Exploring the Divide in the Digital Divide: The Effect of Race/Ethnicity on Computer Ownership in United States, 1984 – 2003

by

Salvador Rivas
University of Wisconsin, Madison

The Research Problem

As early as 1985, researchers were seeing the signs of a forthcoming technological gap between various segments of the U.S. population (McPhail 1985; Nelson 1985; Watkins and Brimm 1985). A subsequent review of the literature by Mary Sutton (1991) documented a widening technological gap. The National Telecommunications and Information Administration (NTIA) has documented the existence and persistence of this technological gap – the *digital divide* – from the October 1984 Current Population Survey (CPS) supplement to the most recent in October 2003 (NTIA 1999; 2001; 2000; 2002, 2004). The NTIA reports document the relationship of race/ethnicity, education, income, metropolitan status, and other demographic indicators with the likelihood of owning a computer and using the Internet.

Studies that describe the existence and dimensions of the digital divide call attention to the potential negative consequences of not having access to a computer and not being online. Missing from these studies, however, is an investigation of how factors related to computer ownership co-vary with one another and how these relationships have changed across time. Most glaring, however, is the lack of a better understanding of how and why race/ethnicity matters in relation to computer ownership at the household-level. The present study aims to fill these gaps. Moreover, it is motivated by the following research questions:

Why and to what extent are Latino and Black households less likely to own computers than White and Asian households?
    a. To what extent do the associated factors help explain the racial differences in computer ownership?
    b. To what extent does immigrant status help explain the observed differences?
    c. To what extent have the effects of race/ethnicity changed across time, and to what extent are such changes explained by the associated factors?

Rationale of Study

Having a computer in the home is likely to benefit most, if not all, of the household members. Among adults, a computer at home provides an opportunity to develop skills that can improve employability (Noble 1984), especially for older adults who completed their schooling before computers were incorporated into the school curriculum. In the case of children, previous research suggests that the presence of a computer in the home affects how likely they are to use

computers at school and what their attitudes will be towards computers in the future (Chambers and Clarke 1987).

This notion of an accumulative computing effect is corroborated by Edward McQuarrie (1985), who suggests that commitment to future computing is often a result of the value placed on computing and the momentum that accumulates from previous computing behavior. As noted by Douglas Noble (1984) and more recently Alan Krueger (2000), computer access and thus computer literacy are important not because being knowledgeable about computers necessarily leads to higher wages, but because computer literacy has become another qualification by which employers assess employability. Thus, in an effort to be truly an "information society," one that includes *all* of society and not just certain groups, it is important to understand why these observed disparities exist.

In addition, by understanding better the relationship between race/ethnicity and computer ownership, this study hopes to help public policy efforts be more effective in solving this contemporary issue. Billions of dollars are being spent to "solve" the digital divide through federally managed programs. In particular, the E-Rate program provides significant discounts on telecommunications technologies to schools and libraries (Carvin, Conte, and Gilbert 2001). Since its inception in 1993, the program has invested over $1.7 billion to bring technology to over 80,000 schools and libraries across the country (Carvin, Conte, and Gilbert 2001; Schwartz 2003). However, a recent New York Times article reported that millions of dollars may have been fraudulently spent (Schwartz 2003). While many schools and libraries have benefited from this federal program, it is possible that these monies could be better spent elsewhere if this effort has not been effective in reducing the digital divide (e.g., after-school programs for children or work programs for adults). Thus, an effort to improve our understanding of what drives these disparities is likely to help policy-makers bridge the digital divide.

Data and Methods

This study uses eight cross-sections of Current Population Survey data, from 1984 to 2003, to study differences in computer ownership by race/ethnicity at the household level. The main independent variable of interest is household race/ethnicity – specifically the race/ethnicity of householder. I restrict the sample to the four major racial/ethnic groups in the United States: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Asian. A series of logistic regressions are estimated to examine how the effect of race/ethnicity on computer ownership is mediated by the selected independent variables. The final model includes race/ethnicity, level of education, household income, household type, presence of young relatives, age of householder, region, and urbanicity. In addition to these previously established correlates, I also control for the presence of immigrants, being a Spanish-language-only household, and exposure to computer use at work.[1]

Finally, because the data analyzed include both Latino and Asian households, whose populations are largely composed of immigrants, this study also investigates the role that immigrant status plays in computer ownership at the household level. Thus, I also explore how the effect of the presence of immigrants on computer ownership varies by the race/ethnicity of the household.

---

[1] The nativity and Spanish-only variables are not available until 1994; thus, these variables are only used in five of the eight cross-sections of data. The computer use at work question is not available until 1997.

Overall, my study improves on previous studies in three major ways. First, conceptually I frame the digital divide within the framework of social inequality theory and use this as the starting point from which to understand Diffusion of Innovation theory (DoI). Diffusion of Innovation theory successfully explains the process by which an innovation is adopted, but not how certain groups become privileged enough to be early adopters. By framing DoI within an understanding of social inequality and social stratification processes, this study advances a better understanding of why we see the digital divide as it exists between the four major racial groups in the United States. Second, I employ a multivariate logistic regression approach, which provides a clearer picture of the net effects associated with these variables. Finally, I make use of multiple cross-sections of Current Population Survey data to assess the contours of the digital divide across time.

Expected Findings

- o Based on previous research (Rivas 2004), I expect to find differences in computer ownership by race/ethnicity for each cross-section of data used.

- o Given the close association between race/ethnicity and income and education, I expect to find that much of the observed racial difference in computer ownership is due to differences in income and educational levels.

- o Given ethnic and cultural differences, as measured by immigrant status and Spanish-speaking ability within the four racial groups in this study, I hypothesize that the presence of immigrants and being a Spanish-language-only household will have a significant negative effect on computer ownership, all else being equal.

- o Given the reported association between computer ownership and work computer use, I hypothesize that computer use at work will be positively and significantly associated with computer ownership at home, all else being equal.

REFERENCES

Carvin, Andy, Chris Conte, and Allen Gilbert. 2001. "The E-Rate in America: A Tale of Four Cities." Pp. 223-242 in *The Digital Divide: Facing a Crisis or Creating a Myth?*, edited by B. M. Compaine. Cambridge, Mass.: MIT Press.

Chambers, S. M. and V. A. Clarke. 1987. "Is Inequity Cumulative? The Relationship Between Disadvantaged Group Membership and Students' Computing Experience, Knowledge, Attitudes and Intentions." *Journal of Educational Computing Research* 3:495-517.

Krueger, Alan B. 2000. "The Digital Divide in Educating African-American Students and Workers." Industrial Relations Section, Princeton University - Working Paper #434, Princeton, NJ.

McPhail, Irving P. 1985. "Computer Inequities in School Uses of Microcomputers: Policy Implications." *Journal of Negro Education* 54:3-13.

McQuarrie, Edward Francis. 1985. "Commitment to Home Computing: A Joint Result of Action and Evaluation." Dissertation Thesis, University of Cincinnati, Cincinnati, OH.

National Telecommunications and Information Administration. 1999. "Falling Through the Net: Defining the Digital Divide." U.S. Department of Commerce, Washington, D.C.

—. 2000. "Falling Through the Net: Toward Digital Inclusion." U.S. Department of Commerce, Washington, D.C.

—. 2001. "Falling Through the Net: Defining the Digital Divide." Pp. 17-46 in *The Digital Divide: Facing a Crisis or Creating a Myth?*, edited by B. M. Compaine. Cambridge, Mass.: MIT Press.

—. 2002. "A Nation Online: How Americans Are Expanding Their Use of the Internet." U.S. Department of Commerce, Washington, D.C. Online: (http://www.ntia.doc.gov/ntiahome/dn/Nation_Online.pdf).

—. 2004. "A Nation Online: Entering the Broadband Age." U.S. Department of Commerce, Washington, D.C.

Nelson, F. Howard. 1985. "Black Computer Workers: Closing the Gap in High Technology Employment." *Journal of Negro Education* 54:548-557.

Noble, Douglas. 1984. "Computer Literacy and Ideology." *Teachers College Record* 85:602-614.

Rivas, Salvador. 2004. "The U.S. Digital Divide: Race, SES, and Social Context as Predictors of Computer Ownership, 1997-2001." Dissertation Thesis, Department of Sociology, University of Michigan, Ann Arbor.

Schwartz, John. 2003. "Schools' Internet Subsidies Are Called Fraud-Riddled." in *The New York Times*. New York.

Sutton, Rosemary E. 1991. "Equity of Computers in the Schools: A Decade of Research." *Review of Educational Research* 61:475-503.

Watkins, Bruce and David Brimm. 1985. "The Adoption and Use of Microcomputers in Homes and Elementary Schools." Pp. 129-150 in *Children and Microcomputers: Research on the Newest Medium*, edited by M. Chen and W. Paisley. Beverly Hills, CA: Sage Publications.