

TOWARD WORLD-CLASS TECHNOLOGY SKILLS IN NORTHEAST OHIO COMMUNITIES

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Information technology skills are an important component of workforce development in the digital age. An increasing number of jobs require some level of proficiency in information technology, and recent research shows that on a national level, those who use computers or the Internet at work earn considerably more than their counterparts who do not – in fact, \$118 more per week on average, even taking into account differences in education, occupation, and other factors. In fact, less-educated workers, who have a high school education or less, African-Americans, and Latinos enjoy a greater proportional benefit from technology use at work (Mossberger, Tolbert and McNeal forthcoming).¹

The ability to attract high-skill, high wage jobs in the region and to level the playing field for disadvantaged workers in the area depends upon technology skills as well as education and soft skills (see Holzer 1996). The development of Northeast Ohio as a World Class region requires information technology skills as one component of the strategy for economic development. National research has shown that a “digital divide” exists despite the growth of information technology use in recent years, and that African-American, Latino, less-educated, low-income, and older Americans are less likely than others to use computers or the Internet, controlling for other factors (Mossberger, Tolbert and McNeal forthcoming). One national study also highlighted the significance of “place” for influencing technology use. Individuals who live in poor communities are significantly less likely to use computers or the Internet, or to use them as frequently. This is true regardless of an individual’s racial or ethnic background. But, once we take into account community-level poverty, African-Americans and whites are not significantly different in their technology use. In other words, racial segregation and poverty explain the role of race in the “digital divide.”² The gap between African-Americans and whites in terms of technology use is therefore a result of restricted opportunities to use technology in poor communities rather than apathy about technology. Earlier national research showed that African-Americans, and to some extent Latinos, have even more positive attitudes toward technology than similarly-situated whites. This is linked to particularly positive views about the links between technology use and economic opportunity. African-Americans are also more likely to use the Internet for job search or for taking online classes (Mossberger, Tolbert and Stansbury 2003; U.S. Department of Commerce 2002). Introducing community characteristics into the

¹ 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, according to the 2003 Current Population Survey, U.S. Bureau of the Census (see also Mossberger, Tolbert and McNeal forthcoming, chapter 2).

² See Mossberger, Tolbert and Gilbert 2006 in *Urban Affairs Review*. The authors used hierarchical linear modeling to examine the effects of both individual-level and contextual (zip code level) factors. Zip code median income and zip code educational attainment were significant for predicting home computer ownership and frequency of use, for respondents of all races. Controlling for these “place” effects, racial differences at the individual level were no longer significant (for African-Americans), but ethnicity at the individual level continued to be significant (for Latinos).

equation explains this apparent puzzle, for communities influence the resources that individuals have to act on these more positive attitudes.

Given these national findings, we investigated two communities in Northeast Ohio with high poverty rates - East Cleveland (32% of population below poverty-level) and Youngstown (25% below poverty level) - and compared them with a more affluent community – Shaker Heights. All three cities have a substantial proportion of African Americans (34% in Shaker Heights, 44% in Youngstown and 93% in East Cleveland), so we can also explore the different experiences of African-Americans in these communities. Based on this study, we offer some policy recommendations for increasing technology use in East Cleveland and Youngstown. Our results also have implications for other cities as well.

ABOUT THE STUDY

This study consisted of a random-sample telephone survey of residents in the three cities, interviews with library officials in the three cities, and interviews with school officials in Youngstown. The research team also examined data on information technology use on the school districts, available at <http://www.etech.ohio.gov>. Some of this data is summarized here, although the information on East Cleveland schools is limited.

The survey used in our analysis, the 2005 Internet Usage Poll, was conducted by the Center for Policy Studies, a division of the Institute for Health and Social Policy at the University of Akron. Households in Youngstown, East Cleveland and Shaker Heights comprised the sampling frame.³ Telephone interviews were completed with 300 respondents in East Cleveland, 360 in Youngstown, and 302 in Shaker Heights, for a total of 962 respondents. The survey included questions about information technology use in various places, including libraries and schools. Library interviews were conducted in 2005 and 2006 by researchers from Kent State University and Youngstown State University.

In this summary, we report key findings from the survey and interviews, and from our statistical analysis examining the factors that determine Internet use, for the full sample, and for respondents who do not have Internet access at home or at work.⁴ One unique aspect of our analysis is the use of “buffers” that measure the educational

³ The cooperation rate was 28 percent, which approximates typical response rates for national telephone surveys. 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 communities.

⁴In 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 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.

attainment, race, and income within a half-kilometer radius of each respondent's residence. This allows us to take into account the neighborhood or environment as possible influences on information technology access and use. We also included distance to the closest library as one of the factors in our models.⁵

SUMMARY OF FINDINGS

What experiences do residents of poor communities in Northeast Ohio have with information technology – what are the barriers they confront and the resources that they use for participating in an increasingly information-based society?

Patterns of Use in the Three Cities

- Fewer residents of East Cleveland (52%) and Youngstown (51%) ever go online, compared to Shaker Heights (79%). This compares with 68% percent of the population in a national poll conducted by the Pew Internet and American Life Project around the same time (summer 2005) (Fox 2005).
- **Surprisingly, residents of East Cleveland have lower rates of home Internet access (39%) than residents of Youngstown (46%), yet they have similar rates of Internet use. This shows effort and motivation to use information technology outside the home.** Many more East Clevelanders who have no Internet connection at home go online primarily through public access or the homes of friends and relatives, rather than at work. While home and work are the places where the Internet is used most frequently across all three communities, work plays a less important role in lower-income East Cleveland and Youngstown, and home access is particularly important for Internet use in Youngstown.

⁵ Information that is available at the block group level – such as educational attainment, race, and income – was 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 half-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, and they eliminate the need for multi-level models such as hierarchical linear models.

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/ Relatives	7.0%	8.6%	1.8%	6.4%	1.3%	1.8%

*All responses are for adults.

- These findings fit with some previous national surveys that have shown that African-Americans (and to some extent Latinos) are even more likely to have positive attitudes toward information technology than whites with similar characteristics (such as education, income, etc.). This is true even though African-Americans and Latinos are significantly less likely to have computers or Internet connections at home, to use technology as frequently, or to report that they have sufficient skills to accomplish tasks online (Mossberger, Tolbert and Stansbury 2003). The results for heavily poor and African-American East Cleveland show higher interest in using the Internet among those who lack convenient access.
- Is East Cleveland unusual in this high rate of Internet use outside home and work? Although Youngstown as a whole looks quite different from East Cleveland, when we compare high-poverty census tracts in both cities (30% poverty or more), we can see a similar pattern. About 18% of those in high-poverty areas in Youngstown and 24% in high-poverty areas in East Cleveland use the Internet most often outside home or work, compared to only 12% in Youngstown overall. This suggests that this pattern may apply to high-poverty areas more generally.
- While East Cleveland residents have made special efforts to use the Internet outside home and work, they clearly go online less frequently. In East Cleveland nearly a third (31%) of Internet users have gone online 10 times or less in the past month in the place where they use the Internet most often. This compares to 20 percent and 15 percent of Internet users in Youngstown and Shaker Heights. This may have significant impacts for skills, for infrequent users may have less time to become familiar with the Internet and to develop skills in searching for information or becoming proficient with hardware or software.

What Determines These Patterns?

The survey results point to considerable disadvantage in racially-segregated and high-poverty neighborhoods, coupled with high motivation to use the Internet. The

problem, however, is that we need further analysis to understand whether differences among respondents are based on race, education, or poverty, and whether the neighborhood itself has any impact. In a previous study using multi-level analysis (Mossberger, Tolbert and Gilbert 2006), the median income and percentage of high school graduates in a respondent's zip code influenced technology access and use, controlling for individual characteristics.

Our statistical analysis of these three Northeast Ohio cities is unique for its ability to precisely take into account the immediate environment of each of our respondents – the characteristics of the neighborhoods within a half-kilometer around the place of residence for each respondent. Additionally, we measured the distance to the nearest library for each respondent, to see whether those who live close to libraries are more likely to use public access. Among the factors we included in our analysis are race, education, income, age, gender, and parental status at the individual level, as well as percentage of African-American, percentage of college graduates, and median household income of the half-kilometer area around each respondent, and the distance to the nearest library (see appendix for the model).⁶

- 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. This may say something about the role of social networks in these areas, as well as individual attitudes that are favorable toward technology. In fact, some of the research on poor minority neighborhoods has emphasized resource sharing within “kinship” networks (Stack 1974).
- 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.
- Distance to library is not important for determining Internet use, even among those who do not have the Internet at home or work. Interest and need are apparently more important than convenience.
- Overall, however, those who are less likely to use the Internet are African-American, less-educated, poor, older, and nonparents. This fits with national patterns.

COMMUNITY INSTITUTIONS: LIBRARIES AND SCHOOLS

Libraries have been important points of public access, and the survey included questions about use of computers and the Internet at libraries and other public places.

⁶ We ran models for Internet use for the full sample (all respondents) and for only those who lacked home or work access. The full model looked much like other “digital divide” studies, and is available in the full paper. Here we summarize the results for the model for those who lack regular access, as this is the puzzle we are most interested in explaining.

- Of those who use computers or the Internet at public libraries in the three cities, 25% of East Cleveland residents do so because they have no computer at home, in contrast to 15% of Youngstown residents and 11% of Shaker Heights respondents.
- Rates of public access use were highest in Shaker Heights, where 54 percent of residents reported using public access computers. Close behind was East Cleveland, where 49 percent of respondents had used public access. Youngstown trailed behind with only 34 percent reporting public access use.
- There are clearly more strains on libraries in East Cleveland than the other two cities. Forty-four percent of East Cleveland residents reported having to wait to use public access computers, compared to only 26 percent in Shaker Heights and 21 percent in Youngstown. Almost 16% waited more than a half hour in East Cleveland, whereas less than 5% waited that long in the other two cities.
- Nearly 22 percent of patrons say that they did not have enough time to use the computer in East Cleveland, and this was about 10 percentage points higher than in the other cities.
- Interviews in the three cities also demonstrate that there are insufficient resources for the demand in East Cleveland. 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 the demand will exceed the supply, even with this new addition.
- 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. Libraries and community technology centers may need further support.
- Technology use in schools is also important for public policy, but we do not have complete information on school programs across the three cities. Some Ohio teacher surveys indicate that both Shaker Heights and Youngstown generally meet or exceed state averages on technology use in the schools, but there is not enough information on East Cleveland for comparison (see www.etechnology.org). Interviews indicated that Youngstown schools have made this issue a priority.
- Our survey of residents showed that most children use computers or the Internet in school, although this is slightly lower in East Cleveland (82% versus 93% in Youngstown and 97% in Shaker Heights). Of course, this doesn't measure the extent or quality of children's technology usage in school.

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 at the local level, 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. 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.

Place matters for those who don't have home or work access. The percentage of African-Americans and the percentage of college graduates in a respondent's immediate environment had a positive and statistically significant effect on use outside home or work. 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. The influence of educational attainment in the surrounding area is greater, however, than the racial context. Highly educated communities such as Shaker Heights are still more conducive to technology use than African-American communities such as East Cleveland. Resources are important as well as motivation. Highly-educated communities likely encourage technology use outside the home through resources as well as community norms and beliefs.

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. East Cleveland could benefit from programs that offer used or low-cost computers. Digital Vision and other groups in the Cleveland area offering community technology centers may be able to help establish such a program and to offer technical support. This can help to enrich the networks of informal learning and sharing, adding new "nodes" in the networks.
- Municipal broadband may be an option that East Cleveland should consider, especially as there is an untapped market that may be viable if monthly payments are low, or if a market vendor provides broadband free to residents in return for advertising rights online. Many larger cities are now exploring such options, but smaller cities in metropolitan areas have already gone forward (such as Aurora, Illinois outside Chicago).
- The new technology facilities for East Cleveland are clearly warranted by the demand, and the library system deserves credit for its efforts to expand access and programs to meet demand. Gates Foundation grants helped to support the

new facilities, and this demonstrates the importance of private resources from non-profits and businesses. East Cleveland should assess whether more facilities are needed.

- Partnerships with organizations such as Boys and Girls Clubs and Digital Vision Cleveland may help to provide other options in addition to library facilities.
- While resources seem largely adequate in Youngstown, the library system there may investigate whether demand is higher in poor neighborhoods.
- Schools can help to compensate for a lack of home access, but poor schools may be less prepared to play this role. Unfortunately, we were unable to say much about technology use and programs in East Cleveland City Schools, but lower rates of home access emphasize the need for the schools to help fill this gap. Youngstown seems to be making progress in this direction.
- The State of Ohio can play an important role, for the state shares responsibility for education and libraries in the intergovernmental system. It is in the interest of the state to facilitate workforce skills and economic development in disadvantaged areas, and to encourage the participation of all in the benefits of the information age.

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FULL SAMPLE

Variables	TABLE A-1: Do you use the Internet?		Community	
	Individual			
FULL SAMPLE	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-2: Do you use the Internet?
SUB-SAMPLE – Individuals without Internet access at home or work

SUBSAMPLE Variables	Individual		Community	
	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.