no other Internet access. About a third of library patrons use public access computers to learn or practice computer skills (Gates Foundation 2004).

THREE NORTHEAST OHIO COMMUNITIES

The three cities selected for comparison represent a socio-economic continuum. East Cleveland and Shaker Heights are both inner-ring Cleveland suburbs with a similar population size (a little under 30,000), but East Cleveland is one of the poorest municipalities in the state, and Shaker Heights is one of the wealthiest. Youngstown is more than twice as large as East Cleveland and Shaker Heights, with a population of nearly 80,000, and it is well-known as a community that has suffered because of the closure of the steel mills that formerly provided the mainstay of the area’s economy. Because Youngstown is larger, it is more economically diverse than East Cleveland, despite its economic problems. It is more racially diverse as well.

East Cleveland is a majority-African American community directly adjacent to the east side of the City of Cleveland. With a city-wide poverty rate of 32 percent, East Cleveland has many neighborhoods that fit the 40 percent threshold for concentrated poverty. Like many other communities characterized by this level of poverty, it is also highly racially segregated. The population of East Cleveland is 93.4 percent African-American, according to the 2000 census. Self-reported unemployment among survey respondents was 18.7 percent.

Youngstown also has a high poverty rate, about 25 percent city-wide. There are areas of concentrated poverty throughout the city, but there is more variation overall. The median household income of \$24,201 is about \$3,700 higher than in East Cleveland. Non-Hispanic whites comprise about 51 percent of the population and African-Americans about 44 percent. Approximately 5 percent of Youngstown residents are Latino. In Youngstown, 12.3 percent of respondents reported being unemployed.

Shaker Heights is a racially diverse city, with a population that is about 60 percent white, 34 percent African-American, and 3 percent Asian-American. But, Shaker Heights stands in stark contrast to the other two communities economically. The poverty rate is only 7 percent, and median household income is \$64,000 – more than three times the median income in East Cleveland and over 2.5 times the median income in Youngstown. This is also more than 50 percent higher than the median household income for the state of Ohio, which is about \$40,000. Unemployment is lowest in Shaker Heights, with only 5.3 percent of respondents identifying themselves as unemployed.

Because of the significance of education for technology use, it is noteworthy to compare educational attainment in the three communities. The percentage of adults age 25 and over who are high school graduates is similar for East Cleveland (69%) and Youngstown (73%). The small percentage of the population that has a bachelor's degree or more is also similar – 8.5 percent for East Cleveland and 9.7 percent for Youngstown. Shaker Heights has an almost universal rate of high school graduation (95 percent of residents), and 62 percent of the population has at least a 4-year college degree. Shaker Heights is a highly-educated community.

We have selected one smaller city that closely resembles the criteria for concentrated poverty and racial segregation, and another, larger poor city that contains many areas of concentrated poverty, but is more economically and racially varied. Cities were selected to represent two somewhat contrasting poor areas and a comparison area that is economically more affluent, but also racially diverse. By comparing very different communities that all have substantial populations of African-Americans (of at least 40 percent), we can isolate the effects of living in impoverished, racially-segregated areas of concentrated poverty from the effects of race at the individual level. We can thus explore prior findings that African-Americans in middle-class neighborhoods are at least as likely to have home access to technology as similarly-situated whites (Mossberger, Tolbert and Gilbert 2006).

First, we examine patterns of access and use across the three communities using descriptive statistics. One finding that stands out is high Internet use outside home and work in poor communities. We further analyze these results using multivariate analysis that introduces contextual as well as individual variables.

PATTERNS OF ACCESS AND USE

This section presents results from the random digit-dialed survey conducted June-August 2005 in the three selected cities. Survey methods are described in more detail at the beginning of the section on the multivariate analysis. Here, we document patterns of access and use for adults, with some revealing findings in the poorest neighborhoods.

Technology Use and Place of Use

Comparing cities, there are clear differences in information technology use. When asked “Do you ever use the Internet, for any reason?,” only 52 percent of respondents in East Cleveland and 51 percent in Youngstown answered yes, in comparison with 79 percent of the respondents in Shaker Heights. Responses for computer use were similar. This compares to national surveys conducted by the Pew Internet and American Life Project from around the same time period (summer 2005) that reported that 68 percent of Americans had ever used the Internet, at least occasionally (Fox 2005). East Cleveland and Youngstown are 18 and 17 points below the national average, while Shaker Heights is 11 percentage points higher.

Even among those who did respond that they have used the Internet, there are contrasts in the places where they use computers or go online, and these differences have implications for frequency of access and opportunities to develop skills. Only 39 percent of East Cleveland residents had Internet access at home, compared to 46 percent of Youngstown residents and 76 percent of Shaker Heights respondents (nearly double the percentage in East Cleveland). Although only 39 percent of East Cleveland residents have Internet access at home, 52 percent of them have still gone online, indicating that for at least 13 percent of these respondents home is not the primary place of use. This differs markedly from the other cities. There are only 5 percent more Youngstown residents and 3 percent more Shaker Heights residents who report being online in comparison with the percentage of residents who have Internet connections at home.

Table 1 below shows a greater tendency among East Cleveland residents to rely on public access and networks of friends and relatives. We asked respondents to name the three most frequent places where they used computers in the past month, and then asked how often they had used them in that place in the past month.²

Table 1. Place Where Respondent Uses Computers and the Internet *Most Often*

	E. Cleveland		Youngstown		Shaker Heights	
	Comp.	Int.	Comp.	Int.	Comp.	Int.
Work	22.5%	15.6%	20.7%	16.6%	36.7%	32.4%
Home	55.0%	63.0%	70.1%	71.3%	59.0%	62.6%
Library	7.0%	6.3%	2.4%	3.2%	2.2%	2.7%
*School	6.2%	3.9%	1.8%	1.3%	0.4%	--
Friends/	7.0%	8.6%	1.8%	6.4%	1.3%	1.8%

*All respondents are adults

While home is the most frequent place of use for computers and the Internet for all cities, it is interesting to note that work is the most frequent place of use for a much higher percentage of residents in affluent Shaker Heights. Libraries (or community centers), schools, and friends or relatives are the *most frequent place of use* for a higher percentage of East Cleveland residents; nearly 20 percent of East Clevelanders who use technology access both computers and the Internet most frequently outside home or work. This compares with only about 6 percent of computer users and 11 percent of Internet users in Youngstown, and 4 percent of computer users and 4.5 percent of Internet users in Shaker Heights.

A higher proportion of East Cleveland residents rely upon their social networks for technology use, as well as upon public access. Nine percent of the respondents who had used the Internet in East Cleveland said that the place where they had used it most frequently in the past month was at the homes of friends or relatives, in comparison with 6 percent in Youngstown and 2 percent in Shaker Heights. Social networks may play a more important role in technology use in low-income communities, according to our data. This is consistent with studies of “kinship,” lending, and resource-sharing in low-income communities (Stack 1974). Still, it is unlikely that personal networks alone can fulfill the need for technology use, and while public access has made important contributions, the limits of technology use in poor communities are apparent.

Because home and work are the most common places for frequent access, this means that East Cleveland residents are likely to use computers and the Internet much less regularly. Frequency of use suggests both regular access and the skill to use technology. In East Cleveland, 31 percent of Internet users went online 10 times or less in the past month in the place where they used the Internet most often. This compares to 20 percent and 15 percent of Internet users in Youngstown and Shaker Heights who went online 10 times or less in the place where they most frequently used the Internet. These individuals have less time to become familiar with the Internet and to develop skills in searching for information.

Overall, East Cleveland stands out when we compare cities. But, do the poorest neighborhoods in Youngstown look similar to East Cleveland? Is the effort to use computers and the Internet outside the home typical of neighborhoods affected by

concentrated poverty, or is it the result of some other distinctive characteristic? Table 3 below shows that respondents living in areas with poverty rates of 30% or more in Youngstown have higher rates of Internet use outside of home or work than in Youngstown as a whole. We used the criterion of 30% poverty or more, because there was little Internet use among respondents living in areas with 40% or more poverty. Although respondents in high-poverty areas in East Cleveland show somewhat higher rates of use outside home and work (23 percent) than similar neighborhoods in Youngstown (18 percent), the high-poverty neighborhoods outrank their cities in use outside home and work in both instances. This indicates what may be a more general trend, in other very poor communities. High-poverty neighborhoods in East Cleveland and Youngstown conform with the findings about poor communities in national studies (Gates Foundation 2004), where libraries often provided the sole or primary means of access.

Table 2. Where Internet is Used Most Often in Youngstown and East Cleveland, Overall and in High-Poverty Areas.

	Youngstown	East Cleveland	Youngstown 30% or more poverty	East Cleveland 30% or more poverty
Sample Size	164	128	29	89
Home	71.3%	63.3%	67.9%	58.9%
Work	16.6%	15.6%	14.3%	17.8%
Other	12.1%	21.2%	17.9%	23.3%

Because concentrated poverty has traditionally been associated with racial segregation as well, we examined the racial composition of the high-poverty areas in the study. Areas with poverty rates of 30% or more in Youngstown were 66.2 percent African-American; 93.5 percent African-American in East Cleveland; and 91.0 percent African-American in Shaker Heights. While Shaker Heights is an extraordinarily affluent community, there are some small, poor neighborhoods on the city's boundaries. High-poverty areas in our sample are predominantly African-American in all cities, although Youngstown is somewhat less so, in comparison with East Cleveland. This fits with previous findings on the interaction between race and concentrated poverty in the digital divide, and positive attitudes toward technology expressed by African-Americans. Residents of poor, predominantly African-American communities believe that information technology is important, and make efforts to use the Internet despite lacking a regular source of access.

The descriptive statistics on the neighborhoods suggest some greater generalizability to other places of concentrated poverty. Next, we turn to multivariate analysis to explore the individual and contextual factors that explain higher rates of use. Using multivariate controls, we can discover whether living in a high-poverty and predominantly African-

American neighborhood is significant for predicting Internet use in places other than home or work; or whether other factors better explain these patterns.

MULTIVARIATE ANALYSIS: WHAT DETERMINES HIGH INTERNET USE OUTSIDE HOME AND WORK?

Based on the literature, we hypothesize that contextual characteristics matter in patterns of technology use. Three primary hypotheses structure this research: 1) We expect that individuals residing in areas with enhanced socioeconomic characteristics, measured by average household income and percentage of college graduates within a half-kilometer of the respondent's residence, will use the Internet more than individuals residing in areas with resource-poor socioeconomic characteristics. 2) We also hypothesize that individuals who do not possess daily Internet access will use technology more when residing closer to a public access site. Distance to the closest public library from a respondent's home is used to measure proximity to public access. In each community in the sample, libraries are the primary and only consistent public access sites. 3) Finally, we hypothesize that individuals living in communities with a high proportion of African-Americans will use technology outside home and work more than individuals residing in more heterogeneous communities. Prior research at the zip code level (Mossberger, Tolbert and Gilbert 2006) shows that disparities among African-Americans are due to place effects of segregation and concentrated poverty rather than an individual's race alone. Yet, the descriptive data here suggest a positive impact for technology use *when we are considering those individuals who lack regular access*. Individuals who are poor and living in high-poverty areas may lack frequent access, but are making efforts to go online nonetheless.

Survey Data

These hypotheses are explored by using survey data merged with data from the 2000 census. For each respondent in the survey we recorded the location of their residence, which was then used to create contextual variables for each respondent. This environmental data is used to measure socioeconomic context and distance to public libraries.

The survey used in our analysis, the 2005 Internet Usage Poll, was conducted for the researchers by the Center for Policy Studies, a division of the Institute for Health and Social Policy at the University of Akron.³ Households in Youngstown, East Cleveland and Shaker Heights comprised the sampling frame. The cooperation rate for the survey was 28 percent, which approximates typical response rates for national telephone surveys.⁴ Federal data show that telephone service now reaches 94 percent of the population (U.S. Department of Commerce 1995), so telephone surveys are a reasonable methodology for obtaining sample data even in low-income or racially isolated communities.⁵

Because the survey targeted three cities in Northeast Ohio which are relatively dichotomous in their racial composition (white and African American), the sample included a very small proportion of any other racial and ethnic minorities. Of the

respondents,⁶ 48.5 percent were white non-Hispanic, 51 percent were African-American, .5 percent Asian-American and there are no Latinos in the sample.⁷ Thus, the 51 percent African-Americans sample population is significantly greater compared to the national average of 12.3 percent of the U.S. population in the 2000 census. Thirty-two percent of the sample had household incomes below \$18,000, allowing accurate inferences to low-income Americans as a whole. Cities were selected to represent two somewhat contrasting poor areas and a comparison area that is economically more affluent, but also racially diverse.

A binary dependent variable is analyzed to examine the hypotheses. In each model, the dependent variable is binary --“Do you use the Internet?”--coded 1 for yes, and 0 for no. We estimate a logistic linear regression with a binomial distribution for the entire sample using individual-level variables only. Next we include contextual factors that control for socioeconomic characteristics of the respondent’s community as well as distance to the closest technology public access site (or public library) in the three communities. Finally, we estimate the same logistic models with only individual, as well as individual and contextual variables using only the sub-sample of respondents who do not have access to the Internet at home or work. This sub-sample allows us to further probe the use of the Internet by individuals who do not possess readily available access to the Internet in their daily lives at work or home.

Explanatory variables measure individual-level demographic factors, as well as geographical characteristics of the respondent’s community (See Appendix Table 1 for variable descriptions). In order to best represent the context of each individual, we created a series of buffers around each respondent’s place of residence. Information that is available at the block group level – such as educational attainment, race, and income – could be calculated for each buffer. A geographic information systems package was utilized to extract and reassemble the information for each context. Because each respondent had a unique residential location, there were as many buffers as there were respondents. These buffers could be of any radius, and we developed buffers of both one kilometer and a half kilometer in radius. In the end, we decided to utilize the ½ kilometer buffers as a way to determine a respondent’s more immediate neighborhood environment. The buffered variables allow us to build models that take the effects of place into account even more accurately than census tracts or block groups.

Contextual variables may represent the character of social networks and resources in the respondent’s immediate environment. As previous research has shown that African-Americans have positive attitudes toward technology, but less access and skill, living in a predominantly African-American community could either encourage technology use because of positive attitudes, or discourage it because of more limited experience with technology within social networks (or public institutions such as schools) (Mossberger, Tolbert and Stansbury 2003; Mossberger, Tolbert and Gilbert 2006). Because the descriptive statistics presented above show that high-poverty areas and heavily African-American neighborhoods seem to be associated with high rates of technology use outside the home, we expect that predominantly African-American neighborhoods have social networks that encourage technology use. We measure racial

composition of the respondent's environment by the percent African-American population within a radius of one half kilometer of the respondent's residence. Socioeconomic context is measured by the percentage of the population with a college degree and average household income within a radius of one-half kilometer of the respondent's residence. We utilize average household income because it provides more continuous variation than poverty rates. We use educational attainment, or the percentage of college graduates within a half-kilometer radius, as a measure of the educational climate in the respondent's neighborhood. Educational attainment and income were found to be significant contextual variables at the zip code level in a previous national study (Mossberger, Tolbert and Gilbert 2006). Finally, the distance to a library is included to measure convenient use of the Internet at a public site.

Control variables measure individual-level attributes of the respondents and were included to measure income, education, race, gender, and age. These are traditional demographic variables used in prior "digital divide" research, and we expect that factors other than gender will be significant. Another variable included is whether or not there are children present in the household. Some descriptive studies have shown that households with children have higher rates of home access (Lenhart 2003). We also expect that this variable could encourage use outside the home, as parents without home access may accompany children to public access sites. Binary variables measure gender, race, and children in the household. For race, white non-Hispanics are the reference or left-out group; for gender, women are the reference group. Households with children are coded 1, and 0 otherwise. Education is measured on a five-point scale with responses ranging from 1= less than a high school degree to 5= postgraduate work. Age is recorded in years. Income is measured on a five-point scale with responses ranging from 1 =<\$18,000 to 5 = over \$72,000.

Binary logistic regression is used to explore the impact of socioeconomic characteristics on an individual's Internet use. The baseline model equation with only individual attributes is:

$$\dot{Y}(\text{Internet Usage}) = \alpha + \beta_1(\text{African American}) + \beta_2(\text{Income}) + \beta_3(\text{Education}) + \beta_4(\text{Age}) + \beta_5(\text{Male}) + \beta_6(\text{Parent}) + \varepsilon$$

Binary logistic regression is then utilized to examine the effect of individual and neighborhood contextual characteristics on an individual's Internet use. The model equation employed is:

$$\dot{Y}(\text{Internet Usage}) = \alpha + \beta_1(\text{African American}) + \beta_2(\text{Income}) + \beta_3(\text{Education}) + \beta_4(\text{Age}) + \beta_5(\text{Male}) + \beta_6(\text{Parent}) + \beta_7(\text{Percent African American}) + \beta_8(\text{Average Household Income}) + \beta_9(\text{Percent Population with a College Degree or More Education}) + \beta_{10}(\text{Distance to the Closest Library}) + \varepsilon$$

(Each model is then repeated with the sub-sample of respondents that do not have Internet access at home or work.)

Internet Use and the Full Sample: What Matters?

What factors influence technology use in any setting when we examine the sample as a whole? How do these compare to prior, national studies? Table A-2 presents the logistic regression of Internet usage that contains variables for the respondent's individual characteristics and community contextual variables for the entire sample. The first model in the left-hand column includes the variables measuring the respondent's individual characteristics as predictors for using the Internet for the entire sample (Table A-2). Consistent with previous research on digital inequality (Mossberger, Tolbert and Stansbury 2003; US Department of Commerce 2002; Lenhart 2003) we find that respondents who are more affluent, educated, young, and parents are statistically more likely to use the Internet at home than respondents who are poor, less-educated, older and childless. Also, African-Americans are statistically less likely to use the Internet than whites. Prior survey research (Mossberger, Tolbert Stansbury 2003) demonstrates African-Americans' lower rates of access and skill, despite their positive attitudes toward technology. In sum, a number of individual predictors are statistically associated with the dependent variables of home computer access and frequency of Internet use at home, and these are consistent with previous studies.

There are no clear differences between the full sample model including variables measuring respondent's individual characteristics (Table A-2, Column1) and the full sample model including both variables measuring respondent's individual characteristics and contextual community variables (Table A-2, Column 2). None of the contextual variables have a statistically significant relationship with Internet usage. This suggests, when considering all types of Internet access (at home, work, and other places), the areas in which individuals live do not significantly shape their Internet usage. This differs from prior findings at the zip code level in national studies. Perhaps one reason is the lower level of scale used in our contextual measures here. Another may be the smaller amount of variation within this high-poverty, heavily African-American sample. Like the model containing only variables measuring the respondent's individual attributes, once we control for the contextual variables – African-American percent of the population, college-educated percent of the population, and average household income within a one half-kilometer radius of the respondent's residence – we find that respondents who are affluent, educated, young, white, and parents are still statistically more likely to use the Internet at home than respondents who are poor, less-educated, older, African-American and childless. Distance to the nearest library is not significantly associated with general Internet use.

Internet Use: What Matters for Those Who Lack Regular Access?

The question driving this research is the effect of contextual characteristics on Internet use, especially for explaining use by those who lack access at home or work. In the sample from the three socio-economically different communities, respondents' Internet use was not impacted by contextual characteristics. However, if we estimate a model examining only those individuals with obstacles to Internet use, will the contextual

characteristics of their communities significantly affect their Internet use? Without readily available Internet access at home or work, individuals are forced to look to other individuals in their social networks or public institutions within their communities, such as schools and libraries, to gain access to the Internet. Therefore, contextual characteristics may play a significant role when estimating a model for this sub-sample of respondents.

In this section we repeat the binary logistic regression models, with and without the contextual community variables, using a sub-sample of the survey respondents. The sub-sample population is all of those respondents who do not have access to a computer at home or at work. Since home and work computer access leads to more frequent and convenient Internet use, this sub-sample of respondents may have different factors that influence their use of the Internet. The sub-sample of respondents without Internet access at home or work is composed of a greater proportion of African Americans. Also, the sub-sample of respondents is younger, with a lower mean education and income. We expect that both individual demographic predictors and environmental predictors will be related to Internet usage.

Table A-3 reports our two models estimating Internet usage for survey respondents who do not possess access to the Internet at home or work. Largely paralleling the findings for the overall sample, in the binary logistic regression model of the sub-sample of respondents who do not possess Internet access at home or work, those who are younger, more educated, white and parents are still significantly more likely to use the Internet. However, income is no longer a statistically significant predictor in explaining Internet usage. The sub-sample has a much smaller mean income than the full sample. Thus income may not be a significant predictor because of its lack of variance across the respondents included in the sub-sample.

There is a noticeable difference when we compare the coefficients from the full sample model with both individual and contextual variables (Table A-2, Column 2) with the sub-sample model with both individual and contextual variables (Table A-3, Column 2). Respondents with a greater proportion of African-Americans and a college-educated population within a one-half kilometer radius from the respondent's residence are statistically more likely to use the Internet than individuals living in communities with a smaller proportion of African-Americans or a smaller college-educated population. That is, when we examine only individuals who must regularly seek out Internet access in order to use the Internet, community characteristics become a statistically significant predictor of Internet usage. This may be due to the influence of social networks surrounding respondents, or because of resource differences in such communities.

Surprisingly, average household income for the buffered area surrounding respondents' residences is not statistically significant. Also, although respondents without Internet access at home or work may rely on public access sites for Internet use, the distance to library variable, which is a measure for the ease of gaining access at a public site, is not statistically significant. Respondents may pursue Internet use primarily (or more frequently) through their social networks, such as friends and family, rather than

public institutions. Education and other individual-level variables may be more important for motivating information technology use at libraries than proximity and convenience.

We consider the model in Table A-3, Column 2 to be the fully-specified model, but include the other models as a reference to the general population (full sample Table A-2) and the influence of individual characteristics (Table A-3, Column 1). This analysis suggests that, as hypothesized, community characteristics shape usage rates for those individuals who have obstacles in accessing technology (Internet at home and work), beyond individual-level factors.

How Much Does Context Matter for Technology Use?

Probability simulations are used to understand the substantive magnitude of the effect of geographic factors on Internet use, while holding other explanatory variables constant at their mean or modal values. All simulations are for the sub-sample – that is, those lacking Internet access at home or at work. The probabilities shown in Box 1 below are reported as percentages, but are based on the logistic coefficients reported in our fully-specified model (Table A-3, Column 2). The box presents simulations for a hypothetical respondent who is African-American, male, childless, with mean education, income, and age. The respondent is assumed to reside at a location with average African-American population, household income and educational attainment. The distance to the library variable is also set at the mean. Box 1 varies the percent African American and college graduates within one half-kilometer of the respondent’s residence, holding other factors constant.

Box 1: Impact of Context on Internet Use for African Americans

	Percent African American	Probability of Internet Use	Difference from the Mean	Percent College Graduates	Probability of Internet Use	Difference from the Mean
Very High (+2 SD)	100%	17.1%	+ 4.5	50.4%	32.5%	+ 19.9
High (+1 SD)	96.3%	16.6%	+ 4	33.2%	21.0%	+ 8.4
Mean	59.2%	12.6%	--	16.0%	12.6%	--
Low (-1 SD)	22.1%	8.6%	- 4	0.0%	8.2%	- 4.4
Very Low (-2 SD)	0%	8.3%	- 4.3	--	--	--

Two main findings are striking. First, the size of the African American population and the educational attainment of the community matter substantively and result in disparities in Internet use, holding individual demographic factors constant. Second, educational attainment has a larger impact on Internet use. Essentially, Box 1 shows the educational attainment of the community surrounding African Americans appears to have a greater impact in shaping Internet use. Respondents residing in areas with high levels of educational attainment (33.2 percent of the population with a college degree or more education) were 8.4 percent more likely to have use the Internet than the same respondent living an area where 16 percent of the population within a half-kilometer radius had a

college degree — a comparison of one standard deviation above the mean and the mean.

Though not as large of a disparity, we find that holding other factors constant, African-American respondents residing in areas with a small African-American population (one standard deviation below the mean) within one half-kilometer of their home are 4 percent less likely to use the Internet than the same respondent living in a residence with an average African-American population (the mean); or 8 percent less likely than respondents living in an area with a large African-American population (one standard deviation above the mean) within one half-kilometer of their residence. This suggests that positive attitudes in communities or social networks with high proportions of African-Americans are supportive of technology use and are associated with the effort that individuals without regular access make to use technology. But, better-educated communities provide an even more conducive environment, either because of social networks or the resources provided in places like Shaker Heights. These results are consistent with the powerful effect that education has in determining technology access and use in general, an effect that has been stable across a number of studies (Katz and Rice 2002; Mossberger, Tolbert and Stansbury 2003; Fairlie 2004). Overall, place factors clearly matter for respondents without Internet access at home or work.

Given use at the homes of friends and relatives, social networks are a likely explanation for these place effects. Another, perhaps not mutually exclusive explanation is that differences in institutional resources in the three communities encourage or discourage public access use, and increase with the percentage of African-Americans and/or the percentage of college graduates. The next section briefly explores the possible effects of community resources on use, and some data on children and schools.

PUBLIC ACCESS AND LIBRARIES

Respondents were asked, “Have you ever gone to a public place to use a personal computer or the Internet – for example, a library, community center, school, or other public place?” Rates of public access use were highest in Shaker Heights, where 54 percent of residents reported using computers in a public place. Close behind was East Cleveland, where 49 percent of respondents had used public access sites. Youngstown trailed behind with only 34 percent reporting having ever used a computer in a public place. Reasons for using public access technology were clearly different in the three cities. For East Clevelanders, the most common reason for using public access sites was the lack of a home computer – 24.5 percent in East Cleveland, versus 14.8 percent in Youngstown and 10.6 percent in Shaker Heights. In the other two cities, the most common reason was convenience.

Although we asked more generally about public access use in any place, libraries were overwhelmingly the most common place of public computer and Internet use. Questions about the quality of public access use can therefore be interpreted as reflecting the experiences respondents encountered in public libraries.

Table 3. Experiences with Use of Computers at Public Places

	E. Cleveland	Youngstown	Shaker Heights
Need to wait ¹	44.1%	21.3%	25.5%
Avg. wait more than half hour ²	15.6%	3.8%	4.9%
Enough time to use ³	78.6%	83.5%	91.3%
Found help ⁴	86.6%	90.8%	87.6%

Note: Question wording is as follows: ¹ Do you usually have to wait to use a personal computer or the Internet at a public place? ² On average, how long would that be . . . less than 5 minutes, between 5 and 15 minutes, between 15 minutes and a half hour, or longer? ³ When you use a personal computer or the Internet at a public place, do you usually have enough time to do what you want? ⁴ When you use a personal computer or the Internet at a public place, do you generally find you can get help when you need it?

The overall picture is positive, but with some variation. In most cases, respondents said that there was help available in all cities. They also generally felt that they had enough time using the public terminals, although respondents from East Cleveland were somewhat less likely than those in Shaker Heights to say they had enough time (79 percent in East Cleveland, 84 percent in Youngstown, and 91 percent in Shaker Heights). Overall, those respondents who use the library in Youngstown report experiences that are fairly comparable to those in Shaker Heights, although there is less frequent public access use in Youngstown than Shaker Heights.

Some stress is apparent in East Cleveland, where over 20 percent of patrons say that they did not have enough time to use the computer, and 16 percent waited more than half an hour. This suggests that public access is filling an important need in East Cleveland, but that there is some unmet demand because of the higher use and greater dependence on public access.

Interviews with librarians responsible for technology programs in the three cities suggest very different scenarios in terms of resources available to residents. East Cleveland and Shaker Heights had a similar number of computers during 2005, when the surveys were conducted: 1.6 library computers for every 1,000 residents in Shaker Heights, and 1.5 library computers for every 1,000 residents in East Cleveland. Youngstown had about half as many – 0.75 for every 1,000 residents.

In Youngstown, the library system in has eliminated scheduled training classes, in part because of downsizing, and in part because of lack of demand. In recent years, attendance at classes often dwindled to one or two participants. Library officials cite insufficient space for adding new computers, but hope that some consolidation of branches will make more space available in the future. Youngstown stands out in terms of lower public access use, and this seems to be partly because of less demand, as evidenced by the cancellation of technology classes. The supply of computers in the five

city branches may be a contributing factor as well, although only the Main branch has time limits.

In contrast, East Cleveland has had to impose time limits on users at all three branches, and usually has waiting lists for their classes on software programs and Internet use. The library system added a 30-seat computer laboratory in the main branch during July 2006, but librarians believe that demand will exceed the supply, even with this new addition. Our survey responses are from one year prior to the addition of the new computer lab.

Shaker Heights has public access computers available in both branches, plus a computer center. Time limits may be imposed during peak hours, but librarians cite waiting times of only 10-15 minutes at most. Technology classes are offered, but have shifted toward more advanced topics in recent years because of repeat clientele. Classes and the computer center draw participants from Cleveland as well as Shaker Heights.

Demand for public access and technology classes is higher in East Cleveland and Shaker Heights. The reasons for public access use are different in East Cleveland than in the other communities – lack of a computer at home rather than convenience. This reinforces the picture drawn in the earlier multivariate model – that poor African-American communities are distinctive. But, demand and resources are also high in affluent, highly-educated Shaker Heights.

SCHOOLS AND PUBLIC ACCESS FOR CHILDREN

Libraries are a critical link for children in low-income communities, but schools may have an even greater impact on future technology use. Table 2 below shows where students 18 and younger use computers and the Internet, as reported by parents. In general, this reinforces the patterns visible for adults.

Table 4. Where Children in Household Use Computers or the Internet

	E. Cleveland	Youngstown	Shaker Heights
School	82.0%	92.6%	96.2%
Home	56.8%	71.7%	88.6%
Library	69.4%	55.7%	67.6%
Friend/Relative	63.1%	72.6%	68.6%

NOTE: Question wording is, “I am going to read you a list of places where children use personal computers or the Internet . . . please indicate yes or no after each place your children use computers or the Internet: school; home; library or community center; a friend or relative’s house; a church, temple mosque, house of worship or religious organization; somewhere else.

Information technology use at home is markedly lower for children in East

Cleveland, but supplemented by somewhat higher rates of use at libraries. In all cities, the percentage of children who use technology at libraries is higher than for adults. Children in Youngstown are somewhat more likely to use computers or the Internet at the homes of friends or relatives, but are less likely to use libraries than young people in either East Cleveland or Shaker Heights. The vast majority of parents in all three communities say that their children use information technology at school, but this is somewhat lower in East Cleveland.

Although the respondents in the survey were all adults, we did ask some questions about whether they had children in school and whether they were satisfied with what their children were learning about technology in school. Overall, the vast majority of respondents said that they were satisfied. Still, there were some clear differences between the three communities in the survey. While 94 percent of respondents in Shaker Heights and 91 percent of Youngstown residents were satisfied with what their children were learning about technology, only 70 percent of East Cleveland respondents were satisfied. Although our results are far from conclusive, there is some evidence that East Cleveland Schools are not providing information technology use to the same extent as the other districts. Some Ohio teacher surveys indicate this as well, although the very low response rate for teachers in East Cleveland makes it difficult to draw comparisons (see <http://www.etech.ohio.gov/>).

CONCLUSION: RESOURCES ARE NEEDED AS WELL AS MOTIVATION

Despite greater diffusion of information technology in recent years, regular access and use are still less common in low-income communities, according to our study of three northeast Ohio cities, as well as an earlier national study. Examining patterns of access and use in more detail at the local level, including in one city characterized by widespread concentrated poverty, we find promise in the motivation of residents, alongside a continued need for technology resources.

The most striking aspect of our survey results is the extent to which residents of the poorest neighborhoods make an effort to compensate for a lack of home or work access. East Cleveland residents achieve levels of Internet connectivity (but not frequency of use) that are close to those in Youngstown, where home Internet access is higher. Thirteen percent of East Cleveland residents are Internet users without home access, while only three to five percent of Internet users in the other cities rely exclusively on access outside the home. This demonstrates motivation to use technology, and is an encouraging sign. Public access is playing an important role in providing the primary or sole connection for many, although social networks of friends and family fill this need in low-income communities to a somewhat greater extent. The poorest neighborhoods in Youngstown also show higher rates of use outside of home and work in comparison with the city as a whole, suggesting possible generalizability to other areas of concentrated poverty with high populations of African-Americans. While a program evaluation conducted by the University of Washington found that public libraries play a greater role in poor communities, this study demonstrates the importance of social

networks as well (Gates Foundation 2004). The latter is consistent with research on resource sharing and kinship in the poorest neighborhoods (Stack 1974).

To unpack these results, we conducted multivariate regression analysis that included contextual variables measured within a half-kilometer radius for each respondent, comparing Internet use in general for the full sample, and Internet use for the sub-sample that lacked access at home or at work. Results for individual-level factors were largely consistent with previous studies in both samples.

Only in the sub-sample did the contextual variables matter. The percentage of African-Americans and the percentage of college graduates in a respondent's immediate environment had a positive and statistically significant effect. Both of these indicate the supportive potential of social networks, or perhaps the influence of the attitudes and practices of others in the immediate environment. While the presence of college graduates creates a conducive environment for technology use in more affluent communities, a high percentage of African-Americans in poor communities conveys some positive effect despite barriers such as low income, low education, and lack of access that also exist in these areas. The impact of the racial composition of the area is less pronounced than the effect of neighborhood educational attainment. Race has contradictory consequences. At the individual level, African-Americans are less likely to be Internet users; but, controlling for other factors, living in areas with higher African-American populations has a somewhat positive influence on use – at least for those who lack a regular means of access. The encouraging influence of living in an African-American community makes sense when viewed in the perspective of prior research showing more positive attitudes toward technology based on race, and some evidence that African-Americans in more affluent communities have equal or even somewhat higher rates of access than similarly-situated whites (Mossberger, Tolbert and Stansbury 2003; Mossberger, Tolbert and Gilbert 2006). While we did not find exactly the same effects for place variables, compared to previous national research, some differences may be due to less variation in the sample and to the measurement of contextual factors within a smaller area.

At the local level it is possible to test the influence of factors such as distance to the closest library. This was not significant for determining Internet use either for those who lack home or work access, or for Internet use more generally. Other factors that were significant suggest capacity or interest as determinants of technology use, rather than convenience.

Despite some cause for optimism about the role of motivation for closing technology gaps, there is a need for further policy attention to the availability and quality of technology opportunities in poor communities. The problem with depending upon access in places other than home or work is that this leads to considerably less frequent use, and perhaps lower levels of skill in areas such as technical competence and information literacy. Schools can help to compensate for a lack of home access and informal training by parents, but poor schools may be less prepared to play this role, as suggested by our survey. Highly-educated communities likely encourage technology use

outside the home through resources as well as community norms and beliefs.

Real change will not be possible unless resources are available in these communities to maintain and improve public access in schools and libraries. The paradox, however, is that poor communities are often least likely to provide public support for technology use, because of the needs/resource dichotomy. In the United States, local communities are heavily dependent upon own-source revenues, and impoverished cities often lack the fiscal capacity to provide for many necessary services. In East Cleveland, for example, computers have been added to the library through donations and fundraising. But outside funds are becoming more scarce. Federal programs supporting hardware, software, and training have been eliminated. The E-rate program is limited to wiring and connectivity. Nonprofits have made contributions, from community technology centers, youth programs such as Boys and Girls Clubs, and library support from the Gates Foundation, yet the coverage of such voluntary efforts is often uneven. More needs to be done in order to capitalize on the motivation that is evident in areas of concentrated poverty.

States can play an important role in filling gaps where voluntary initiatives and local resources are not enough, for states share responsibility for education and libraries in the intergovernmental system. States can help to level the playing field, facilitating workforce skills and economic development in disadvantaged areas, and encouraging the participation of all in the benefits of the information age.

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TABLE A-1: Descriptive Statistics: Individual and Community Variables

	Mean	S.D.	Min.	Max.	Definition
<i>Individual Variables</i>					
African American	0.51	0.50	0	1	Dummy coded measure of race (0=all others, 1=African American)
Educate	3.03	1.22	1	5	Index of individual educational attainment (1=some high school or less, 2=high school graduate, 3=some college, 4=college graduate, 5=post graduate work or degree)
Income	3.56	1.69	1	5	Index of individual annual income (1=<\$18,000, 2=\$18,001-36,000, 3=\$36,001-54,000, 4=\$54,001-\$72,000, 5=over \$72,000)
Age	50	18	18	56	Measured in years
Male			0	1	Dummy coded measure of gender (0=female, 1=male)
Parent	0.34	0.47	0	1	Dummy coded measure of parenthood (0=no children, 1=has child(ren))
<i>Contextual Variables</i>					
African American Population	0.52	0.37	0.00	0.99	Percentage of population African American
College Educated Population	0.25	0.24	0.01	0.87	Percentage of population college graduate
Household Income	3.56	1.67	1	6	Average household income
Library distance (n=962)					Distance to the library

TABLE A-2: Do you use the Internet?Individual FULL SAMPLE Community

FULL SAMPLE				
Variables	β (se)	p> z	β (se)	p> z
<i>Individual Level</i>				
African American	-0.45 (0.21)	0.03	-0.50 (0.27)	0.06
Non African American	---	---	---	---
Education	0.89 (0.11)	0.00	0.83 (0.12)	0.00
Income	0.50 (0.08)	0.00	0.46 (0.09)	0.00
Age	-0.06 (0.01)	0.00	-0.06 (0.01)	0.00
Male	0.03 (0.20)	0.88	0.02 (0.21)	0.92
Female	---	---	---	---
Parent	0.82 (0.23)	0.00	0.83 (0.23)	0.00
Non-parent	---	---	---	---
<i>Community Level</i>				
African American Population			0.28 (0.38)	0.46
College Educated Population			1.33 (1.07)	0.21
Household Income			0.00 (0.00)	0.97
Library Distance			-0.12 (0.09)	0.18
Constant	0.11		0.07	
Cox & Snell R2	0.40		0.41	

Note: Binary logistic regression coefficients with standard errors in parentheses. Parameters in bold are significant at .10 or better. A dash in the place of coefficients indicates the variable's reference category. Listwise deletion of cases results in a final N of 820 selected cases.

TABLE A-3: Do you use the Internet? SUB-SAMPLE – Individuals without Internet access at home or work

SUBSAMPLE				
Variables	β (se)	p> z	β (se)	p> z
<i>Individual Level</i>				
African American	-0.55 (0.27)	0.05	-0.86 (0.35)	0.01
Non African American	---	---	---	---
Education	0.63 (0.15)	0.00	0.58 (0.15)	0.00
Income	0.06 (0.12)	0.62	0.02 (0.14)	0.87
Age	-0.06 (0.01)	0.00	-0.05 (0.01)	0.00
Male	-0.29 (0.27)	0.27	-0.29 (0.28)	0.29
Female	---	---	---	---
Parent	0.97 (0.30)	0.00	1.08 (0.31)	0.00
Non-parent	---	---	---	---
<i>Community Level</i>				
African American Population			0.86 (0.52)	0.10
College Educated Population			3.35 (1.59)	0.04
Household Income			0.00 (0.00)	0.30
Library Distance			0.00 (0.16)	0.99
Constant	0.53		0.13	
Cox & Snell R2	0.23		0.24	

Note: Binary logistic regression coefficients with standard errors in parentheses. Parameters in bold are significant at .10 or better. A dash in the place of coefficients indicates the variable's reference category. Listwise deletion of cases results in a final N of 422 selected cases.