

Inequality in the Information Age: From the Digital Divide to the Usage Divide

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On my honor I have neither given nor received unauthorized aid on this thesis.

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ABSTRACT

This paper examines the current inequalities in home internet access and the use of online resources. Situated within a societal context of internet dependency, to the point of indispensability, this study explores whether or not access gaps have closed and the potential opening of usage gaps. Using data from The Current Population Survey July 2013: Computer and Internet Use Supplement, logistic regression analyses were used to examine the effect of demographic factors on access to home internet and use of online financial services, preventative health information and job seeking tools. The findings demonstrate that access to the internet, as well as use of internet resources, reflect existing inequalities in society, especially in regard to race, income and education. In every case, racial disparities persist even after controlling for socioeconomic status, suggesting that social marginality in the information age transcends class.

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INTRODUCTION

A recent policy brief by the Office of the New York City Comptroller argues, “access to the internet is the fourth utility of the modern age— as central to our daily lives as electricity, gas and water,” due to the connections the internet facilitates to education, employment, culture and commerce (Office of the New York City Comptroller 2014). However, this view of the internet as essential is a new phenomenon. In 1995 only 14 percent of American adults used the internet, compared to 87 percent in 2014 (Pew Research Center 2014). This rapid adoption and diffusion has had a widespread impact in terms of the way people access and share the news, take care of their health, perform their jobs, learn, engage in political activity and communicate with others (Pew Research Center 2014). Not only do the majority of Americans now use the internet, but 90 percent of users report that the internet has been a good thing for them personally, and 76 percent of users report that they believe the internet has been a good thing for society (Pew Research Center 2014). However, as early as the 1990s, some researchers and policymakers became concerned that the benefits of information and communication technologies (ICTs) were inequitably distributed (Espstein, Nisbet and Gillespie 2011).

Persistent gaps between those who do and those who do not have internet access have been shown along socioeconomic, geographic, educational, racial and gender lines (Espstein, Nisbet and Gillespie 2011). For example, in 2014, 55 percent of Americans with less than a high school degree used the internet, compared to 96 percent of Americans with a bachelors or advanced degree (Pew Research Center 2015). These gaps have been broadly defined as a “digital divide”. Wellman, Quan-Hasse, Witte and Hampton (2001) argue that as the internet becomes a routinized part of everyday life, a lack of access to this resource can significantly undermine access to employment opportunities, current news, and secure online government services.

While gaps in access appear to be closing due to the widespread adoption of the internet and digital commodities, there has been much debate surrounding the assumption that homogenous internet use patterns have emerged across race and class lines. The fact that 87 percent of American adults use the internet creates an illusory openness that omits the possibility that access is insignificant if the internet is not used in instrumental ways (DiMaggio and Hargittai 2001). This idea led to the expansion of the concept of a “digital divide” to include a “usage divide,” in which social researchers began to examine how people actually use the internet, whether it be for information, entertainment or social networking (DiMaggio and Hargittai 2001). Sociological research in terms of usage patterns has shown, that despite increasing access, usage divides have emerged and may be reflecting existing inequalities in society (DiMaggio and Hargittai 2001). While initiatives have been put in place in community centers, libraries and schools to reduce social disparities in access to information technologies, the literature continues to show that one has to look beyond a simple, binary access divide to see whether the benefits derived from the internet are universally experienced among users.

The present paper investigates the digital divide and usage divide in the United States by using The Current Population Survey July 2013: Computer and Internet Use

Supplement. Multivariate logistic regression analyses were employed to examine whether, and to what degree, race, income and education, while controlling for other factors, would affect the likelihood of the following: (1) home internet access; use of the internet for (2) information on health conditions or preventative care; (3) financial services (such as banking, investing, or stock or futures trading); and (4) job seeking.

REVIEW OF LITERATURE

“Digital Divide”

The invention of the internet was initially believed to be a great equalizer for society, in that it would improve access to information by dramatically reducing the cost (DiMaggio and Hargittai 2001). However, the reality that technology could exacerbate inequality rather than ameliorate it was quickly realized (NITA 2000). In 2000 various publications by the US Department of Commerce’s National Telecommunications and Information Administration (NITA) showed that information technologies were not blind to race and socioeconomics, as people had hoped. For example, in 2000, 50.3 percent of Whites and 49.4 percent of Asian Americans had access to the internet compared to only 29.3 percent of African-Americans and 23.7 percent of Hispanics (Castells 2001). It was due to these reports that the concept of a “digital divide” emerged to describe the gap between those who have and those who do not have access to information technologies. While it was clear from the publications in 2000 that the gender gap has completely disappeared, and that there were actually more women than men using the internet at that time, the issue of a “digital divide” in terms of race and socioeconomics prevailed into the following decade (Castells 2001). As Castells (2001) argues, “The internet is indeed a technology of freedom—but it can free the powerful to oppress the uninformed.” It is in this light that he declares that in the information age to “switch-off” is to ultimately be sentenced to marginality.

Diffusion and Reconceptualization

While the rhetoric of a “digital divide” gained increasing popularity, research fixated on measuring access to computers and the internet. Hoffman (1998) found that 73 percent of White students had home computers compared to only 32.9 percent of Black students, and that 58.9 percent of White students compared to 31.1 percent of Black students used the web. Additionally, she found that White students missing a home computer compared to Black students were more likely to find an alternate means of accessing the internet. In terms of current research, it has been consistently found that education and income are the most central predictors of internet access (Beunte and Robin 2008; Goldin and Katz 2008; Hale, Cotton, Drentea, and Goldner 2010). However, this type of access-oriented research was short lived due to the rapid diffusion of computers and the internet. By 2013, 70 percent of American adults had a high-speed broadband connection at home, compared to only 11 percent in 2002 (Pew Research Center 2013). Similarly, by 2014, 64 percent of American adults had smartphones, compared to only 35 percent in 2011 (Pew Research Center 2014). New technologies such as tablet computers are experiencing an even greater spike in ownership with only 3 percent of the American

population using them in 2010 versus 42 percent by 2014 (Pew Research Center 2014). The general diffusion of these information technologies has forced sociologists and researchers to begin to look at the nuances of different, technological *usage* rather than simply a binary, *access* divide. While Compaine (2001) saw the rapid diffusion of information technologies as a sign that the “digital divide” had been resolved due to market forces, Castells (2001) argues that “while the huddled masses may finally have access to the phone-line internet, the global elites will have already escaped into a higher circle of cyberspace.” This sentiment is echoed by Dijk (2006) who states, “as soon as the laggards have caught up, the forerunners have already moved further ahead and are using a more advanced technology.” It is in this vein that the notion of digital inequality came to the forefront of the literature.

As gaps began to close between those who did and did not have access to information technologies, theorists started to speculate that society needed to look beyond access and examine potential inequalities in usage and skill that may recreate disparities (DiMaggio and Hargittai 2001; Warschauer 2002). DiMaggio and Hargittai (2001) were the first to address the diffusion of technology and what it meant for the concept of a “digital divide.” As technology penetrates every part of society, DiMaggio and Hargittai (2001) argue that the question is no longer who can find a network connection at home, work or in a library community center, but what people are actually doing, and what are they *able* to do, when they use the internet. They theorize that the increasing rates of internet penetration will not resolve issues of inequality, but rather increase the prominence of a new kind of inequality surrounding types of use, and inequality in regard to what extent users are able to reap the benefits of the use of technology (DiMaggio and Hargittai 2001). They suggest that research must now look at an individual’s technical means, autonomy of use, skill set, social support, and purposes in regard to the internet. They predict that the internet will be more strongly associated with positive life outcomes when used for information rather than when used for pure consumption activities. Similar to Castells (2001), they suggest that the inequality will be between those who are interacting with the web versus being interacted with, in other words, those who use the internet actively to find information versus those who use it passively for entertainment (DiMaggio and Hargittai 2001). They see the internet as a resource incomparable to print media and television. The internet requires not only enabling technologies, but also users versed in sufficient skills. In comparison, previous media was relatively passive since users did not have to interact with interfaces. Additionally, DiMaggio and Hargittai (2001) argue that this concept of digital inequality will not be a static divide, as presented before, but a dynamic continuum of marginality.

Like DiMaggio and Hargittai, Warschauer (2002) also calls for a reconceptualization of the “digital divide.” Warschauer (2002) states that the “digital divide” is marked not only by physical access to computers and connectivity, but also to access to resources that allow people to use technology efficiently. Looking beyond a binary of access there exists issues of content, language, education, literacy or community and social resources (Warschauer 2002). He takes issue with the rhetoric of a “digital divide” in that it “holds open the division between civilized tool-users and uncivilized nonusers. As well-meaning as it is as a policy initiative, it is marginalizing and patronizing

in its own terms” (Warschauer 2002). He suggests an alternative framework of social inclusion and digital literacy. In a broader sense, he defines literacy as involving “mastery over the processes by means of which culturally significant information is coded” (Warschauer 2002). In the information age he finds many similarities between literacy and information and communication technology (ICT), both are closely connected to advances in human communication and means of knowledge production (Warschauer 2002). Even in 2002, the concept of the digital illiterate was a key issue in terms of inequality and social inclusion.

“Usage Divide”

The notion of digital literacy, or simplistically, digital skills, became the focus of research concerning digital inequality. Van Dijk (1999) for example expands the definition of digital skills to one’s ability to search, select, process and apply information from an overload of sources. Similarly, Dijk and Hacker (2003) build on this definition of digital skills by defining the concept of *strategic skills*, which refer to one’s ability to use digital means to improve one’s position in society, work, education, and cultural practices. They argue that in modern times relative differences in getting information and lines of communication have become increasingly important for one’s position in society, more so than in any society to exist before (Dijk and Hacker 2003). They refute Compaine’s (2001) argument that markets will solve most problems by lowering prices and offering more choices to consumers, rather they stress that the task of future society will be to prevent *structural* inequalities in the skills and usage of ICTs from increasing. Additionally, they argue that ICTs are unique in terms of their multifunctional nature. While printed media, radio, television, and the telephone have been used in various ways across demographic subgroups, their difference in functionality is minute compared to computers and the internet.

Livingstone and Helsper (2007) find that while there are very few children who do not use the internet anymore, boys, older children and middle-class children benefit more in terms of having better quality access to the internet. Similarly, Cho, Zuniga, Rojas and Shah (2003) find that young, upper-class users were more effective in obtaining gratification they sought online, while others took more indirect or multiple routes to achieve the same result. This idea of people’s online efficiency is also explored by Hargittai (2002) who finds considerable variation in the success of people’s online strategies. Eastin and LaRose (2006) show that prior internet experience was the strongest predictor of internet self-efficacy. Eastin and LaRose (2006) found that people need up to two years of experience to achieve sufficient self-efficacy. Additionally, they showed that internet stress and self-disparagement were negatively related to internet self-efficacy. Self-efficacy is defined here not as a measure of skill, but reflects what individuals believe they can do with the skills they possess.

Beyond strategies, many scholars, using DiMaggio and Hargittai’s (2001) theory, have explored differences in use of the internet in terms of information versus entertainment by demographics. Jochen and Valkenburg (2006) find that adolescents with greater socioeconomic and cognitive resources used the internet more for information than entertainment, and that adolescents with higher household incomes are more likely to use

the internet as a social medium. Ethnicity and gender however were not related. This finding suggests that internet use may surmount gender and racial differences in the information age, and that socio-economic and cognitive resources matter. Bonfadelli (2002) also found that better educated people use the internet more for information, while less educated people use it more for entertainment.

On the other hand, Negroponte (1996) predicts that once access gaps close, homogenous internet use patterns will emerge in that there will be little to no difference between racial and socioeconomic subgroups. This is supported by research such as that produced by Eastin, Cicchirillo, and Mabry (2015) who examine different reasons ethnic subgroups use media. They argue that understanding how racial subgroups use certain media will allow for better-tailored conveyance of civic information in a form congruent to expectancies; however, they find no significant difference in internet usage between ethnic subgroups. This is also the case in Haight, Quan-Hasse, and Corbett's (2014) research on social networking use in Canada, in which they find no significant differences amongst racial subgroups; rather they find that women, young people and current students use social networking most.

While the research is divided on the role of racial demographics on internet use and skills, some scholars believe that as the internet matures, it will increasingly reflect known social, economic and cultural relationships of the offline world, including inequality (Deursen and Dijk 2014). Deursen and Dijk's (2014) recent research on the Dutch population found that people with low levels of education and disabled people are using the internet more hours a day than higher educated and employed people. Deursen and Dijk (2014) identify seven clusters of usage: information, news, personal development, commercial transaction, leisure, social interaction and gaming. They also find, consistent with the literature, that females use the internet more for communicative purposes compared to males who use the internet more for information, entertainment and commerce (Subrahmanyam and Greenfield 2001; Valkenburg and Peter 2007; Zillien and Hargittai 2009).

As of 2013, 70 percent of American adults now have access to high-speed broadband at home. However, the question that remains is what population is represented in the remaining 30 percent? (Pew Research Center 2013). This paper first investigates whether there has actually been a diffusion of access in regard to home internet in the United States. Secondly, it investigates whether, amongst those with access, there is an emerging usage divide in terms of what resources individuals make use of, or whether there are now homogenous usage patterns among users. While there has been a plethora of research concerning access divides and usage divides in terms of social media, information and entertainment, there is a gap in the literature in regard to the specific use of preventative health information, financial services, and job seeking (Jochen and Valkenburg 2006; Bonfadelli 2002; Haight, Quan-Hasse, and Corbett 2014; Deursen and Dijk's 2014). This limitation in our understanding of who uses these instrumental resources is concerning due to the implications and consequences of digital inequality within a society that has become dependent on the internet to the point of indispensability (Hoffman, Novak and Venkatesh 2004).

METHODS

Data/Sample

The Current Population Survey July 2013: Computer and Internet Use Supplement was analyzed to understand demographic patterns in internet access and internet application usage habits in the United States. This survey is conducted by the Bureau of the Census for the U.S Department of Commerce, National Telecommunications and Information Administration. The population represented in the sample consists of all persons in the civilian noninstitutionalized population of the United States. The respondent answers on behalf of the entire household; proxy responses were allowed. The probability sample selected to represent the population consists of approximately 56,000 households. The supplement was conducted as part of that month's Current Population Survey (CPS). However, only 75 percent of the households that participated in the basic portion of the CPS also participated in this supplement. Interviews were conducted during the period of July 14-23, 2013.

Measures

Dependent Variables

Internet home access. The concept of an "access divide" was measured by the question "People can connect to the internet from home in multiple ways, including using mobile devices such as laptops or smartphones, as well as on desktop computers. Does anyone in this household use the internet from home?" Responses were limited to either "yes" or "no." This particular question allows one to gain a snapshot of who has internet access at home, symbolizing "autonomy of use" and a baseline of access in which a usage divide could emerge (DiMaggio and Hargittai 2001).

Internet application usage habits. In order to measure potential usage divides, those who responded that they did have internet access were asked questions regarding if respondents used the internet for a variety of activities, including information on health conditions or preventative care, financial services (such as banking, investing, or stock or futures trading), and job seeking. Similarly, responses were limited to either "yes" or "no" and did not have any measure of frequency of use. These three types of internet usage illustrate instrumental skills for both information and self-betterment. DiMaggio and Hargittai (2001) predicted that the internet, when used for information, rather than when used for pure consumptive activities, would be strongly associated with positive life outcomes. Thus these activities represent active, instrumental usage that could help ameliorate inequality if homogenous usage patterns have emerged, or could exacerbate and reproduce inequality if usage patterns differ by socioeconomic demographics, despite universal access to these resources.

Independent Variables

The following explanatory variables were included in the analysis: age, sex, highest level of education, household income, race, and immigration status. These six independent variables were chosen based on disparities shown in the most updated

descriptive statistics concerning digital divides in the United States (Pew Research Center 2015). While the data takes a much more comprehensive approach to race, including a variety of mixed race options, I restricted the sample to only Black, White, American Indian and Asian. I generated a new variable to represent race and ethnicity that included these four options as well as the Hispanic variable. Race is used as a categorical variable. Gender is also a categorical variable coded 1 for male and 2 for female. I generated a new variable in which female is coded as 1 and male is coded as 0. Household income, a sixteen category measure, is treated as a quasi-interval variable ranging from less than \$5,000 to more than \$150,000. Education level of respondents was also originally a sixteen category measure. I collapsed this variable so it would have four categories. The categories include: less than high school, high school degree or GED, some college, college or associates degree, and advanced degree. Nativity status was originally coded with five distinct categories. I collapsed these categories to make a dichotomous variable that distinguishes between those who are native to the United States and those who are either naturalized citizens or are unauthorized immigrants. Native citizens are coded as 0 and immigrants are coded as 1. This explanatory variable permits a comparison amongst racial groups and ensures that observed differences are not the result of recent immigrant status. This is important given that in 2013 41.3 million immigrants lived in the United States, representing 13 percent of the national population and an all-time high for the nation (Migration Information Source, 2015). Race, income and education were the main independent variables of interest in this study, especially in regard to the question if race would remain significant after controlling for income and education.

Statistical Analyses

Analyses were run with Stata Software (StataCorp 2013). Multivariate logistic regression analyses were employed to examine whether, and to what degree, race, income, and education, while controlling for other factors, would affect the likelihood of the following: (1) home internet access; use of the internet for (2) information on health conditions or preventative care; (3) financial services (such as banking, investing, or stock or futures trading); and (4) use of the internet for job seeking.

For all analyses, logistic regression is used due to the dichotomous nature of the response options. Logistic regression estimates the likelihood of respondents having home internet access or using the internet for specific purposes based on explanatory variables. Odds ratios are reported, indicating whether each variable increases or decreases the relative odds of having home internet or using the internet for specific purposes, controlling for all other explanatory variables in the models. Multivariate models permit one to investigate whether patterns remain significant while controlling for key variables. With this in mind, one can tease out how race, income and education interplay with one another. For example, it allows one to discern to what degree race effects are based on income and education disparities. Age, sex, gender and immigration status also act as control variables in the models. Margins were calculated to show the predicted probabilities of respondents answering yes to having home internet or using the internet for certain purposes, while holding all other variables in the model at their means. The predicted probabilities are shown in graphical representations.

RESULTS

Descriptive Statistics

Table 1. Descriptive statistics for explanatory variables by internet home access and usage type (N=31,075)

Variables	Frequency within Category	Percentage within Category	Percentage home internet access	Percentage use financial services	Percentage use health information	Percentage use job seeking
Age						
55 or younger	21,390	68.83	88.23	51.17	9.47	22.31
Older than 55	9,685	31.17	89.26	44.07	11.81	8.16
Income						
Less than 24,99	6,349	20.43	74.07	35.87	7.12	22.19
25,000 to 59,999	10,487	33.75	87.27	45.27	9.21	18.13
More than 60,000	14,239	45.82	96.03	57.51	12.30	15.82
Gender						
Male	14,361	46.21	89.41	49.17	9.10	18.07
Female	16,714	53.79	87.88	48.77	11.16	17.76
Highest level of education						
Less than HS	2,765	8.90	77.25	22.68	3.65	16.78
HS degree	7,829	25.19	82.92	36.86	7.84	16.12
Some college	6,124	19.71	88.55	49.69	9.54	20.35
College/associates degree	10,264	33.03	93.14	58.89	12.05	18.60
Advanced degree	4,093	13.17	95.70	63.84	15.47	16.66
Race						
White	23,433	75.41	91.00	51.60	11.20	16.40
Black	2,969	9.55	78.12	39.04	6.60	26.54
American Indian	242	0.78	42.35	36.36	6.20	21.07
Asian	1,412	4.54	93.56	48.87	9.63	18.06
Hispanic	3,019	9.72	78.47	39.22	6.56	20.77
Nativity						
Native to the U.S	27,707	89.16	88.84	49.64	10.51	17.78
Foreign born	3,368	10.84	86.50	43.35	7.12	18.94
Total % yes			88.59	48.96	10.20	17.90

The descriptive statistics in Table 1 show that 88.6 percent of respondents have home internet access. However, only 74.1 percent of those in the lowest income category reported home internet access, compared to 96 percent in the highest income category. This difference between income levels in access to home internet is also mirrored in education. Only 77.3 percent of respondents who have completed less than a high school degree have access, compared to 95.7 percent of respondents with an advanced degree. Between racial groups 91 percent of Whites have home internet access compared to 78.1 percent of Blacks, 42.4 percent of American Indians, 93.6 percent of Asians and 78.5 percent of Hispanics. The differences in percentages of home internet access are less drastic between age groups, gender and nativity status.

Similar trends appear in the case of financial services, in which 49 percent of respondents use this service. Only 35.9 percent of respondents in the lowest income level use the internet for financial services, compared to 57.5 percent of respondents in the

highest level. This difference is also apparent across education levels. Only 22.7 percent of respondents with less than a high school degree use the internet for this service compared to 63.8 percent of respondents with an advanced degree. Racial differences are also apparent with 51.6 percent of Whites and 48.9 percent of Asians using this resource compared to 39 percent of Blacks, 36.4 percent of American Indians and 39.2 percent of Hispanics. The differences in percentages of respondents who use financial services are less extreme between age groups, gender and nativity status.

In terms of the use of online health information, only 10.2 percent of respondents use this resource. However, there are some profound differences. For example, only 3.7 percent of respondents with less than a high school degree use this resource, compared to 15.5 percent of those with an advanced degree. These differences may be due to the fact that one is not controlling for age. Additionally, 11.2 percent of White respondents use the internet for this purpose compared to 6.6 percent of Blacks, 6.2 percent of American Indians, 9.6 percent of Asians and 6.6 percent of Hispanics. Differences in age, income, gender and nativity status are not noteworthy. Lastly, in terms of online job seeking, 17.9 percent of respondents use this resource. This resource is the most evenly distributed in that there are minimal differences between explanatory variables, with the exception of age in which 22.3 percent of younger people use this service compared to only 8.2 percent of older respondents. This is not surprising since a large portion of older respondents are most likely retired or settled into stable employment. The differences across income levels are also most likely explained by the fact that those with higher incomes are most likely employed. However, it is surprising that those who have achieved the highest degree of education do not have much lower rates of job seeking compared to those with only a high school degree. This may be the case since age is not controlled for and those with only a high school degree may still be students. The most profound difference observed is between Black respondents of which 26.5 percent use this resource compared to 16.4 percent of Whites, 21.1 percent of American Indians, 18.1 percent of Asians, and 20.8 percent of Hispanics. These differences are most likely accounted for by socioeconomic status differences that are not controlled for.

Internet Access

Table 2 reports the logistic regression results for home internet access. Model 1 shows the effect of age, gender and race. In the second model, income, nativity and education are introduced in order to control for socioeconomic status and nativity status. Model 1 indicates that age, gender and all racial groups, in comparison to Whites, have a significant negative effect on the likelihood of having home internet access. In the second model, both gender and Asians (compared to Whites) are no longer statistically significant. Additionally, the effects of the remaining racial groups are still significant, but are no longer as substantial. It is likely that initial disparities between Asians and Whites, Males and Females and the more drastic disparities among all racial groups rested, in part, on socioeconomic differences. However, after controlling for socioeconomic differences as well as nativity status, significant differences among racial groups remain. Relative to White respondents, Blacks are still 47.5 percent less likely to have home internet access than Whites, while American Indians are 60.5 percent less likely, and Hispanics are 51.5

percent less likely. In addition, those with an advanced degree compared to those with less than a high school degree are 5.44 times more likely to have access, and those who are foreign born are 16.3 percent less likely to have access than those who are native to the U.S. Model 2 also indicates that income, nativity and education are all significant predictors of having home internet access. In general, those who have home internet access are significantly more likely to be White (compared to Black, Hispanic or American Indian), young adults, have higher income levels, be more educated and be native to the U.S.

Table 2.
Odds ratios for the effects of selected variables on the likelihood of having home internet access

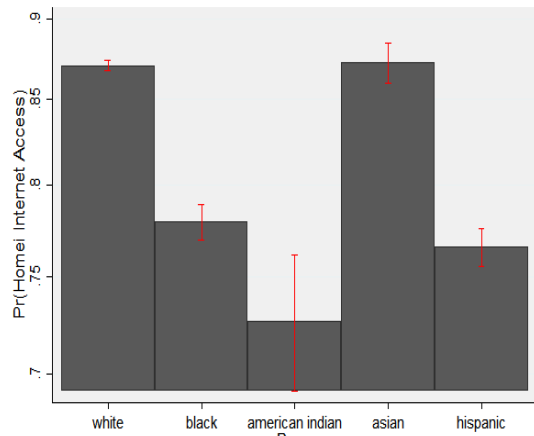
	Model 1	Model 2
Age	.971*** (.001)	.971*** (.001)
Gender (Ref: Male)		
Female	.965* (.018)	1.029 (.021)
Race (Ref: White)		
Black	.343*** (.009)	.525*** (.016)
American Indian	.213*** (.069)	.395*** (.096)
Asian	1.231*** (.061)	1.013 (.059)
Hispanic	.318*** (.008)	.486*** (.016)
Income		1.219*** (.003)
Nativity (Ref: Native to US)		
Foreign Born		.837*** (.029)
Education (Ref: <HS)		
HS Degree		1.469*** (.042)
Some College		2.708*** (.092)
College/Associates		3.761*** (.128)
Advanced Degree		5.333*** (.298)
Log Likelihood	-37323.63	-31197.09

Notes: Standard errors are presented in parentheses.
+ $p < .10$ (two-tailed test), * $p < .05$ (two-tailed test), ** $p < .01$ (two-tailed test), *** $p < .001$ (two-tailed test)

Graph 1.

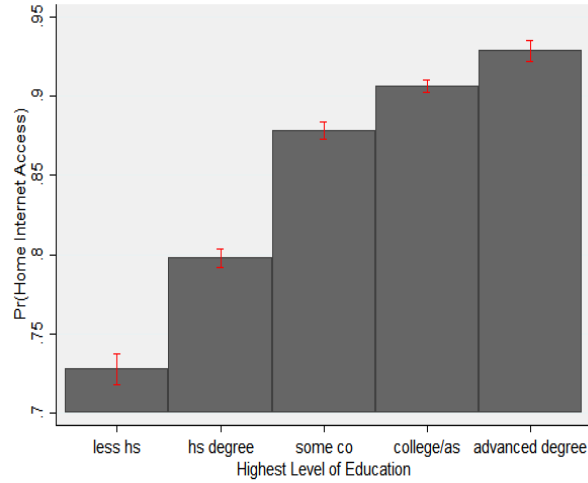
Predicted probabilities of having home internet access by (A) racial group; (B) highest level of education; (C) and household income

(A)



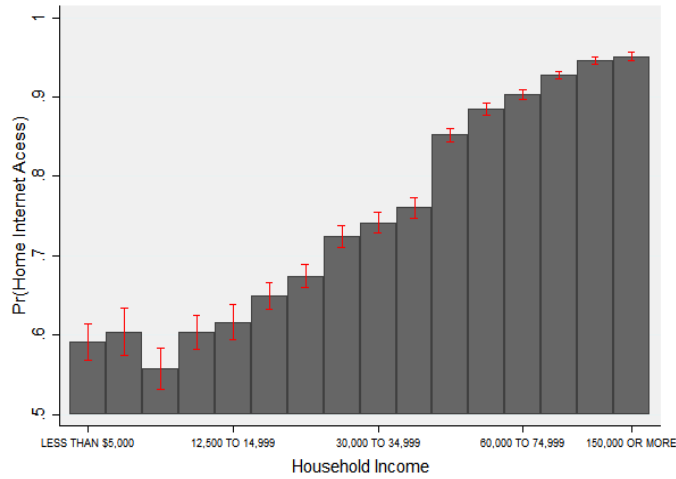
Notes: Adjusted Predictions of race with 95% CIs

(B)



Note: Adjusted Predictions of education with 95% CIs

(C)



Note: Adjusted Predictions of income with 95% CIs

Graph 1 (A) shows the predicted probabilities (with 95 percent confidence intervals) of having home internet access by racial group, while other explanatory variables are held constant at their means. The graph indicates that the predicted probability of having home internet access is 87.1 percent for Whites and 87.2 percent for Asians, compared to only 77.9 percent for Blacks, 72.6 percent for American Indians and 76.6

percent for Hispanics. Both the logistic regression and predicted probabilities suggest that race is a significant predictor for having home internet access even after controlling for demographic factors, socioeconomic status, and nativity status. However, the logistic regression only indicates that all racial groups, with the exception of Asians, are significantly less likely to use this service relative to Whites. The predicted probabilities and 95 percent confidence intervals allow one to further investigate differences between all five racial groups. Based on Graph 1 (A) one can only be confident that significant differences exist between Whites and Asians compared to Blacks, American Indians or Hispanics.

Graph (B) and Graph (C) show the predicted probabilities (with 95 percent confidence intervals) of having home internet access by education level and income level, while other explanatory variables are held constant at their means. For both education and income, a quasi-linear pattern is observed. For education, there is no overlapping of confidence intervals between education levels, suggesting that they are all different from each other. Additionally, for education, those with less than a high school degree only have a 72.8 percent probability of having home internet access compared to 92.8 percent for those with an advanced degree. For income, those in the lowest income bracket, earning less than \$5,000, only have a 59.1 percent probability of having home internet compared to those in the highest income bracket, earning more than \$150,000, who have a 95.1 percent probability of access.

Usage of Online Financial Services, Health Information and Job Seeking

Table 3 reports the results of logistic regressions for using the internet for three instrumental purposes. In the first model, for each internet use type, the effect of age, gender and race are shown. In the second model, for each internet use type, income, nativity and education are introduced in order to control for socioeconomic status and nativity status. As all models show, similar to the results on home internet access, age, income, education and race (in comparison of Whites to Blacks) are significant predictors of using the internet for financial services, job seeking or preventative health information, even when controlling for socioeconomic and demographic variables.

Model 1 and 2 report the odds ratios of using the internet for financial services. Model 1 shows that race and age are significant predictors of using the internet for financial services, and remain significant as the models progress. Model 2 shows that race, income and education are significant, independent predictors of using the internet for financial services when controlling for age, gender, and nativity status. Relative to White respondents, Blacks are 29.6 percent less likely to use financial services, Native Americans are 30.8 percent less likely, Asians are 24.5 percent less likely and Hispanics are 19.9 percent less likely to use this resource. However, the disparities in race do slightly diminish from Model 1 to Model 2. It is likely that initial racial disparities rested, in part, on socioeconomic differences. However, the fact that these disparities persist after controlling for socioeconomic status suggests that the differences in use rest in another form of inequality and marginality. Those who use financial services are significantly more likely to be White (compared to any other racial group), young adults, educated and have a

higher income level. For example, those with an advanced degree are 5.6 times more likely to use this resource than those with less than a high school education.

Table 3.

Odds ratios for the effects of selected variables on the likelihood of using the internet for financial services, preventative health care information and job seeking

	Financial Services		Health Information		Job Seeking	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	.994*** (.001)	.989*** (.001)	1.006*** (.001)	1.004*** (.001)	.969*** (.001)	.967*** (.001)
Gender (Ref: Male)						
Female	1.001 (.023)	1.006 (.034)	1.269*** (.048)	1.284*** (.049)	.981 (.029)	.936* (.028)
Race (Ref: White)						
Black	.576*** (.023)	.704*** (.029)	.573*** (.044)	.664*** (.051)	1.582*** (.073)	1.493*** (.071)
American Indian	.513*** (.069)	.692*** (.096)	.534* (.017)	.652 (.176)	1.142 (.184)	1.078 (.176)
Asian	.863** (.047)	.755*** (.048)	.878 (.082)	.899 (.094)	.960 (.069)	.893 (.072)
Hispanic	.567*** (.023)	.801*** (.036)	.591*** (.046)	.779** (.064)	1.024 (.051)	1.055 (.057)
Income		1.058*** (.003)		1.035*** (.006)		.952*** (.004)
Nativity (Ref: Native to US)						
Foreign Born		.920+ (.042)		.803** (.063)		1.045 (.096)
Education (Ref: <HS)						
HS Degree		2.129*** (.113)		1.939*** (.215)		1.533*** (.096)
Some College		3.441*** (.186)		2.343*** (.262)		1.997*** (.126)
College/Associates		4.663*** (.244)		2.847*** (.309)		2.120*** (.130)
Advanced Degree		5.601*** (.334)		3.605*** (.413)		2.309*** (.167)
Log Likelihood	-20139.39	-20158.67	-10137.17	-9969.21	-13950.04	-13795.79

Notes: Standard errors are presented in parentheses.

+ $p < .10$ (two-tailed test), * $p < .05$ (two-tailed test), ** $p < .01$ (two-tailed test), *** $p < .001$ (two-tailed test).

Models 3 and 4 report the odds ratios of using the internet for preventative health information. Model 3 shows that age, gender and race are all significant predictors, with the exception of Asians relative to Whites. These three variables, with the exception of

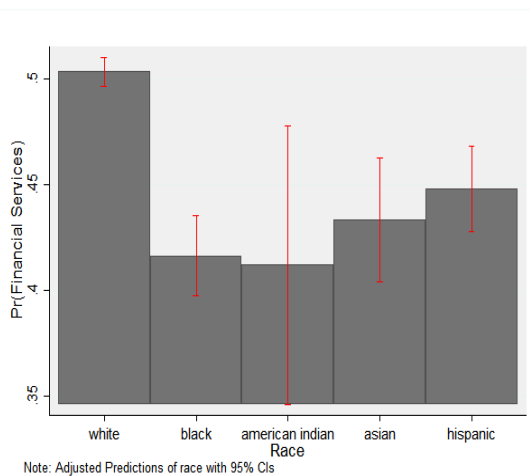
Asians and American Indians, compared to Whites, remain significant as the model progresses. Being foreign born, Black, or Hispanic all have a significant negative effect on the likelihood of using the internet for preventative health information. Foreign-born individuals are 19.7 percent less likely to use the internet for this purpose compared to native citizens. Additionally, relative to White respondents, Blacks are 33.6 percent less likely and Hispanics are 22.1 percent less likely to use this resource. Those who do use the internet for this purpose are significantly more likely to be White (compared to Black or Hispanic), female, older, educated, have a higher income level and be native to the U.S.

Lastly Models 5 and 6 report the odds ratios of using the internet for job seeking. Model 5 shows that being Black, compared to White, and age are significant predictors of using the internet for job seeking, and remain significant as the models progress. Interestingly, gender becomes significant as the models progress with females having a significant negative effect on the likelihood of using this resource. Model 6 also shows that Black respondents, compared to White respondents, income and education are significant, independent predictors of using the internet for job seeking when controlling for age, gender, and nativity. Compared to White respondents, Blacks are 49.3 percent more likely to use this resource. Even after controlling for unemployment status, Black respondents are still 39.3 percent more likely than White respondents to use this service. Those who use the internet for job seeking are significantly more likely to be Black (compared to White), males, young adults, educated and have a lower income level. However, the positive effect of education is far less extreme in this case compared to other usages.

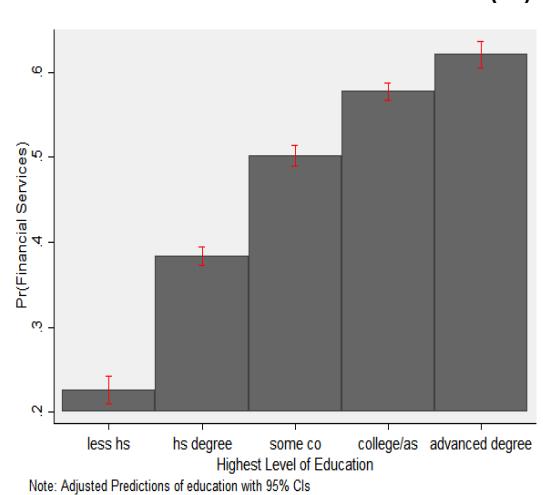
Graph 2.

Predicted probabilities of using the internet for financial services by (A) racial group; (B) highest level of education; (C) and household income

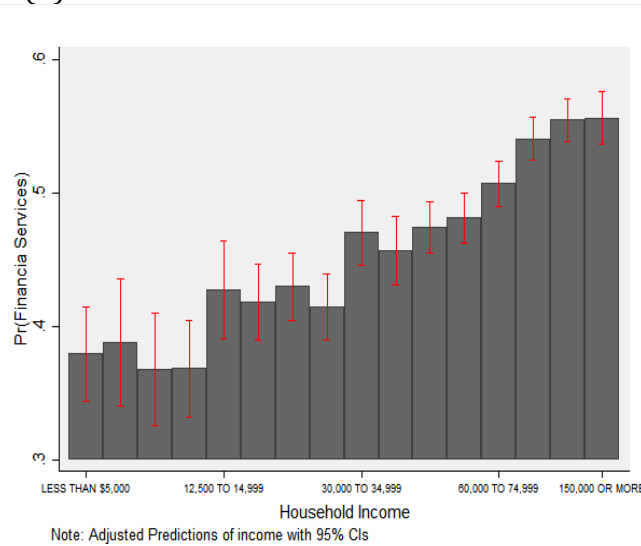
(A)



(B)



(C)



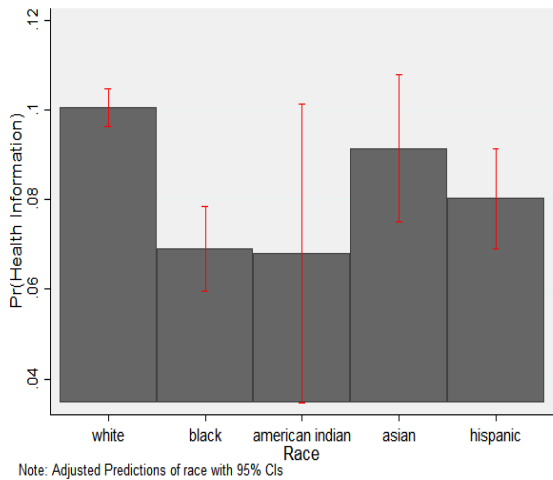
Graph 2 (A) shows the predicted probabilities (with 95 percent confidence intervals) of using the internet for financial services by racial group, while other explanatory variables are held constant at their means. The graph indicates that the predicted probability of using this service is 50.3 percent for Whites, compared to 43.3 percent for Asians, 41.6 percent for Blacks, 41.2 percent for American Indians and 44.8 percent for Hispanics. Both the logistic regression and predicted probabilities suggest that race is a significant predictor of using the internet for this resource even after controlling for demographic factors, socioeconomic status, and nativity status. However, the logistic regression only indicates that all racial groups are significantly less likely to use this service relative to Whites. The predicted probabilities and 95 percent confidence intervals show that Whites are the only group whose confidence intervals do not overlap with any other groups'. Therefore, one can only be confident that significant differences exist between Whites compared to Blacks, American Indians, Asians or Hispanics.

Graph 2 (B) and (C) show the predicted probabilities (with 95 percent confidence intervals) of using the internet for financial services by education level and income level, while other explanatory variables are held constant at their means. For both education and income a quasi-linear pattern is observed. For education, there is no overlap of confidence intervals between education levels, suggesting that they are all significantly different from each other. Additionally, for education, those with less than a high school degree only have 22.7 percent probability of using online financial services compared to 62 percent for those with an advanced degree. For income, those in the lowest income bracket, earning less than \$5,000, only have a 37.9 percent probability of using this resource compared to those in the highest income bracket, earning more than \$150,000, who have a 55.6 percent probability.

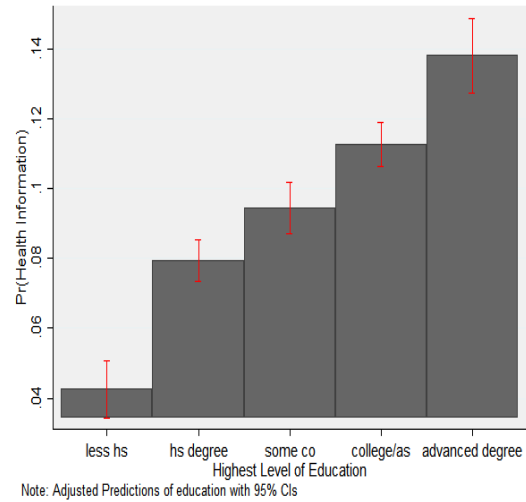
Graph 3.

Predicted probabilities of using the internet for health information by (A) racial group; (B) highest level of education; (C) and household income

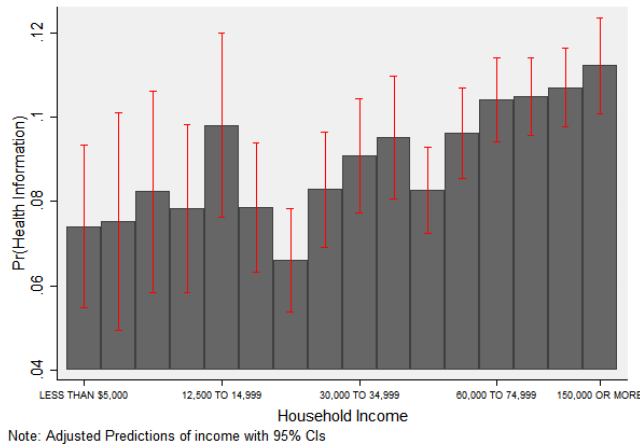
(A)



(B)



(C)



Graph 3 (A) shows the predicted probabilities (with 95 percent confidence intervals) of using the internet for health information by racial group, while other explanatory variables are held constant at their means. The graph indicates that the predicted probability of using this service is 10.1 percent for Whites and 9.1 percent for Asians, compared to 6.9 percent for Blacks, 6.8 percent for American Indians and 8 percent for Hispanics. Both the logistic regression and predicted probabilities suggest that

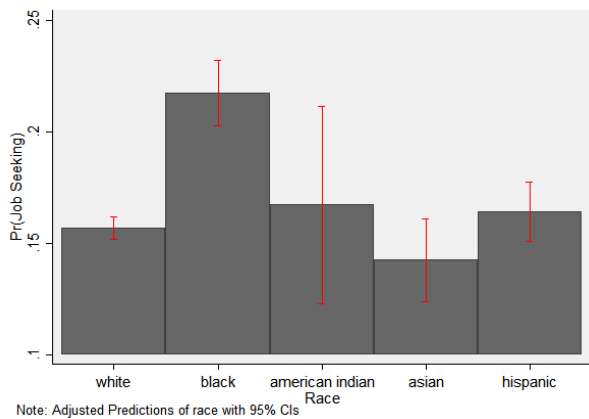
race is a significant predictor of using the internet for this resource after controlling for socio-demographic factors, socioeconomic status, and nativity status. However, the logistic regression only indicates that Black and Hispanic respondents are significantly less likely to use this service relative to Whites. Graph 3 (A) shows that one can only be confident that significant differences exist between Whites compared to Blacks and Hispanics and not between any other groups.

Graph 3 (B) and (C) show the predicted probabilities (with 95 percent confidence intervals) of using the internet for health information by education level and income level, while other explanatory variables are held constant at their means. For education, a quasi-linear pattern is observed. Additionally, for education, there is no overlapping of confidence intervals between education levels, suggesting that they are all different from each other. Those with less than a high school degree only have a 4.3 percent probability of using this resource compared to 13.8 percent for those with an advanced degree. For income, those in the lowest income bracket, earning less than \$5,000, only have a 7.4 percent probability of using this resource compared to those in the highest income bracket, earning more than \$150,000, who have an 11.2 percent probability.

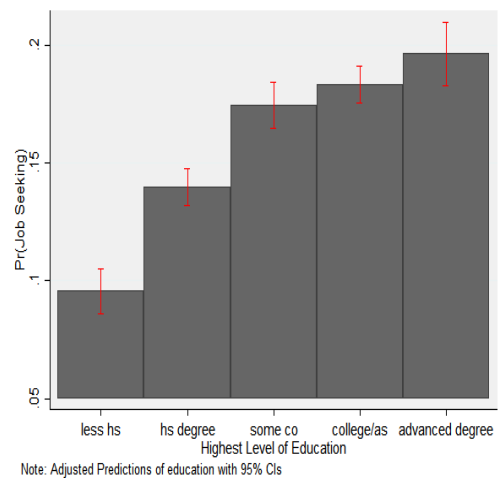
Graph 4.

Predicted probabilities of using the internet for job seeking by (A) racial group; (B) highest level of education; (C) and household income

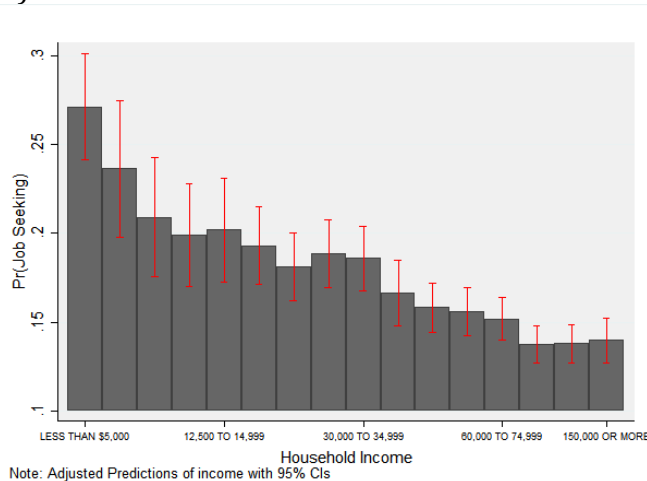
(A)



(B)



(C)



Graph 4 (A) shows the predicted probabilities (with 95 percent confidence intervals) of using the internet for job seeking by racial group, while other explanatory variables are held constant at their means. The graph indicates that the predicted probability of using this service is 21.7 percent for Blacks compared to 15.67 percent for Whites, 14.2 percent for Asians, 16.7 percent for American Indians and 16.4 percent for Hispanics. Both the logistic regression and predicted probabilities suggest that race is a significant predictor of using the internet for this purpose when comparing Whites to Blacks, even after controlling for socio-demographic factors, socioeconomic status, and nativity status. However, the logistic regression and predicted probabilities only indicates that Black respondents are significantly more likely to use this resource relative to White respondents. Therefore, one cannot be confident that Whites are significantly different from Asians, American Indians or Hispanics since their confidence intervals overlap, or that any of these groups are different from each other. One can only be confident that significant differences exist between Blacks compared to Whites, Asians and Hispanics.

Graph 4 (B) and (C) show the predicted probabilities (with 95 percent confidence intervals) of using the internet for job seeking by education level and income level, while other explanatory variables are held constant at their means. For both education and income a quasi-linear pattern is observed. For education, those with less than a high school degree only have 9.6 percent probability of using this resource compared to 19.6 percent for those with an advanced degree. For income, those in the lowest income bracket, earning less than \$5,000, have a 17.2 percent probability of using this resource, compared to those in the highest income bracket, earning more than \$150,000, who have a 14 percent probability.

DISCUSSION/CONCLUSION

While extreme access gaps have closed since the early days of the internet, universal access and homogenous usage patterns are far from the reality. While research has fixated on how people use the internet in terms of social media, information, and entertainment, it has not examined who uses various digital resources, such as financial services, job seeking and health information, as part of the usage divide. Dijk and Hacker (2003) defined the concept of *strategic skills*, which refer to one's ability to use digital means to improve one's position in society, in work, education, and cultural practices, yet the majority of the research has focused on an information versus entertainment duality that does not adequately capture this concept. The three digital resources used in this study represent instrumental, online services that have a clear potential to improve one's position in health, finance and overall socioeconomic status. The literature on access and usage, as well as this study, confirm that there are still disparities in the information age, especially in regard to race, education and income. Additionally, this study finds that these racial inequities persist and remain significant, even after controlling for human and economic capital in the form of education and income.

To better understand these phenomena, data from The Current Population Survey July 2013: Computer and Internet Use Supplement were used to run statistical analyses of home internet access and use of three online resources. The results, based on multivariate logistic regression and predicted probabilities, show that the digital divide and a usage divide continues to exist in the United States along race, education and income lines. A divide in this case does not represent a clear binary, but a continuum of disparities in regard to access and usage. In terms of access, Whites, young adults, those with a higher income level, a higher level of educational attainment and those native to the U.S have a significantly greater likelihood of having home internet access. For education, those with less than a high school degree only have a 72.8 percent probability of having home internet access compared to 92.8 percent for those with an advanced degree. For income, those in the lowest income bracket, earning less than \$5,000, only have a 59.1 percent probability of having home internet compared to those in the highest income bracket, earning more than \$150,000, who have a 95.1 percent probability of access.

The results also indicated disparities across the three usage types. Financial services had high rates of disparities, health information had low rates of differences, and job seeking fell in between the other two usages in terms of disparities. First, in terms of financial services, those who are White (compared to any other racial group), young adults, educated and have a higher income level have a significantly greater likelihood of using the internet for financial services. For example, those with less than a high school degree only have a 22.7 percent probability of using online financial services compared to 62 percent for those with an advanced degree. Secondly, those who use the internet for health information are significantly more likely to be White (compared to Black, Hispanic or American Indian), female, older, educated, have a higher income level and be native to the U.S. Relative to White respondents, Blacks are 33.6 percent less likely and Hispanics are 22 percent less likely to use this resource. Lastly, in terms of job seeking, users are significantly more likely to be Black (compared to White), males, young adults, more educated and have a lower income level. Compared to White respondents, Blacks are 49.3

percent more likely to use this resource. Even after controlling for unemployment status, Black respondents are still 39.3 percent more likely than White respondents to use this service. One explanation for this result, even after controlling for factors such as education, income and unemployment status is that due to discrimination in the labor market, Black individuals are forced to utilize more resources to find employment or better employment. Recent research has consistently found that African-Americans with college degrees are twice as likely to be unemployed as other graduates, even among graduates of high-demand fields such as engineering (Ross 2014). Additionally, recent research has also found underemployment rates for African-American workers was 20.5 percent, compared to 18.4 percent for Hispanic workers and 11.8 percent for White workers (Holland 2014).

The multivariate logistic results show these relationships to be robust even when controlling for demographic factors, socioeconomic and nativity status. In general, for both access and usage, there are significant differences between Black respondents and White respondents, as well as between those native to the U.S. and those who are foreign born, between education levels and between income levels. These results resonate with the findings of the majority of the literature, which suggest that as the internet matures it will reflect existing inequalities in society rather than ameliorate them. However, the finding that racial disparities persist beyond class is especially noteworthy. The fact that race remains significant between White and Black respondents, in every case, suggests that there is a new form of social marginality in the information age that obstructs access and usage, and transcends class based differences. While recent literature has not found significant racial differences in terms of an information versus entertainment binary, this study's findings suggests that research on the usage divide may need to redirect its attention to digital resources and race.

This study, while building on previous research on the digital divide and usage divide, makes three other important contributions to the literature. For one, it provides the most up to date multivariate analysis of access to home internet and usage of digital resources in the United States. Secondly, it expands current definitions of *strategic skills* by arguing the research needs to look beyond the information versus entertainment binary and adopt a more nuanced understanding that focuses on key, instrumental resources and who uses them. While research has also looked at technical skills, this is irrelevant if these skills do not translate into beneficial use of online resources. Future research ought to explore more cases of instrumental, online services and provide a means to measure outcomes based on use as well as frequency of use. Additionally, future research, including future supplements to the census, ought to include a wider variety of uses that are both instrumental in terms of life outcomes and popular among the American public. For example, the addition of questions regarding whether or not respondents use LinkedIn, and then measuring over time if respondents found employment through this digital resource, would be beneficial towards understanding to what degree technology could enable class mobility. This would be much more comprehensive than simply asking respondents if they use the internet for job seeking without any measure of frequency of use or outcomes. Lastly, this study moved beyond traditional comparisons of means tests and frequency tables to include multivariate regression and predicted probabilities. This allows for an

assessment of the robustness of relationships through the inclusion of key control variables. By subjecting the variables to the rigors of multivariate regression, the study was able to expose nuances in the patterning of internet use and access that previous studies have largely failed to expose.

The most notable limitation to the study is that it only presents a snap shot in time of a usage gap. In order to be truly certain that there is a rise of a usage divide, there needs to be longitudinal data that allows for the construction of a time series of internet use. This has frequently been done in regard to access, and has shown a closing of access gaps (Pew Research Center 2015). This same approach has been neglected in terms of usage divides since researchers have yet to reach a consensus on what internet uses are truly influential, and partly because what uses are significant are always shifting. It is in this light that research must measure, longitudinally, which online uses actually translate into positive life outcomes, rather than speculate from theoretical frameworks. This is particularly difficult to achieve considering, as DiMaggio and Hargittai (2001) argue, the concept of digital inequality is not a static divide, as presented before, but a dynamic continuum of marginality. Therefore, the topic of digital inequality presents a unique challenge for researchers in that they are presented with the task of measuring a form of inequality that is the resultant of a constantly adapting resource.

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