This study presents results from a 2002 Midwest urban random sample survey (N = 167 adults). It is proposed that attitudes toward technology have a direct impact on digital citizenry and are colored by racial and educational differences. A path model showed several key results. Desire for computer skills increased among respondents with lower levels of educational attainment. Respondents with higher levels of education were more likely to use computers at home and work. Non-Whites were more likely than Whites to agree that technological information is key to citizen empowerment and that computers should be accessible to all citizens, as well as reporting increased interest in learning computer skills. Interest in developing computer skills was positively associated with digital citizenship. Viewing technology as a source of informational power was positively related to support for digital government and to support for computer access equity.

Keywords: digital citizenship; technology; SEM
DIGITAL CITIZENSHIP AND DIMENSIONS OF ITL

Citizenship is increasingly mediated by digital communication (Hernon, 1998; Larsen & Rainie, 2002; Temin, 1997). Political parties interact with members online; interest groups use web sites and e-mail to woo the public; media organizations perpetually update the news on their information-rich sites; and government makes vital information and documents available and collects it from citizens via the World Wide Web (Fountain, 2001). Online information can provide the basis for environmental or personal health protection (Beierle & Cahill, 2000; Fox & Rainie, 2002). These and other communicative functions are all aspects of the emerging digital citizenship (Black, 1998; Davis, 1999). The rise of the “virtual” individual and cyberspace community substantively changes both the manner in which citizens can engage democracy and the prerequisites for equitable participation (Baddeley, 1997; Jordan, 1999; Moore, 1999).

Infrastructural Barriers to Access

Despite persistent evidence of stratification of information technology (IT) access, critics of the digital divide concept as a “trendy phrase” argue that market forces in due course invariably will make interfaces cheaper, more widely accessible, and easier to use (Cornfield, 2000; Crandall, 2001). In this view, marketing techniques such as the “Web-on-Wheels”—rather than public policy interventions—hold out the possibility for market-based IT diffusion that is “soulful and relevant” (“How to Bridge America’s Digital Divide,” 2000). Digital divide skeptics prefer to frame the issue as the have-nows versus the have-laters. They juxtapose the rapid roll-out of Internet capability to millions with the dispersion rates for earlier forms of telecommunications, such as radio and television (Compaine, 2001) and object to the economic redistribution of digital divide policy (Mueller, 2001). Proliferating studies of the digital divide focusing on physical access produce generally consistent results (National Telecommunications and Information Administration, 2000, 2002). The paradox of simultaneous growth in computer ownership and usage as well as the persistence of indicators of a digital divide remains, and in some cases it has been exacerbated, despite evidence of recent gains for some groups (National Telecommunications and Information Administration, 2002).

Social Barriers to Access

The Pew Internet and American Life Project (Lenhart, 2000) reported that among the half of the U.S. population lacking Internet access, a solid majority lacked even a firm interest in doing so. Also notable was the so-called gray gap, which showed the likelihood of Internet holdout status was greatest among those over the age of 65. Among the foremost reasons for ambivalence were concerns about privacy, irrelevance, cost, and perceptions of the steep learning curve required to use computers and the Internet.

Income and education are among the variables that correlate positively with levels of access to and familiarity with computers and the Internet (National Telecommunications and Information Administration, 2000, 2002; UCLA Internet Report, 2000; Wilhelm, 2000). The purchase of a home computer or computer access is largely dependent on income. Education provides knowledge and skills that set the stage for a desire for technological skills. Of individuals with a college degree, 75% have a home computer, compared to only 13% of those with a secondary education. When considering home Internet access, similar dispari-
ties are noted (70% and 12%, respectively) (National Telecommunications and Information Administration, 2002).

Race, age, language, and disabilities also are significant predictors of IT access and familiarity, even controlling for socioeconomic status (Cooper, 2000; Goslee, 1998; Novak & Hoffman, 1998). Although home computer ownership and Internet access have steadily increased for all racial and ethnic groups, Blacks and Hispanics continue to lag behind. For instance, more than half of Whites (56%) have home computers, compared to roughly one third of both Blacks (33%) and Hispanics (33%). Nearly half of Whites (46%) have Internet access at home, whereas less than a quarter of Blacks (24%) and Hispanics (24%) do (National Telecommunications and Information Administration, 2000). Home computer use and Internet access were less common among African Americans in North Carolina even after controlling for socioeconomic status (SES) (Wilson, Wallin, & Reiser, 2003).

Although Internet access steadily expands, the ability to take advantage of that increasing access hinges on information technology literacy (ITL) levels among citizens. Structural inequality is reproduced as social factors intersect with infrastructural barriers to IT access. The lack of access to and the desire to use IT among economically disadvantaged racial and ethnic minorities exacerbates their ability to function as citizens in a democratic society. Community members, particularly in certain more economically vulnerable groups, often lack basic skills and concepts required when navigating an expanding electronic interface with government. Whereas IT should make it easier for all citizens to conduct their routine business with the government, in fact, it appears to be widening the gap between the IT literate and those without basic navigational skills.

Digital inequality is further compounded as the technology changes by leaps and bounds, existing skills become antiquated, and no ready path is available to acquire new skills. A better solution is to plan to adapt to changes in the technology. This involves sufficient foundational material to enable one to acquire new skills independently after one’s formal education is complete (National Research Council, 1999, p. 2). The 1999 National Research Council (NRC) Report, Being Fluent With Information Technology, challenges researchers to look beyond a reductive skills-based notion of computer literacy. Invoking fluency in place of literacy, the report called for a higher baseline level of IT competency that creates the ability for lifelong independent learning and adaptation, and broadens the scope of cognitive development. Simple computer literacy skills, in this model, are trumped by more challenging notions of “FITness,” or fluency with information technology (National Research Council, 1999). Among the many virtues of the FITness concept are its adaptability to multiple tools and changes over time. A static definition of computer literacy is ill-suited to meet the rapid shifts in IT. Furthermore, the more dynamic notion of fluency makes individual adaptability and problem solving paramount.

Theory

Diffusion of innovations theory aptly applies to the digital divide by exploring demand-side explanations. Roger’s (1983) model of adoption explains the process by which people implement an innovation. Adoption occurs over time and through a series of stages. First, an individual must learn about a new idea before forming an attitude about it. This model posits that an attitude must be formed before behavior can follow that either supports or rejects the new technology. In Roger’s persuasion stage, an individual forms attitudes about a particular innovation. One can be persuaded to adopt an innovation if it has obvious advantages and is relevant to one’s life. One’s behavioral intention is manifested in the decision to accept or reject the new idea. Individuals put the innovation to use, and over time it becomes routinized
in everyday life (Rogers, 1983). This entire process of adoption and diffusion of innovation is influenced by social relationships and individuals’ knowledge base. Personal characteristics carry great weight in shaping one’s access to innovation and receptivity to exploring technological advances.

RESEARCH OBJECTIVES AND METHODS

Research Objectives

The ongoing public debate about disparate levels of Internet access reflects competing conceptualizations of governance and citizenship. We maintain, however, that a focus on ITL reveals a problem that is far more complicated than debates about the various pathways to universal IT access. However, less data-based information exists regarding the effectiveness of interventions that seek to identify and remove social barriers to equity in citizenship in a comprehensive and systematic manner. We find sufficient evidence to argue that improving ITL “is not simply a matter of running wire and providing public computers—it is also a matter of ensuring that people have the requisite skills to use the technology and that they see the relevance of technology in their lives” (Organization for Economic Co-operation and Development Secretariat, 2000; also see Seiden, 2000). Nonetheless, we are somewhat more skeptical than the NRC authors that the full array of capabilities, concepts, and skills can be made universal. At the very least, there are intermediate steps, specifically more universal ITL, that we feel are prerequisites to embarking on a program of FITness for all. We agree with the NRC report that implementation needs will vary across population groups (National Research Council, 1999).

The aim of this study is to elucidate attitudinal measures that will lessen the digital divide, particularly among a lower SES, racially diverse urban population. Educationally and racially disenfranchised citizens may face unique challenges that influence their desire to become fluent with information technology. The authors contend that becoming a digital citizen is a process influenced by technological attitudes that may have the effect of widening the digital gap; in turn, racial and educational differences may have independent effects. Researchers seek to identify the attitudinal elements that influence ITL and are most likely to foster digital citizenship. FITness that promotes awareness of the links between citizenship and ITL is precisely what this research aims to deliver.

Sample

This research is based on a 2002 random sample survey of adult (age 18 and above) respondents ($N = 167$ completed surveys) in a moderate-size Midwestern city. The sample was compiled from the county assessor’s database of land parcels. Women and men were equally represented. Racial and ethnic origins were self-reported—approximately two thirds were White (63%); nearly one quarter were Black (24%); and 13% were of other racial/ethnic origins, including Asian (4%), Hispanic (4%), American Indian/Alaskan Native (2%), or multiethnic (3%). The age breakdown was as follows: 18 to 30 years (7%); 31 to 50 years (48%); 51 to 70 years (37%); and 70-plus years (8%). Of respondents, 3% reported not completing high school, and 17% had achieved a high school degree, 10% some job training following high school, and 17% had achieved a high school degree, 10% some job training following high school, 33% had 1 to 2 years of college education, and 37% a 4-year degree or some work toward a graduate degree. Of respondents, 81% owned an apartment or house, 13% rented, and 6% reported shared living or other residential arrangements.
In comparison, of the overall U.S. population, the Pew Internet and American Life Project reported that 52% were women (48% males). Three quarters were White, and roughly 20% were Black (11%) or Hispanic (10%). By age, 23% of the U.S. population were between 18 and 29 years; 42% were 30 to 49 years, 20% were 50 to 64 years, and 15% were 65-plus years. Of the U.S. adult population, 14% have not graduated from high school, 35% have graduated from high school, 25% have taken some college coursework, and 26% have acquired undergraduate or graduate school degrees (Lenhart et al., 2003).

The treatment group consisted of 66 respondents, who were randomly selected from a low-income urban population. They received a mail questionnaire in addition to a brochure inviting them to attend free computer classes. The remaining responding participants (101) were members of a randomly selected control group. The response rate was low for both the treatment and control groups (3% and 6%, respectively). Participants in an ITL treatment group had significantly more frequent responses at both extremes of software use and had a significantly greater response rate at the low skill level for distance education, with the control group having more access to or making greater use of word processing, e-mail, computers, printers, CD-ROMs, DVDs, scanners, experience using the Internet, and use of a computer at work or school.

**Measures**

The following variables were employed in statistical analysis. Education is treated as a continuous variable. Response categories range from 1 (noncompletion of high school), 2 (high school diploma), 3 (trade school), 4 (1-2 years of college), 5 (undergraduate degree), and 6 (graduate or professional degree). The mean value is 4.03; higher values reflect increased levels of education. Race is a dichotomous variable, with response categories 0 (White) and 1 (non-White). Non-Whites compose 37% of the sample.

Principal components factor extraction with varimax rotation, using Kaiser normalization, was performed with SPSS on the 10 items measuring attitudes toward technology. Three factor scales were extracted: Desire for Computer Skills, Technological Information.
Power, and Computer Use (see Table 1). Desire for Computer Skills is a scale composed of four items. Assessing interest in learning basic computer skills, e-mail, and the Internet have the most robust factor loadings (ranging from .88 to .91) and the computer training item has the lowest factor loading (.69). Individual item response categories range from 1 (strongly disagree) to 4 (strongly agree). Higher values of the scale indicate a stronger interest in obtaining computer skills and instruction. Technological Information Power is a scale consisting of 4 items. Computers as valuable tools has the largest factor loading (.79). Technology should connect people to government (.64), people who lack access to technology are less informed (.67), and technology should be used more efficiently (.69) have moderate factor loadings. Individual item response categories range from 1 (strongly disagree) to 4 (strongly agree). Higher values of the scale indicate a desire to increase IT power. The Computer Use scale consists of two items—computer use at home (.87) and at work (.89)—both with robust factor loadings. Individual item response categories range from 1 (strongly disagree) to 4 (strongly agree). Higher values of the scale indicate that respondents make greater use of computers.

Two factor scales were extracted from the seven digital government items (see Table 2). Digital Government is a scale constructed of five items. The largest factor loadings are for the Internet provides reliable political information (.81), computers solve unequal participation in the government (.79), and elections should be held on the Internet (.72). Most people use computers effectively (.66), and citizens should use the Internet to impact government (.47) have the lowest loadings. Individual response categories range from 1 (strongly disagree) to 4 (strongly agree). Higher scale values reflect higher levels of support for digital government. Computer Access Equity is a scale constructed of two items. Everyone should have computer and Internet access has a less robust loading (.78) than computers and software should be provided to all citizens (.86). Individual response categories range from 1 (strongly disagree) to 4 (strongly agree). Higher scale values indicate increasing support for computer access for all citizens. Unless otherwise indicated, all factor scores were obtained by principal components extraction and varimax rotation, with the Anderson-Rubin method (Anderson & Rubin, 1956) used to save the resulting factors as uncorrelated standard normal composite variables with mean zero and standard deviation one, and missing values replaced by mean substitution. For the Digital Government scale, the square root transformation was used to induce normality.
RESULTS

Correlations

Intercorrelations among the variables examined in this study, together with descriptive statistics, are presented in Table 3. The pattern of correlations suggests that the exogenous (independent) variables were relevant predictors of the outcomes measured in this study. In regard to the exogenous variables, non-Whites had less education than their White counterparts (r = -.31). Education declined as the desire for computer skills increased (r = .35). As education declined, so did positive attitudes toward technological sources of information (r = -.17). Computer use was positively related to education (r = .32). Education had a negative relationship with digital government and computer access equity (both r = -.18). Non-Whites were more likely to report a desire for computer skills (r = .25) and to view technological information as a source of power (r = .16). Non-Whites reported more positive attitudes toward digital government and computer access equity than did Whites (r = .21, r = .22, respectively). Desire for computer skills was positively related to digital government and computer access equity (r = .19, r = .16, respectively). Interest in computer skills exhibited strong relationships with digital government (r = .35) and computer access equity (r = .35).

Structural Equation Model

A structural equation model (estimated with LISREL 8.30 statistical software, using the maximum likelihood procedure) with observed variables (path model) fit the data well (see Figure 1). The chi-square lack-of-fit test was nonsignificant ($\chi^2 = 12.61$, df = 11, $p = .35$). The goodness of fit index (GFI) was .98, and the adjusted goodness of fit index (AGFI) was .94, whereas the normed fit index (NFI) was .90; in all cases, values closer to 1.00 indicate a better fit of the model to the data. Errors in the model were not correlated. There were nine cases per parameter. Consequently, the estimates meet the usual criteria for being stable and reliable (Bollen, 1989). Several one-tailed significant results ($p < .05$) were found. (One-tailed results are employed because of the exploratory nature of this analysis and to maximize the opportunity to discover meaningful indirect effects.) Direct effects are displayed in

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Race (1 = non-White)</td>
<td>-0.31**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Desire for computer skills (factor score)</td>
<td>-0.35**</td>
<td>0.25**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Technological information power (factor score)</td>
<td>-0.17*</td>
<td>0.16*</td>
<td>0.01</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Computer use (factor score)</td>
<td>0.32**</td>
<td>-0.11</td>
<td>-0.03</td>
<td>-0.01</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Digital government (factor score)</td>
<td>-0.18*</td>
<td>0.21*</td>
<td>0.19*</td>
<td>0.35**</td>
<td>0.02</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Computer access equity (factor score)</td>
<td>-0.18*</td>
<td>0.22**</td>
<td>0.16*</td>
<td>0.35**</td>
<td>0.01</td>
<td>-0.01</td>
<td>—</td>
</tr>
<tr>
<td>Mean</td>
<td>4.04</td>
<td>0.37</td>
<td>-0.00</td>
<td>-0.00</td>
<td>0.00</td>
<td>1.71</td>
<td>-0.00</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>1.43</td>
<td>0.48</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.29</td>
<td>1.00</td>
</tr>
</tbody>
</table>

NOTE: N = 153.
*p < .05. **p < .01.
Figure 1 by arrows that go directly from a predictor variable on the left to a dependent variable to its right, without passing through any other variable in between. In contrast, indirect effects are relationships between a left-side predictor variable and a right-side dependent variable that are mediated by passing through one or more variables in between. Cross-multiplying the regression coefficients for any combination of paths that connects a predictor variable on the left with a dependent variable on the right, and then summing these results, determines the magnitude of indirect effects. The total effect of a predictor variable on a dependent variable is the sum of its direct and indirect effects.

There are statistically significant direct effects from education and race to the dimensions of attitudes toward technology. As education declined, the desire for computer skills increased ($\beta = -.30$). Individuals with higher levels of education were more likely to use computers at home and work ($\beta = .33$). Non-Whites were more likely to report that technological information was key to citizens’ empowerment ($\beta = .17$). Blacks had greater interest in learning computer skills ($\beta = .15$). Race also had a direct effect on one of the governmental role factors. Nonwhites were more likely to indicate that computers should be accessible to all citizens ($\beta = .18$). Direct effects also were found between the attitudes toward technology factors on the perceptions of government’s role regarding ITL factors. Interest in developing computer skills was positively associated with digital citizenship ($\beta = .21$). Viewing technology as a source of informational power was positively related to digital government ($\beta = .35$) and computer access equity ($\beta = .32$).

The path model displayed in Figure 1 demonstrates how some predictors may have an intervening effect on the outcome measure, but these indirect effects are marginal. Total effects are decomposed into direct and indirect effects in Table 4. A statistically significant indirect effect was found between race and computer access equity through technological information power. These results indicate that the direct effect of race on computer access equity accounts for 78% of the total effect (.18). The indirect path from race through technological information power to computer access equity (.05) accounts for the remainder.
**TABLE 4**

Decomposition of Total Effects for Reduced Model

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Dependent Variable</th>
<th>Total Effect</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Standard Error</th>
<th>t Statistic</th>
<th>Direct Effect as % of Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Desire computer skills</td>
<td>-.30</td>
<td>-.30</td>
<td>.00</td>
<td>.06</td>
<td>-3.80**</td>
<td>100.0</td>
</tr>
<tr>
<td>Race</td>
<td>Desire computer skills</td>
<td>.15</td>
<td>.15</td>
<td>.00</td>
<td>.17</td>
<td>1.92*</td>
<td>100.0</td>
</tr>
<tr>
<td>Race</td>
<td>Technological information power</td>
<td>.17</td>
<td>.17</td>
<td>.00</td>
<td>.17</td>
<td>2.10*</td>
<td>100.0</td>
</tr>
<tr>
<td>Education</td>
<td>Computer use</td>
<td>.33</td>
<td>.33</td>
<td>.00</td>
<td>.05</td>
<td>4.30**</td>
<td>100.0</td>
</tr>
<tr>
<td>Education</td>
<td>Digital government</td>
<td>-.06</td>
<td>.00</td>
<td>-.06</td>
<td>.01</td>
<td>-2.32**</td>
<td>0.0</td>
</tr>
<tr>
<td>Race</td>
<td>Digital government</td>
<td>.09</td>
<td>.00</td>
<td>.09</td>
<td>.02</td>
<td>2.49**</td>
<td>0.0</td>
</tr>
<tr>
<td>Desire computer skills</td>
<td>Digital government</td>
<td>.21</td>
<td>.21</td>
<td>.00</td>
<td>.02</td>
<td>2.93**</td>
<td>100.0</td>
</tr>
<tr>
<td>Technological information power</td>
<td>Digital government</td>
<td>.35</td>
<td>.35</td>
<td>.00</td>
<td>.02</td>
<td>4.68**</td>
<td>100.0</td>
</tr>
<tr>
<td>Technological information power</td>
<td>Computer access equity</td>
<td>.32</td>
<td>.32</td>
<td>.00</td>
<td>.08</td>
<td>4.27**</td>
<td>100.0</td>
</tr>
<tr>
<td>Race</td>
<td>Computer access equity</td>
<td>.23</td>
<td>.18</td>
<td>.05</td>
<td>.15</td>
<td>2.38**</td>
<td>78.3</td>
</tr>
</tbody>
</table>

NOTE: Total effect = direct effect + indirect effect.
*significant at $p \leq .05$ (i.e., $t$ value $\geq 1.65$). **significant at $p \leq .01$ (i.e., $t$ value $\geq 2.33$).
Education and race also had indirect effects on digital government. A greater level of educational attainment decreased support for digital government through desire for computer skills (–.01). The effect of race on digital government was mediated by desire for computer skills, but more so through technological information power (.09). Information supplementing the results in Figure 1 is provided in Table 5, assessing the strength of the model results using a wide array of fit indices.


Education and race also had indirect effects on digital government. A greater level of educational attainment decreased support for digital government through desire for computer skills (–.01). The effect of race on digital government was mediated by desire for computer skills, but more so through technological information power (.09). Information supplementing the results in Figure 1 is provided in Table 5, assessing the strength of the model results using a wide array of fit indices.

The values of the root mean square error of approximation (RMSEA = .02), normed fit index (NFI = .90) (Bentler-Bonett, 1980), Akaike information criterion (AIC = 46.2) (Akaike, 1987), and other indicators confirm that the reduced model accurately reproduces the relationships among the variables contained in the model. Figure 2 demonstrates that the model residuals are well behaved; that is, the predictive validity of the model is reasonably consistent across all predictor variables.

DISCUSSION

The results of this research provide some unique insights into attitudes toward technology and the role of government. These findings are indicative of a digital divide. Although Internet access is expanding, citizens must have a baseline of ITL to take advantage of it. IT permits some citizens to conduct their routine business with the government more easily; by and large, it appears to be widening the gap between the IT literate and those without basic navigational skills. As this gap widens, non-Whites are significantly more likely to believe IT is a valuable source of power, which translates into a somewhat greater belief in computer access equity. On balance, non-Whites report significantly more desire than do Whites for equal access to computers and the Internet. Positive attitudes toward technology, an intervening variable, correlates with respondents being more likely to report a need to provide computers to the public and an acknowledgement of the changing face of government; race also has some influence on digital government.

This study also makes clear that there is a direct linkage between a desire for computer proficiency and digital citizenship, whereas education exerted only a minor influence on this outcome. These findings suggest that there is a need for innovative IT research and education to eliminate new and existing social divisions. Potentially, service-learning is a well-suited intervention to bridge the divide between disenfranchised groups and digital citizenry; quasi-experimental assessments of the effects of service learning interventions on ITL are underway.

A limitation of the present study is that its results are based on a survey conducted in a Midwestern city and therefore may not generalize to other regions of the United States nor to

### Table 5

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$\Delta \chi^2$</th>
<th>$\Delta$df</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMSEA</th>
<th>NFI</th>
<th>NNFI</th>
<th>RFI</th>
<th>AIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>12.61</td>
<td>11</td>
<td>.32</td>
<td>115.51</td>
<td>10</td>
<td>.98</td>
<td>.94</td>
<td>.027</td>
<td>.90</td>
<td>.97</td>
<td>.81</td>
<td>46.2</td>
</tr>
</tbody>
</table>

Figure 2: Standardized Residuals

NOTE: Range = –1.62, 2.03.
rural or suburban populations. It is very likely that the resulting sampling frame may have oversampled a higher SES population than intended. With existing databases built from utility customers or homeowners, it is difficult to sample a lower income, digitally disenfranchised population. Targeting the survey to renters, homeless persons, or those with episodic residences is difficult at best. The data are cross-sectional and do not provide evidence of longer term trends. Although the model may fit well and be theoretically defensible, it does not imply causality. However, this study has explored some key considerations regarding how the digital divide may be reduced and greater technological equity established. These findings have established a functional baseline for explicating the patterns of interrelationships among behavioral, attitudinal, and demographic variables that can be applied to subsequent studies of the digital divide and promise to inform both contemporary and future policy perspectives on this critical aspect of rapidly evolving societal structures and power relations.

REFERENCES


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