

## INTERNET USE IN LOW-INCOME FAMILIES: IMPLICATIONS FOR THE DIGITAL DIVIDE

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### ABSTRACT

*This article identifies personal and situational factors that predicted Internet use during the first year of home Internet access by 123 adult participants who were primarily African American, female, never married and had annual household incomes of less than \$15,000. In exchange for a home computer with Internet access from January 2001 till May 2002, participants allowed their Internet use to be continuously recorded and completed surveys at multiple points during the project.*

*While both personal and situational factors influenced Internet use during the first six months, race and age influenced Internet use across the entire year. African Americans used the Internet less than did European Americans despite similar levels of income and education. Both quantitative and qualitative evidence indicated a high need for technical support by all users. Results suggest reconceptualizing the digital divide as a "use" divide rather than an "access" divide. Future research to identify cultural factors that influence the frequency and nature of IT use is discussed.*

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The digital revolution has been accompanied by both optimism and pessimism about its ultimate impact on individuals, society and the global community. On the optimistic side are hopes that access to information technology (IT), particularly the Internet, will facilitate a more equitable distribution of social, economic and political goods and services. On the pessimistic side are concerns that lack of access to digital technologies will exacerbate existing inequalities among individuals, groups and nations around the world. The phrase "digital divide" was coined to refer to this gap between the technology "haves" and "have nots" – between those who have access to IT and those who do not (e.g., Norris 2001).

Within the U.S. considerable time and resources have been devoted to eliminating the digital divide, primarily by providing underserved groups with access to IT. The "access solution" is based on the assumption that the digital divide is attributable primarily to differences in income. Therefore providing free or low-cost access to IT for low-income groups will eliminate the divide. Indeed results of the 2000 and 2002 surveys by the U.S. Department of Commerce have led at least some to conclude that the digital divide has all but disappeared in the U.S., and that concerns about it should be removed from the public agenda (Amison 2002; Compaigne 2001; Samuelson 2002).

Other researchers, educators and policy makers have come to a quite different conclusion, arguing that the digital divide is alive and unwell in the U.S. (Alvarez this issue; Gordo this issue; Borgida et al. 2002; Cooper 2002; Lazarus & Mora 2000; Jackson, Ervin, Gardner, & Schmitt 2001a; Martin 2003; Robinson and Neustadt 2003; Norris 2001; Robinson, DiMaggio & Hargittai this issue). Roughly half the adult population is still "disconnected" at home. Moreover, while disparities in Internet access attributable to income, education, age, race/ethnicity, geographic location and gender have decreased, only one – gender, has disappeared (Nie & Erbring 2000; U.S. Department of Commerce 1995, 1997, 1999, 2000, 2002).

According to the same surveys used to proclaim the demise of the digital divide, income remains a strong predictor of Internet access; only 25% of households with incomes less than \$15,000 had Internet access in 2001, compared to 80% of households with incomes over \$75,000 (U.S. Department of Commerce 2002). Higher educational attainment also remains a strong predictor of Internet use – even stronger than income (Robinson et al., this issue). Among individuals who have bachelor's degrees or better, over 80% use the Internet, compared to 40% of those having only a high school diploma.

Younger people still use the Internet far more than do older people; Internet use rates are highest between the ages of 12 and 50, and fall off precipitously after age 55. Asians/Pacific Islanders and European Americans are more likely to use the Internet (71% and 70%, respectively) than are Hispanic and African Americans (32% and 40%, respectively). Diminishing but not disappearing are gaps related to geographic location; use rates in rural areas are now close to the national average (54%), but rates for central city

residents remain lower (49%) than rates for urban/not central city residents (57%; see also Donnermeyer & Hullifield 2003). Although the gender gap has disappeared, differences related to gender persist (e.g., age; see also Jackson, Ervin, Gardner and Schmidt 2001b; Losh this issue)

Some researchers have argued that understanding disparities in Internet use, particularly among racial/ethnic groups, requires a reconceptualization of the digital divide that focuses on educational, social, and cultural factors that influence IT use (Alvarez this issue; Donnermeyer & Hullifield 2003; Gorski 2002; Cho, Gil de Zuniga, Rojas & Shah 2003; Jackson, Barbatsis, Biocca, Zhao, von Eye & Fitzgerald in press; Hoffman and Novak 1998, 1999; Hoffman, Novak & Schlosser 2000; Payton 2003; Robinson et al. this issue). Carvin (2000), a former Senior Associate at the Benton Foundation's Communications Policy Program in Washington, D.C., suggested that issues of literacy, broadly defined, and issues of content relevance must be addressed before access to IT will result in the quantity and quality of use needed to eliminate the divide. The Children's Partnership (2000) offered similar explanations for why underserved groups may not use the Internet even when they have access to it (e.g., lack of cultural diversity on the Internet).

Research on the racial digital divide in the U.S. supports the view that providing access to IT will not be enough to eliminate the digital divide. Based on an in-depth analysis of three national representative surveys, Hoffman and Novak concluded that neither income nor education fully explain race differences in Internet use (1998, 1999; Hoffman et al. 2000), a conclusion reinforced more recently by Alvarez (this issue). African Americans earning less than \$40,000 annually, and African Americans at all levels of education, use the Internet less than do comparable European Americans. Similarly, Jackson and colleagues found race differences in Internet use among college students who had similar access to the Internet (Jackson et al. 2001a).

A report by the Pew Internet and American Life Project (2000a) examined why individuals from all walks of life may choose not to use the Internet. Reasons included beliefs that the Internet is a dangerous place (54%), the online world has nothing to offer (51%), the Internet is too expensive (39%) and the online world is confusing and difficult to navigate (36%).

In another report by the Pew Internet and American Life project (2000b), a national representative sample of African American Internet users was surveyed about how and why they used the Internet. Pew researchers concluded that there are both quantitative and qualitative differences in African Americans use of the Internet compared to use by European Americans. These differences may be summarized as follows:

- 1) African Americans are more likely than European Americans to use the Internet to search for jobs, places to live, entertainment (e.g., music, videos), religious or spiritual information and health care information or to pursue hobbies and learn new things.

2) African Americans are less likely than European Americans to say that using the Internet helps them stay connected to family and friends.

3) Women and parents are driving the growth of African American Internet use.

4) As in the general population, African American women are more likely to search for health, job and religious information, whereas African American men are more likely to search for sports and financial information and to purchase products online.

5) Compared to older African Americans, those under age 30 are more likely to participate in chat rooms, play games, and use multimedia sources. Older African Americans are more likely to search for religious information than are younger African Americans.

The Pew Internet and American Life report (2000b) concluded that although the gap in Internet access between African Americans and European Americans is decreasing, African Americans still have a long way to go. African Americans who do have access do not go online as often in a typical day as do European Americans. Moreover, online African Americans do not participate in most Web activities to the same extent as do online European Americans (see Alvarez this issue, for an in-depth discussion of race differences in Internet use based on the General Social Survey).

Overall, a better understanding of factors that influence Internet use is needed if the digital "use" divide is to be eliminated. This present article focuses on factors that predict Internet use by members of underserved groups given home Internet access and the difficulties they experience in using the Internet at home.

### **THE HOMENETOO PROJECT**

HomeNetToo is a research project designed to examine socio-psychological factors that influence Internet use in low-income families. Participants in the project were African Americans and European Americans who agreed to have their Internet use continuously recorded, to complete surveys at multiple points during the project, and to participate in home visits during which basic instruction on how to use the Internet use was provided. In exchange, participants received a home computer, Internet access, and in-home technical support for their computer and Internet use.

This article focuses on two personal and two situational factors predicted to influence Internet use. The two personal factors were self-perceived Internet skills and affect toward the Internet (positive and negative). The two situational factors were experiences of success using the computer and Internet

at home and family support for computer and Internet use. The following hypotheses were formulated:

Hypothesis 1: Participants with greater self-perceived Internet skills will use the Internet more than participants with lesser self-perceived Internet skills.

Hypothesis 2: Participants with more positive and less negative affect toward the Internet will use the Internet more than participants with less positive and more negative affect toward the Internet, respectively.

Hypothesis 3: Participants who experience more success using the computer and Internet will use the Internet more than participants who experience less success.

Hypothesis 4: Participants who have greater family support for computer and Internet use will use the Internet more than participants who have less family support.

Previous research suggests that a number of additional factors should influence Internet use, namely previous experience using the Internet and demographic characteristics (Hoffman & Novak 1998, 1999; Hoffman et al. 2000; Jackson et al. 2001a, 2001b; Pew Internet and American Life Project 2000a, 2000b; UCLA Internet Report 2000, 2001; U.S. Department of Commerce 2000, 2002). Participants with more previous experience, European American participants and younger participants are predicted to use the Internet more than participants with less previous experience, African American participants and older participants, respectively. Because previous research has produced inconsistent results with respect to gender and Internet use, no specific hypothesis was formulated (e.g., Losh this issue; Jackson et al. 2001b; U.S. Department of Commerce 2000, 2002). Moreover, although previous research has found that income, education and marital status predict Internet use, it was expected that the relative homogeneity of the sample with respect to these factors would eliminate or at least attenuate these relationships (Jackson, Barbatsis, Biocca, Zhao, von Eye & Fitzgerald in press).

To shed additional light on why low-income adults may use or not use the Internet, both quantitative and qualitative measures were obtained about the difficulties they experienced in using the Internet at home. Quantitative measures were the number of requests for technical support to the project's phone-in helpline, emails to project staff, and diary accounts of home visits. Qualitative measures were obtained during in-home ethnographic interviews with participants as they engaged in Internet activities.

*Participants:* Participants were 123 adults from 90 low-income families residing in a medium-size urban community in the midwestern United States. They were primarily African American (67%), female (80%), never married (42%), and earning less than \$15,000(USD) annually (49%). The majority of participants reported having some college education (49%) or earning a college degree (13%). Average age of participants was 38.6 years old.

*Methods:* Participants were recruited at meetings held at their children's middle school or a Black Child and Family Institute in the midwest. In exchange for completing surveys, participating in home visits, and allowing their Internet use to be automatically recorded, participants received home computers, Internet access and in-home technical support. Those who completed the project (94% of the 90 families) were permitted to keep their computers and were assisted in finding a new Internet service provider and technical support.

Scheduled home visits at pre-trial, one-month, three months, nine months and post-trial were conducted by trained undergraduate "technology facilitators." Approximately half were majoring in computer engineering or related fields, and more than half were members of underserved groups (e.g., African American). Following each home visit, the technology facilitator submitted (electronically) a diary documenting events during the visit, including technical support provided and/or needed. Additional home visits to provide technical support were conducted by graduate students majoring in computer engineering or educational technology. Activities during these home visits were logged immediately following the visit.

A sub-sample of 30 participants agreed to two-hour in-home interviews and observations while they engaged in Internet activities. Interviews were conducted as a conversation between interviewer (one of the co-authors and a trained graduate student) and participant during which they explored the Internet together (Dervin 1989). Internet use was approached as a social practice co-determined by and integrated with other social practices in the home (e.g., television use). Interviews were recorded unobtrusively using a small digital recorder and transcribed for content analysis.

### **Measures:**

1) *Internet use:* Four measures of Internet use are considered in this report: time online (minutes/day), number of Internet sessions (log-ins/day), number of unique Web domains visited (per day), and number of emails sent (per day). To examine changes during the first year of the project, all Internet use measures were divided into two time periods: Time 1 being 1-6 months; Time 2 being 7-12 months.

2) *Personal factors:* Surveys administered at pre-trial, three months, nine months and post-trial included measures of self-perceived Internet skills ("I

am very skilled at using the Internet.") and Internet affect (5 positive affect items (e.g., "I enjoy using the Internet") and 5 negative affect items (e.g., "I feel confused when I use the Internet."); see Appendix for complete list of measures). Five-point rating scales were used; higher values indicated greater self-perceived skills and more positive and negative affect. Previous experience using the Internet was measured by three items at pre-trial (e.g., How would you rate the extent of your experience with the Internet? 1=no experience, 5=a great deal of experience). Also measured at pre-trial were demographic characteristics (i.e., race, age, gender, income, education and marital status).

3) *Situational factors*: Surveys administered at three months, nine months and post-trial included measures of situational factors predicted to influence Internet use. Success using the computer and Internet was measured by three items (e.g., "How successful have you been in using email?"). Family support for Internet use was measured by three items (e.g., "When you have problems using your computer, how helpful are family/household members?"). Five-point ratings scales were used: higher values indicated greater success and more family support.

4) *Requests for Technical Support*: The number of requests for technical support made by phone-ins to the project help-line, emails to project staff, and indirectly through technology facilitators' home visit diaries served as measures of the amount of technical support requested by participants.

## RESULTS

1. *Internet Use*: Descriptive statistics for the four automatically recorded measures of Internet use are presented in Table 1. On average, participants spent about 41 minutes per day online, in 0.7 sessions, visiting 10 domains and sending 0.4 emails (i.e., 2.8 emails per week). Evident from the standard deviations in Table 1 is the high variability in Internet use among project participants. Taken together with other evidence of skewed distributions, log transformations of Internet use measures were used in all subsequent analyses.

Paired contrasts between Internet use at time 1 and time 2 revealed a significant decrease in time online,  $t(93)=3.1$ ,  $p<.05$ , and number of sessions,  $t(95)=6.3$ ,  $p<.001$ , and a marginally significant increase in number of domains visited,  $t(91)=1.8$ ,  $p<.07$ . Thus, consistent with findings of national surveys (UCLA 2000, 2001), participants became more efficient in using the Internet, spending less time to accomplish more tasks (i.e., visit more Web sites).

**TABLE 1: INTERNET USE DIFFERENCES BY MONTHS 1-6 VS. MONTHS 7-12**

Time online (minutes/day)		Number of sessions (per day)		Number of domains visited (per day)		Number of emails sent (per day)	
<u>M</u>	<u>sd</u>	<u>M</u>	<u>sd</u>	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>sd</u>
Time 1 (1 to 6 months)							
42.3	89.0	0.9	1.2	10.0	14.7	0.47	1.1
Time 2 (7 to 12 months)							
39.6	91.6	0.6	0.9	10.7	19.4	0.4	2.1

Note: All measures were automatically logged. M=Mean. sd=standard deviation. Sample sizes ranged from 116 to 123.

## PERSONAL FACTORS

2. *Self-perceived Internet skills.* Means ratings of self-perceived Internet skills are presented in Table 2. Comparisons among means at pre-trial, three months, nine months and post-trial indicated that self-perceived skills increased between pre-trial and three months,  $t(105)=-3.1$ ,  $p<.01$ , but not thereafter. Mean level of self-perceived Internet skills changed from slightly below moderate skills to moderate skills ( $M=2.8$ , on a 5-point scale, where "5" indicates "very skillful"). Results of regression analyses to predict Internet use from self-perceived Internet skills are presented in Table 3 (for time 1 only). Pre-trial skills predicted number of domains visited and number of emails sent at time 1, but not time online or number of sessions. At time 2, self-perceived Internet skills at three months did not predict Internet use after controlling for Internet use at time 1. Not surprisingly, Internet use during time 1 accounted for most of the variance in Internet use during time 2.

3. *Affect toward the Internet.* Composite measures of positive and negative Internet affect were computed by averaging the five positive affect items and five negative affect items, respectively ( $.8<\alpha<.9$ ). Mean comparisons (Table 2) indicated that positive affect increased between pre-trial and three months,  $t(108)=-2.6$ ,  $p<.01$ , dropped slightly but not significantly between three months and nine months, then dropped significantly by post-trial,  $t(111)=2.0$ ,  $p<.05$ . Thus, participants' early enthusiasm about the Internet waned over time, although mean levels of positive affect were quite high throughout the project (all means approached 4 on 5-point scales, where "5" indicates "very positive affect"). Negative affect toward the Internet decreased between pre-trial and three months,  $t(107)=4.3$ ,  $p<.001$ , and remained low for the remainder of the project (all means were slightly above 2 on 5-point scales, where "5" indicates "very negative affect").

4. *Previous Experience.* Results of regression analyses to predict Internet use from previous experience using the Internet are presented in Table 3. Positive affect at pre-trial predicted the number of Internet sessions and

**TABLE 2: DESCRIPTIVE STATISTICS FOR PERSONAL AND SITUATIONAL FACTORS TO PREDICT INTERNET USE**

	Pre-trial		Three months		Nine months		Post-trial	
	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>sd</u>	<u>M</u>	<u>sd</u>	<u>M</u>	<u>sd</u>
Internet skills	2.3	1.1	2.9	1.1	2.8	1.1	2.8	1.1
Internet affect - positive	3.6	0.8	3.9	0.9	3.7	0.8	3.7	0.9
Internet affect - negative	2.6	0.8	2.1	0.9	2.1	0.8	2.1	0.9
How successful have you been in using your computer?	X	X	3.0	1.5	2.8	1.6	2.8	1.6
How successful have you been in using email?	X	X	2.9	1.4	2.8	1.4	2.9	1.4
How successful have you been in finding information on the Web?	X	X	2.9	1.3	3.1	1.3	3.1	1.2
When you have problems using your computer, how helpful are other members of your family/household?	X	X	3.8	1.0	3.9	1.0	3.7	1.1
Do family/household members enjoy helping you to use the computer	X	X	4.0	0.8	4.0	0.9	3.9	1.0
Do you think having a home computer has helped or hurt relationships within family/household?	X	X	3.6	0.8	3.6	0.7	3.6	0.9

**Note.** Five-point ratings scales were used: higher values indicated greater skill, more affect (positive and negative), more success, helpfulness and enjoyment. Sample sizes ranged from 112 to 122. M=Mean. sd=standard deviation.

**TABLE 3: PREDICTION OF INTERNET USE FROM PERSONAL FACTORS**

<u>Criterion</u>	<u>Predictor</u>	<u>Beta</u>	<u>R<sup>2</sup></u>
Time online	Self-perceived Internet skills	.10	.01
# of sessions	Self-perceived Internet skills	.07	.10
# of domains	Self-perceived Internet skills	.20*	.04
# of emails sent	Self-perceived Internet skills	.22*	.05
Time online	Positive affect toward the Internet	.17	
	Negative affect toward the Internet	.02	.03
# of sessions	Positive affect toward the Internet	.23*	
	Negative affect toward the Internet	.01	.05
# of domains	Positive affect toward the Internet	.21*	
	Negative affect toward the Internet	.06	.04
# of emails sent	Positive affect toward the Internet	.06	
	Negative affect toward the Internet	-.22*	.06
Time online	Previous experience using the Internet	.18*	.03
# of session	Previous experience using the Internet	.14	.02
# of domains	Previous experience using the Internet	.21*	.05
# of emails sent	Previous experience using the Internet	.24*	.06

*Note.* Beta=standardized regression coefficient. R<sup>2</sup> is adjusted. Measures used in the analyses were obtained at pre-trial. \*p<.05.

domains visited at time 1; more positive affect was associated with more sessions and visiting more domains. Negative affect at pre-trial predicted the number of emails sent at time 1; more negative affect was associated with sending fewer emails. Neither positive nor negative affect measured at three months predicted Internet use at time 2, after controlling for use at time 1. Note that previous experience using the Internet, a composite of three items on the pre-trial survey (alpha=.9), was quite low ( $M=1.9$ ,  $sd=1.0$ ,  $Md=1.8$ ,  $Mode=1$ , where "1" indicates "no experience"), indicating that most participants were new to the Internet. Previous experience predicted time online, number of domains visited, and number of emails sent at time 1, but not number of Internet sessions. At time 2, previous experience did not predict Internet use after controlling for use at time 1.

5. *Demographic characteristics.* Regression analyses to predict Internet use from race, age, gender, income, education and marital status indicated that only the first three of these characteristics predicted use. Results of the regression analyses to predict Internet use from race, age, and gender are presented in Table 4. At time 1, race predicted time on line and gender marginally predicted it; European Americans and females spent more time online than did African Americans and males, respectively. Race significantly predicted number of sessions, and age and gender marginally predicted it;

**TABLE 4: PREDICTION OF INTERNET USE FROM DEMOGRAPHIC CHARACTERISTICS**

<u>Criterion</u>	<u>Predictor</u>	<u>Beta</u>	<u>R<sup>2</sup></u>
<b>Time 1</b>			
Time online	Race	.18*	
	Age	-.09	
	Gender	.17 <sup>t</sup>	.06
# of sessions	Race	.24*	
	Age	-.16 <sup>t</sup>	
	Gender	.16 <sup>t</sup>	.10
# of domains	Race	.18 <sup>t</sup>	
	Age	-.15	
	Gender	.17 <sup>t</sup>	.07
# of emails sent	Race	.14	
	Age	-.17	
	Gender	-.09	.01
<b>Time 2</b>			
Time online	Time online at time 1	.79*	
	Race	.10	
	Age	-.15*	
	Gender	-.07	.66
# of sessions	# of sessions at time 1	.81*	
	Race	.09	
	Age	-.08	
	Gender	.01	.72
# of domains	# of domains at time 1	.82*	
	Race	.03	
	Age	-.07	
	Gender	-.05	.67
# of emails sent	# of emails at time 1	.60*	
	Race	.23*	
	Age	.05	
	Gender	-.02	.37

Note. Beta=standardized regression coefficient. R<sup>2</sup> is adjusted. \*p<.05. <sup>t</sup>p<.10.

measure; European Americans, younger participants (under 37 years old) and females engaged in more Internet sessions than did African Americans, older participants and males, respectively. Race and gender marginally predicted emails sent; European Americans and females sent more emails than did African Americans and males, respectively. At time 2, age predicted time online; older participants spent less time online than did younger participants. Race predicted emails sent; European Americans sent more emails than did African Americans. Thus, race and age predicted Internet use at time 2, even after controlling for use at time 1.

### SITUATIONAL FACTORS

6. *Success using the computer and Internet.* Mean levels of self-reported success using the computer and Internet at home are presented in Table 2. Comparisons among means (paired t-tests) indicated no change in computer use success, Web search success or email success over time. Participants reported a moderate degree of success in all of these activities (means around 3, on 5-point scales, where "5" indicates "very successful").

Results of the regression analyses to predict Internet use from success are presented in Table 5. At time 1, success in finding information on the Web, reported at three months, predicted *less* time online and fewer emails sent. None of the success measures predicted Internet use at time 2 *after* controlling for use at time 1.

7. *Family support for Internet use.* Means for the three items measuring family support for computer and Internet use are presented in Table 2. Comparisons among means indicated no changes in family support over time. Moreover, family support was quite high throughout the project (means approaching 4 on 5-point scales, where "5" indicates "very supportive").

Results of the regression analyses to predict Internet use from family support are presented in Table 5. At time 1, the more helpful family members were reported to be, the *less* time the participant spent online, and the *fewer* the number of sessions and domains visited. Family support had no influence on Internet use at time 2 *after* controlling for use at time 1.

Three indirect measures of family support for Internet use were obtained to clarify the relationship between support and use. Participants were asked whether family members had more or less respect for them since they began using a home computer, whether they had more or less respect for family members who used the home computer and whether there was conflict over who gets to use the home computer. Participants indicated that family members had somewhat more respect for them since they began using a home computer (Ms=3.4, 3.4, 3.4, sds=0.7, 0.7, and 0.7, at three months, nine months, and post-trial, respectively; 5-point scales, where "5" indicated "more respect"). Participants had more respect for family members who used the computer (Ms=3.6, 3.5, and 3.5, sds=0.8, 0.8, and 0.8, at three months, nine months, and post-trial, respectively; 5-point scales, where "5" indicated "more respect"). Participants reported little conflict over who gets to use the home computer (Ms=1.8, 1.9, and 1.9, sds=1.1, 1.1, and 1.0, at three months, nine months, and post-trial, respectively, 5-point scales, where "5" indicates "a great deal of conflict"). There was no change in any of these ratings over time, nor did any of these ratings predict Internet use at either time 1, time 2 or the remainder of the project (all means were slightly above 2 on 5-point scales, where "5" indicates "very negative affect").

**TABLE 5: PREDICTION OF INTERNET USE FROM SITUATIONAL FACTORS**

<u>Criterion</u>	<u>Predictor</u>	<u>Beta</u>	<u>R<sup>2</sup></u>
Time online	How successful have you been in using your computer?	-.03	
	How successful have you been in finding information on the Web?	-.20*	
	How successful have you been in using email?	-.05	.05
# of sessions	How successful have you been in using your computer?	.02	
	How successful have you been in finding information on the Web?	-.14	
	How successful have you been in using email?	-.06	.03
# of domains	How successful have you been in using your computer?	.03	
	How successful have you been in finding information on the Web?	-.17	
	How successful have you been in using email?	-.10	.05
# of emails sent	How successful have you been in using your computer?	-.10	
	How successful have you been in finding information on the Web?	-.24*	
	How successful have you been in using email?	-.11	.07
Time online	When you have problems using your computer, how helpful are other members of your family/household?	-.26*	
	Do family/household members enjoy helping you to use the computer?	-.06	
	Do you think having a home computer has helped or hurt relationships within the family/household?	-.16 <sup>t</sup>	.13
# of sessions	When you have problems using your computer, how helpful are other members of your family/household?	-.26*	
	Do family/household members enjoy helping you to use the computer?	.04	
	Do you think having a home computer has helped or hurt relationships within the family/household?	-.08	.07
# of domains	When you have problems using your computer, how helpful are other members of your family/household?	-.24*	
	Do family/household members enjoy helping you to use the computer?	.01	
	Do you think having a home computer has helped or hurt relationships within the family/household?	-.14	.09
# of emails sent	When you have problems using your computer, how helpful are other members of your family/household?	.01	
	Do family/household members enjoy helping you to use the computer?	-.02	
	Do you think having a home computer has helped or hurt relationships within the family/household?	-.07	.01

Note: Beta=standardized regression coefficient. R<sup>2</sup> is adjusted. Measures used in the analyses were obtained at 3 months. \*p<.05. <sup>t</sup>p<.10.

8. *Technical support for Internet use:* The number of technical support needs identified by phone-ins to the project help-line, emails to project staff and indirectly through technology facilitators' home visit diaries are summarized in Table 6. In all, participants made 312 requests for technical support during the first year of the project; 256 by phone, 35 by email, and 31 identified in diaries of home visits. Addressing these technical support needs required 216 home visits, over and above the 450 scheduled visits (pre-trial, one month, three months, nine months, and post trial for each of the 90 families).

#### **ETHNOGRAPHIC ACCOUNTS OF DIFFICULTIES USING THE INTERNET**

The content of conversations with participants in their homes as they engaged in Internet activities revealed the difficulties they experienced in using the technology. These conversations were classified into 4 clusters of 10 general subject matter categories. Here the focus is on two categories within the first and dominant cluster – Using the Internet. The two categories are: "Frustrations with using the Internet" and "Obstacles encountered in using the Internet."

*Frustrations with using the Internet:* Participants reported frustration with what they perceived as the faulty performance of the Internet – its slowness, unreliability and failure to provide the user with guidance. They were irritated by having to spend so much time waiting for images to load, and frustrated with the less than seamless access to the content they wanted, when they wanted it. A sample of participant comments illustrating their frustrations is presented in Table 7.

*Obstacles encountered in using the Internet.* Participants experienced a gap between their current knowledge and the knowledge required to use the Internet. As indicated in Table 8, some viewed the Internet as alien and enigmatic. Its logic did not make sense to them. It seemed to be working in a foreign language. For most this signaled a need for high maintenance learning, hands-on instruction and other activities they viewed as too time consuming. In addition, many users found the Internet to be a source of apprehension. They feared "messing up" or breaking the machine.

#### **DISCUSSION**

Personal and situational factors influenced early Internet use in a sample of low-income adults given home Internet access for the first time. Race and age also influenced Internet use throughout the first year of the project. Taken together these findings support the view that the digital divide should be reconceptualized as a "use" divide and future research should focus on cultural factors that influence the frequency and nature of technology use.

**TABLE 6: TECHNICAL SUPPORT REQUESTS**

<u>Source</u>	<u># of requests</u>	<u># of home visits</u>	<u>Examples</u>
Phone-in	256	186	"Computer will not load Windows and defaults to the c:/ prompt." "Unable to access any of the programs on my computer."
E-mail	35	8	"Unable to remove suspicious program." "We have had problems shutting down the correct way. ___ installed some program called mesh ever since we have had problems."
Dairy	31	22	"Dial up screen was not popping up and participant did not know how to connect to Internet without it." "OE icon not working right. Needs an ini file associated with it."
Totals	312	216	

**TABLE 7: PARTICIPANTS' COMMENTS: FRUSTRATIONS WITH USING THE INTERNET**

<i>Sometimes it freezes up and I can be in the middle of looking for something or playing a game or something or reading and I'll be 'Oh, no, not now!'</i>
<i>I also don't like when it says 'you have a debug error, do you want to fix it now?' And I hate that. No answer...then it redials on you.</i>
<i>Computers are supposed to be pretty smart, they say. I feel like it's supposed to be showing me things that make sense. I don't know if it's just not loading, or the computer don't figure out what I put down.</i>
<i>I don't know what the word is because I don't know the computer verbiage...you can't just go and do a report on refrigerators...I get frustrated...just give me the information!</i>
<i>We've been having problems with this thing right here and it tells you what to do and how to test it and if you do what it tells you to do and it still doesn't work, you're stuck. I got stuck on that.</i>
<i>I tried to build my own Web site...it just frustrated me. I just couldn't do what I wanted, I just couldn't figure certain things out. I did everything it said to do and I still couldn't do it.</i>
<i>Sometimes I get this prompt that says 'Save Mode.' Everything would be different, you couldn't print, you couldn't access the Internet. I couldn't figure it out.</i>

**TABLE 8: PARTICIPANTS' COMMENTS: OBSTACLES ENCOUNTERED IN USING THE INTERNET**

<i>But I don't think I really understand the Internet. I feel there's some sort of secret behind using it.</i>
<i>It just seems so, I don't know, convoluted or something.</i>
<i>I know how to find what I need usually, but in this medium ... I don't really. It's less familiar. It's not comfortable.</i>
<i>I went to a computer class to learn how to use email and I almost cried. I didn't want to do it...click, double click? I was like 'click what'? I couldn't even double click...it took away my motivation to email this person.</i>
<i>I never cried here...but in that class, it was like Chinese, and this was supposed to be an introduction...and I didn't know how to click... 'On an icon?' An icon is something in church... Mary and Jesus is what I saw growing up.</i>
<i>I feel lost. I love to be in charge. Because I feel if you're in charge you get things done. You know, you're all out of sorts...because I don't know what I'm doing or where I'm going.</i>
<i>You know regular people like me, who want a computer, what would they do without support?</i>
<i>I may go through the first ten sites and then I say forget it. I don't have time... That's what I say, I don't have time for this.</i>
<i>I feel like I don't have time ...who has time to watch or play with these machines. There's so much more in life to do.</i>
<i>I was afraid to touch it. I guess what I was afraid of was getting on there and messing everything up, of deleting everything.</i>
<i>I am not very comfortable with the technology itself...I feel like I am going to break it. I am always afraid of doing something wrong.</i>

Personal factors that predicted Internet use were self-perceived Internet skills, affect toward the Internet, previous experience using the Internet, and race and age. Greater self-perceived Internet skills and previous experience predicted greater Internet use, but only during the first six months of home access. More positive affect toward the Internet predicted greater Web use, but not email use. Instead, more negative affect was associated with sending fewer emails. Thus, affect's influence on Internet use depended on both the valence of affect and nature of Internet use. Positive affect appears to facilitate use of the Internet's information tools whereas negative affect appears to undermine use of the Internet's communication tools, at least during the early stages of use (i.e., first six months).

Situational factors predicted Internet use but, like personal characteristics, their influence was limited to the early stages of use. Contrary to predictions, greater success in finding information on the Web was associated with *less* rather than more Internet use. The nature of Internet use by HomeNetToo participants may explain this seemingly paradoxical finding. HomeNetToo participants used the Internet primarily to find information, rather than to communicate with others. In fact, they made very little use of email, sending a mere two to three emails per week throughout the first year of the project – despite spending about 40 minutes per day online. Given their focus on finding information, it is not surprising that those who more successful in doing so spent less rather than more time online.

Also contrary to predictions, greater family support for Internet use was associated with *less* rather than more use during the first six months of the project. One explanation for this finding is that participants who reported more help from family members actually needed more help, and were consequently less inclined to use the Internet. It was simply too difficult for them to use. Alternatively, the presence of "helpful" family members may signal the presence of "heavy" Internet users in the household – users who monopolized the computer, limiting the time available for other household members (Kiesler, Zdaniuk, Lundmark & Kraut 2000).

Among all the predictors of Internet use considered in this research only race and age predicted use at both time periods (i.e., throughout the project). African Americans and older participants used the Internet less than did European Americans and younger participants, respectively, even when use during the preceding time period was controlled. The persistence of race differences in Internet use when (low) income is relatively homogeneous raises questions about the "access solution" to the digital divide, discussed earlier and by others (Hoffman & Novak 1998, 2000; Jackson et al. 2001a). It also suggests that a reconceptualization of the digital divide that focuses on use rather than access may be helpful in distributing the benefits of digital technologies to all. Such a reconceptualization directs research attention to cultural factors that influence the extent and nature of technology use.

Why might African-Americans use the Internet less than European Americans, even when access to technology is not an issue? One possible explanation lies in cultural differences in preferred communication modalities and partners. African American culture is often characterized as an "oral culture" in which face-to-face communication with known others is strongly preferred over other modalities and communication partners (e.g., strangers; Shade, Kelly & Oberg 1997). African Americans' preference for oral communication may render the text-based nature of email communication less appealing to them than it is to other racial/ethnic groups, thus undermining their overall level of interest in using the Internet (UCLA 2000, 2001). And their preference for communication with known others may undermine their use of

other Internet communication tools, such as chat. Support for this argument is found in the comments of our African American participants:

*I don't like it...I don't talk to people I don't know. I have people I can talk to, so no, I don't go to the chat room.*

*This word right here scares me... 'chat'...because I like to know who I'm communicating with. But at the same time they can never find out who I am, but still... Just watching the TV, things that have happened...bad things. I don't see good things happen to them. I just rather for me and my family not to chat. Especially my girls.*

*I have talked to them about chat lines and stuff, and you shouldn't get on to nothing like that because you don't know who you're talking to. Whether they sound friendly or not, you don't even know who you're talking to.*

Another explanation for the infrequent use of email by HomeNetToo project participants, regardless of race, is that the participants quite simply had no one to email. Project participants were selected because they had low incomes. It is likely that their families and friends also had low incomes. Therefore it is unlikely that their families and friends had home computers and Internet access. Similarly, it is unlikely that project participants had jobs that required or encouraged email communication with colleagues. Thus, email communication was infrequent simply because the participants had few people to email.

Returning to the issue of race differences, an explanation for race differences in Web use may lie in cultural differences in aesthetic preferences. Internet Web pages and the architecture of the Internet itself has been designed primarily by White males. It is conceivable that both explicit and implicit design features of the Web are less appealing to African Americans than to members of other racial/ethnic groups. Support for this cultural explanation can again be found in participants' comments:

*This site was not created with much thought of African American culture or interests. I really don't feel represented on this site.*

*It's not a Web site if you wanted to appeal to more blacks. The colors...the food...You see the color...black people like color.*

Other findings in this research indicate unequivocally that novice Internet users require a great deal of technical support in using their computers and Internet at home. The problems they experienced resulted in no less than

256 phone-calls to the project help-line, 35 emails to project staff, and a total of 216 technical support visits to the home, over and above scheduled home visits during which technical support was also provided. Problems ranged from the mundane (e.g., uninstalling software) to the apparently fatal (computer would not boot). Implications of this high need for technical support must be taken into account in future efforts to reduce the digital divide by increasing access to the technology.

More research is needed to identify cultural factors that influence Internet use once access is assured, and the implications of these cultural factors for the design of technology that is truly inclusive. Such research should consider the needs and preferences of a global community of potential Internet users. As wireless technology extends the reach of the Internet and other digital technologies to the most remote corners of the globe, the need to understand and design for a diverse set of users becomes all the more urgent.

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## APPENDIX: MEASURES EMPLOYED IN THE HOMENETTOO PROJECT

### 1) PERSONAL FACTORS

#### Self-perceived Internet skills:

I am very skilled at using the Internet.  
(1=strongly disagree, 5=strongly agree)

#### Positive affect toward the Internet:

Using the Internet is fun.  
I feel relaxed when I use the Internet.  
I like to play around on the Internet.  
I enjoy using the Internet.  
Using the Internet makes me feel good about myself.  
(1=strongly disagree, 5=strongly agree)

#### Negative affect toward the Internet:

I get nervous when I use the Internet.  
Using the Internet is frustrating.  
Using the Internet is stressful.  
I feel tense when I use the Internet.  
I feel confused when I use the Internet.  
(1=strongly disagree, 5=strongly agree)

#### Previous experience using the Internet:

How would you rate the extent of your experience with the Internet?

1. No experience
2. Very little experience
3. Some experience
4. A moderate amount of experience
5. A great deal of experience

How long have you been using the Internet?

1. I never used the Internet.
2. less than 6 months
3. about a year
4. about 2 years
5. more than 2 years

How often do you use the Internet?

1. I never used the Internet.
2. a few times a year

3. a few times a month
4. a few times a week
5. almost every day

Demographic characteristics:

Race/ethnicity (circle a number):

1. Black/African American
2. White/Anglo American
3. Hispanic
4. Asian American
5. Native American
6. Other (please specify): \_\_\_\_\_

Current Age (to the nearest year): \_\_\_\_\_ years-old

Sex: 1=Male 2=Female

What is the total annual income your household (gross, approximately)?

1. Under \$10,000
2. \$10,000 to \$14,999
3. \$15,000 to \$24,999
4. \$25,000 to \$34,999
5. \$35,000 to \$49,999
6. \$50,000 to \$75,000
7. over \$75,000

Highest grade of school completed:

1. 8<sup>th</sup> grade or less
2. some high school but did not graduate
3. high school graduate or GED
4. some college
5. college graduate
6. graduate-level work

For the analyses reported here, 1=High school graduate or less, 2=some college, 3=college graduate or more

Current marital status:

1. Never married
2. Married, living with spouse
3. Divorced
4. Separated

## 5. Widowed

For the analyses reported here, 1=never married, 2=married living with spouse, 3=other (divorced, separated, widowed)

## **2) SITUATIONAL FACTORS**

### Success using the computer and Internet

How successful have you been in using E-mail?

1. Very unsuccessful
2. Unsuccessful
3. Neither successful nor unsuccessful
4. Successful
5. Very successful

How successful have you been in finding information on the Internet?

1. Very unsuccessful
2. Unsuccessful
3. Neither successful nor unsuccessful
4. Successful
5. Very successful

How successful were you in doing what you wanted to do the last time you used your computer?

1. Very unsuccessful
2. Unsuccessful
3. Neither successful nor unsuccessful
4. Successful
5. Very successful

### Family support for computer and Internet

When you have problems using your computer, how helpful are other members of your family/household?

1. Not at all helpful
2. A little helpful
3. Somewhat helpful
4. Helpful
5. Very helpful

Do you think your family/household members enjoy helping you to use the computer?

1. Definitely do not enjoy helping me
2. Do not enjoy helping me
3. No feelings one way or the other

4. Do enjoy helping me
5. Definitely do enjoy helping me

Do you think having a home computer has helped or hurt relationships within your family/household?

1. Has definitely harmed relationships
2. Has harmed relationships
3. Has had no effect on relationships
4. Has helped relationships
5. Has definitely helped relationships

Do you think family/household members have more or less respect for you since you began using a home computer?

1. Definitely have less respect for me
2. Have less respect for me
3. Has had no effect on their respect for me
4. Have more respect for me
5. Definitely have more respect for me

Do you have more or less respect for family/household members who have been using the home computer?

1. Definitely have less respect for them
2. Have less respect for them
3. Has had no effect on my respect for them
4. Have more respect for them
5. Definitely have more respect for them

Is there any conflict in your family/household over who gets to use the computer?

1. Almost never
2. Occasionally, but not often
3. Sometimes
4. Frequently
5. Almost always