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A Disappearing Digital Divide Among College Students?

Peeling Away the Layers of the Digital Divide

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Given debate about the existence of a digital divide in the United States, the question remains: If individuals are in situations where all have access to the Internet (e.g., a university), will aspects of a digital divide still exist? The authors examine whether a racial digital divide exists among college students in the odds of their using the Internet and the different levels and types of usage. Data are from a random sample of full-time, residential college freshmen. Results indicate that aspects of a digital divide exist in terms of whether one uses the Internet for specific purposes; however, once individuals begin using the Internet, few racial differences exist. Internet experience and gender affect particular types of Internet usage, suggesting that the digital divide is multilayered. A policy implication from this study is that bringing individuals into structured environments with assured access may help to decrease aspects of the digital divide.

Keywords: *Internet usage; digital divide; race; college students*

Students must be technologically competent to be full participants in society (Morse, 2004). Those who are not technologically educated and/or do not have "access to that technology will fare poorly in the job market" (Crews & Feinberg, 2002, p. 116). The lack of both 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 and computer- and information-based global economy (Crews & Feinberg, 2002; Selwyn, 2004; Shelley et al., 2004, p. 258; Wilson, Wallin, & Reiser, 2003).

The purpose of this study is to determine whether a digital divide in Internet usage exists among college students. We use social capital theory to show how and why it is that racial differences in Internet usage among college students should remain even within a ubiquitous computing environment.

College Students, the Digital Divide, and Social Capital

There are multiple layers and aspects to the digital divide, including a hierarchy of access among those who are online (Davison & Cotten, 2003; Hargittai, 2002; Toulouse, 1997), tangible aspects of communication and information technologies (i.e., types of access), less tangible factors, such as varying types of usage among different social groups

(Morse, 2004, p. 277), and components such as (a) motivation, (b) possession, (c) digital skills, and (d) digital use (Haan 2004). For college students, access is available to all students on campus, but if students do not possess the skills to use computers or the Internet, then universal access is meaningless.

Little is known about whether a racial digital divide exists among college students. However, approximately 78% of 18- to 29-year-olds and almost 85% of college students use the Internet (Jones, 2002; Lenhart, Madden, & Hitlin, 2005). As many schools now offer Internet connections in residence halls and across campus (Anderson, 2001), access is free and easy for many college students (Jones, 2002).

Having the ability to access and the desire and ability to adopt new technologies represents a form of social capital. Before individuals can adopt new technologies, they must first learn about the new idea and then form an attitude toward it (Shelley et al., 2004, p. 258). Personal characteristics, social networks, and individuals' knowledge affect how technology is adopted and diffused (Shelley et al., 2004). Whites should have higher levels of Internet usage because of their levels of social capital; research shows that Whites have a longer history of using the Internet than do minority groups (Hoffman, Novak, & Schlosser, 2000). Although many minorities may have the desire to use the Internet, many may not have the exposure or training needed to overcome the intimidation that comes with using a new technology (Beckles, 1997; Selwyn, 2004). In addition, the lower number of minority Internet users limits the ability of transference of knowledge to social network members (Selwyn, 2004). Lower percentages of Blacks and Hispanics use a computer at home, own computers, and use computers for completing school assignments (Hoffman & Novak, 1998; Roach, 2003). Consequently, Blacks are not getting the hands-on experience they need to take advantage of this technology. In addition, schools with more ethnic diversity and larger percentages of children from impoverished families are less likely to have access to most types of technology (Brown, Higgins, & Hartley, 2001). Minorities have lower social capital in regard to computer access and Internet use. This suggests that minority college students, especially Black students, continue to lag behind their White counterparts in use.

We examine whether a digital divide exists among college freshmen.[1] If you think about individuals in situations where everyone theoretically has access, and many may be from somewhat similar socioeconomic backgrounds, the question remains whether race differences in Internet usage would exist. Given the assured access policies of many universities but the complex nature of the digital divide (see Davison & Cotten, 2003; Dorr & Besser, 2002; Hargittai, 2002), it is not clear whether a traditional digital divide will exist. We hypothesize that White students and those who have been Internet users for longer periods of time will be more likely to use the Internet and will have higher levels of all types of Internet usage than will non-Whites and novice users. We examine whether race differences exist in the odds of using a variety of types of Internet usage, and we examine levels of usage within these types, all within an assured access environment.[2]

Methods

Data and Sample

We used an existing cross-sectional data set focusing on Internet usage gathered by a web-based survey. The sample consisted of a random sample of residential college freshmen

at a midsized public research university in the mid-Atlantic region of the United States. The response rate for the study was 58% ($N = 232$).[3]

Measures

Internet usage. Respondents were asked the number of hours per week they used the Internet for (a) chatting in chat rooms, (b) using instant messaging (IM), (c) sending and receiving e-mail, (d) posting messages to a bulletin board, (e) surfing for information, (f) playing games,[4] and (g) doing other things. Three composite measures were created: Total communication usage is a composite measure of communication Internet activities (Items a, b, c, d from above are summed together), total noncommunication usage assesses noncommunication Internet activities (Items e and f are summed together), and total Internet hours combines both communication and noncommunication Internet activities. Because of the skewed nature of responses, the natural log (ln) of each of these measures was used.

Measures were also created to assess whether individuals reported using the Internet for any of the seven activities listed above. Zero hours reported was scored 0 on the new dummy variables. Time greater than zero hours was scored 1 on the dummy variable measures. A summary index was created by adding dummy variables together. Individuals could score from 0 to 7.[5]

Frequency of Internet access. Respondents were asked how often they accessed the Internet: (1) several times a day, (2) once a day, (3) several times a week, (4) several times a month, or (5) less than once a month. High scores equal less frequency of accessing the Internet.

History. Length of time having been an Internet user was measured by asking the respondents when they started going online: (1) less than 2 years ago, (2) 2 years ago, (3) 3 years ago, (4) 4 years ago, or (5) 5 or more years ago. A dummy variable was created where 1 equals having started going online 4 or more years ago and 0 equals less than 4 years ago.

Computer ownership. This was measured by asking students if they owned a computer (1 = yes).

Control variables. Control variables included gender (1 = female), declaration of a major (1 = yes), and race (1 = White, 0 = non-White; dummy variable was created because of the small numbers of minority students in the sample).[6]

Analysis Plan

Descriptive statistics were used to describe the characteristics of the sample. Bivariate analysis was conducted to assess the relationships between the independent variables and the dependent variables using chi-square and *t* tests. Logistic regression models were used to examine whether race and years of Internet use influenced the odds of using (vs. not using) each of the seven types of Internet usage. The second series of three models used ordinary least squares regression to determine if race and years of prior use were predictive of the levels of each of the types of Internet usage.

Table 1
Race and Internet Experience Differences in Types of Internet Usage (in percentages)

	Race			Experience		
	Non-White	White	χ^2	Less Than 4 Years	4 or More Years	χ^2
Activity by race						
Play games	55.21	68.90	4.9195*			
Use Internet for other things	56.38	68.00	3.3657†			
Activity by experience						
Use chat rooms				4.72	13.07	5.0122*
Play games				55.14	69.48	5.6083*
Number of activities by experience						
Three or fewer				32.74	26.58	
Four to five				34.51	23.42	
Six or more				32.74	50.00	8.3334*

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Results

The majority of the sample was White (62%) and male (54%). Approximately 75% of the students reported they had declared a major; 98% stated that they owned a computer, and 97% reported accessing the Internet several times a day.[7] The mean age for the sample was 18.47 years. Eighty-eight percent started using the Internet 4 or more years ago. Respondents reported an average weekly use of 6 hrs (ln of 1.4) for e-mail, 20 hrs (ln of 2.4) for IM, and 9 hrs (ln of 1.9) for surfing.[8] Students reported a weekly average of 28 hrs for communicative purpose and 14 hrs for noncommunicative purpose. The only level of usage for which significant race differences existed was in e-mail hours, with non-Whites reporting slightly higher levels.

Whites were more likely to report spending any time playing games and using the Internet for other things than non-Whites (see Table 1).[9] Internet experience was associated with the use of chat rooms, playing games on the Internet, and the total number of Internet activities used. More experienced users were more likely to report using each Internet activity and a larger number of Internet activities.

We used logistic regression to determine whether being White and having more years of Internet experience increased the odds of using each of the seven types of Internet usage (see Table 2).[10] Students who reported 4 or more years of prior Internet experience were 1.6 times more likely to report playing games and 3.0 times more likely to use chat rooms than their less experienced counterparts. White students were more likely to report playing games and less likely to report participating in chat rooms.

Table 3 examines whether usage levels differ by race and Internet experience. Race and Internet experience were not found to be significantly associated with any of the summary

Table 2
Odds Associated With Reporting Use of Each Type of Internet Activity

Variable	Games	Chat Room	Other Usage
History	1.615*	3.031*	
White	1.640*	0.386*	
Female	0.506*	0.311*	0.382***
Log likelihood	340.235	163.995	320.179
Model χ^2	15.659	16.886	17.391

Note: $df = 4$.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Internet usage measures. However, being female was associated with lower levels of noncommunicative Internet usage, with females using the Internet 34.1% less than males.

The second series of models in Table 3 examines communicative Internet usage. Whites reported using e-mail 19.35% less than non-Whites (e-mail hours in Model 1). Females used e-mail approximately 31% more than males and those who had declared a major used it 46.5% more than those without a major (e-mail hours in Model 3). Females used the Internet less for chat room usage and IM.

The final series of models in Table 3 details results for types of noncommunicative Internet usage. Neither history nor race was found to be significantly associated with using the Internet for noncommunicative usage. However, students who had declared a major used the Internet for web surfing approximately 37% more than those without a major (surfing in Model 3). Being female was associated with decreased use of the Internet for gaming (–44.84%) and increased use of bulletin board usage (36.34%; Models 3 and 4).

Discussion and Conclusions

Our hypotheses were partially supported. White students were more likely to report engaging in particular types of Internet activities, namely, playing games and using the Internet for other things, than were non-Whites. They were less likely to engage in the use of chat rooms. More experienced Internet users were more likely to use chat rooms and play games on the Internet. Among residential college freshmen with assured Internet access, few differences exist in the odds of using the Internet in the main ways that college students in particular use the Internet (i.e., e-mail, IM, and surfing the web). However, differences do exist in the odds of playing games, using chat rooms, and other uses.

Although race differences were found in the odds of using different Internet activities, neither race nor Internet experience was significantly associated with students' Internet usage levels. This suggests that once college students begin using the Internet for various activities, digital divide aspects related to race and Internet experience play minimal roles in the amount of time students spend doing each activity. Our findings are somewhat contradictory from those of Hoffman and Novak (1998). Our measures of Internet activities are more extensive than are those of Hoffman and Novak. The variability that was observed

Table 3
Total Usage, Communication Usage, and Noncommunication Usage Models

	Total Usage						Communication Usage						Noncommunication Usage					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
White	–.022	.122			.010	.123	–.078	.134			–.037	.135	.039	.120			.014	.119
History			–.088	.181	–.092	.183			–.109	.199	–.075	.120			–.086	.179	–.142	.176
Female					–.040	.120					.228	.131					–.417***	.115
Major					.139	.137					.216	.149					.074	.132
F	0.032		0.238		0.359		0.339		0.299		1.373		0.104		0.233		3.500*	
R^2	.000		.001		.006		.002		.001		.024		.001		.001		.058	
E-mail hours																		
White							–.215	.113†			–.152	.111						
History									–.244	.169	–.192	.164						
Female											.272*	.108						
Major											.382*	.123						
F							3.633†		2.095		5.278**							
R^2							.016		.009		.085							
Chat room hours																		
White							–.049	.048			–.064	.048						
History									.051	.072	.042	.072						
Female											–.111*	.047						
Major											–.035	.054						
F							1.036		.495		1.868							
R^2							.005		.002		.032							
IM hours																		
White							.036	.153			.083	.153						
History									–.142	.227	–.120	.227						
Female											.301*	.149						
Major											.199	.170						
F							0.055		0.389		1.425							
R^2							.000		.002		.025							

Surfing hours						
White	–.066	.115			–.043	.114
History			–.256	.170	–.303	.169
Female					–.175	.111
Major					.312*	.126
F	.330		2.820		3.029*	
R^2	.001		.012		.051	
Gaming hours						
White	.193	.148			.112	.144
History			.310	.220	.220	.213
Female					–.595***	.140
Major					–.244	.159
F	1.707		1.972		5.904**	
R^2	.007		.009		.094	
Bulletin board hours						
White	–.079	.096			–.100	.95
History			.150	.143	.120	.140
Female					.310**	.092
Major					.135	.105
F	0.674		1.097		3.853**	
R^2	.003		.005		.064	

Note: Ordinary least squares regression. $N = 232$. IM = instant messaging.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

in prior studies may be disaggregated when researchers examine more diverse measures of Internet usage. In addition, the university where this research was conducted is technologically driven and has numerous programs in place to support minority students. Minority students who may not have had a computer or access to a computer and the Internet prior to college receive support that enables them to keep up with their White counterparts. Ninety-nine percent of non-White students reported owning a computer as compared to only 97% of White students in this study; these percentages are dramatic given the prior literature that suggests that non-White households are less likely to own a computer.

Further research is needed to determine (a) if these patterns hold with other more heterogeneous populations; (b) once usage levels are similar between groups at one point in time, whether these remain this way across time or do larger societal structures affect the access and usage levels once individuals leave the relatively easy access present during their college careers; and (c) whether socialization experiences with technology are aimed at acquiring basic academic skills or enhancing problem-solving skills, given that these different functions may lead to different views of individuals' roles with regards to technology (Morse, 2004).

Although this study used a random sample of college freshmen, it was conducted at only one university, and the sample consisted of only residential college freshmen. Thus generalizability to other universities is limited. As this study is cross-sectional, issues of causality can not be determined. We are also unaware of the overlaps among different types of Internet usage.

In conclusion, these results suggest that if you bring people together in structured environments (such as at a university) where individuals have assured access, the digital divide seems to dissipate in many of the traditional ways that we think about the digital divide. The results of this study clearly suggest that aspects of the digital divide are minimized in this environment. We encourage other researchers to push the boundaries of what we know about the digital divide and to think proactively and creatively about situations that can lead to the minimization of the digital divide.

Notes

1. Freshmen college students are an important group to study because they have just made the transition from the households of their parents or guardians to college.

2. This study advances prior college student research by (a) not focusing on one particular racial, ethnic, or gender group of college students (Slate, Manuel, & Brinson, 2002); (b) using a random sampling design, unlike prior research (e.g., Anderson, 2001; Bonebrake, 2002) resulting in limited generalizability of findings, and (c) focusing on more than just use and nonuse of the Internet.

3. This response rate is complementary to other web-based college student surveys (Hertel, 2002; Rigotti, Lee, & Wechsler, 2000; Rohall, Cotten, & Morgan, 2002).

4. Although in some instances playing games via the Internet could be construed as communicating with others, pilot research by the primary investigator revealed that many students do not communicate with others when playing games online. Thus, for the purposes of this study, it is conceptualized as a form of noncommunication Internet usage.

5. Given the distributional properties of this summary measure, responses were regrouped into three categories: 0 = reported using the Internet for three or fewer activities, 1 = reported using the Internet for 4 to 5 of the activities; and 2 = reported using the Internet for six or more activities.

6. Age was not included as a control variable given that all students were college freshmen and 57% of them were age 18 (range equals 18 to 22). No measure of family income was available in the current study.

7. Because of the lack of variability in the measures of computer ownership and frequency of Internet access, these measures will not be included in further analyses.

8. Although the data presented in Table 1 are summary measures, we should not assume that these are mutually exclusive activities. In reality, many students are doing multiple activities in any given period of Internet usage. Measurement issues prevented us from knowing the overlap among these activities.

9. Only significant relationships are shown in this table.

10. Table 3 presents only the results from those models that were significant and includes only significant variables.

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