Instructional Set and Internet Use by Low-Income Adults

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ABSTRACT

This research examined the effects of instructional set on Internet use by low-income adults during a 16-month longitudinal study. Participants (n = 117) received instructions that focused on either the Internet's communication tools or its information tools. Internet use was continuously and automatically recorded. Survey measures of computer and Internet experiences, affect and attitudes were obtained to examine their mediational role in the relationship between instructional set and Internet use. Results indicated that instructions focused on the Internet's information tools led to greater Internet use than instructions focused on its communication tools or only basic instructions about how to use the Internet. Implications for reducing the digital divide are discussed.

INTRODUCTION

HOME NETTOO is a longitudinal field study designed to examine the antecedents and consequences of home Internet use in low-income families (<www.msu.edu/user/jacks067/homenettoo>). The study began in 2000 when 90 families received home computers, Internet access and in-home technical support in exchange for allowing their Internet use to be continuously and automatically recorded, participating in home visits, and completing surveys at multiple points during the 16-month trial. This report focuses on whether instructions about how to use the Internet provided at pre-trial, 1 month, and 3 months influenced subsequent Internet use. Also considered is the mediational role of early computer and Internet experiences, affect and attitudes on the relationship between instructional set and Internet use.

Previous research suggests that communication and information are the primary motives for using the Internet, and that communication is generally the stronger of the two. Indeed email has been referred to as the “killer application” of the Internet. According to researchers at Carnegie Mellon University: “Despite the hoopla surrounding the WWW, and not to dismiss its power in many domains, it is possible that interpersonal communication is driving the average person’s use of the Internet.”

In support of the view that communication is the primary motive behind Internet use, national surveys indicate that the overwhelming majority of people who use the Internet at home use it mainly for e-mail. Even information search is often motivated by the need to communicate with others. The most popular reason for using a search engine is to find other people. On the other hand, the monumental success of the World Wide Web attests to the importance of information motives in everyday use of the Internet. The Web is quickly replacing traditional sources of information (e.g., newspapers), especially among today’s youth. With virtually no limit to the number of Web pages in sight, the Web will likely become the primary source of information for everyone who has access to it.

In the HomeNetToo project we examined whether focusing instructions about how to use the Internet on either its communication or informa-
tion tools would influence Internet use in the months that followed. Participants in the project were low-income adults, a group neglected in much of the research on Internet use.\textsuperscript{7,8,14–18} Low-income adults are of particular interest not only for testing the generalizability of previous findings but also for identifying barriers to Internet use that may be unique to this group. Based on previous research the following hypothesis was formulated:

Instructions on Internet use that focus on its communication tools will result in greater Internet use than instructions that focus on its information tools. Both types of instructions will result in greater Internet use than only basic instructions about how to use the Internet.

Also examined in this research was whether computer and Internet experiences, affect and attitudes mediate the relationship between instructional set and Internet use. Although there is abundant research on the correlates of Internet use, including computer and Internet experiences and attitudes,\textsuperscript{8,19–28} few studies use longitudinal designs that permit a consideration of cause-effect relationships. Fewer still use continuously and automatically recorded measures of Internet use.\textsuperscript{3,4}

\section*{MATERIALS AND METHODS}

\subsection*{Participants}

Adult participants in the HomeNetToo project were 117 residents of a low-income, medium-sized urban community in the mid-western United States. A total of 90 families participated in the project. Only four families did not complete the 16-month trial, attributable to death (one family), relocation to another city (two families), and difficulties monitoring teenager’s use of the Internet (one family). Approximately 140 children of the 117 adult participants discussed in this report also participated in the project but completed different surveys. Participants were recruited at meetings held at their children’s middle school and at the Black Child and Family Institute, Lansing, Michigan. Invitations were extended to all parents whose children were eligible for the federally subsidized school lunch program. To participate in the project a family had to have home telephone service for at least the previous 6 months, consent to having their Internet use continuously and automatically recorded, and agree to completing surveys and participating in home visits at multiple points during the 16-month trial. Also necessary was that participants had never before had home Internet access.

Demographic characteristics obtained at pre-trial indicated that participants were primarily African American (67%), female (80%), never married (42%), and earning less than $15,000 USD annually (49%; net household income). The majority of participants reported having some college education or earning a college degree (62%), indicating that our sample was better educated than is typical of low-income samples.\textsuperscript{17} Average age of participants was 38.6 years old.

\subsection*{Procedures}

Three instructional set conditions were created by varying the Internet activities that participants engaged in during home visits at pre-trial, 1 month, and 3 months. Participants were randomly assigned to instructional set condition, the only restriction being that all members of the same household participate in the same condition (i.e., households were randomly assigned to conditions). Home visits lasted about 1.5 h, and all adult family members were required to participate in them.

\subsection*{Instructional set}

\textit{Communication condition.} Participants in the communication condition were first given basic instruction about how to use the Internet. Basic instruction consisted of verbal instructions from the visiting undergraduate “technology facilitator,” a facilitator-guided demonstration of how to turn on and off the computer and how to logon to the Internet and use email, and handouts prepared by project staff about how to use the computer, Internet and e-mail.

At pre-trial participants in the communication condition, with guidance from the visiting technology facilitator, navigated the project’s web site to an Online Activities drop-down menu, where he or she selected one of three online tutorials about how to use e-mail. Online tutorial options are presented in Table 1. Following the tutorial the participant was guided through the process of sending an e-mail to himself or herself and project staff. During this activity the technology facilitator pointed out how new e-mail was indicated on the screen, how long it takes (typically) between sending and receiving an e-mail, how to open, save and delete an e-mail, and how to view contents of the sent folder.

At one month the participant, together with the visiting technology facilitator, repeated the process
that occurred during the pre-trial home visit, except that the topic of instruction was mailing lists rather than e-mail. The online tutorial options for mailing lists are indicated in Table 1. At three months, the same process was repeated except that the topic of instruction was Internet chats (Table 1).

**Information condition.** Participants in the information condition first received basic instructions about how to use the Internet, identical to those received by participants in the communication condition. Then, at pre-trial, the participant, together with the visiting technology facilitator, navigated the project's web site to the Online Activities drop-down menu where he or she selected one of the online tutorials about the WWW (Table 1). At 1 month the process was repeated, except that the topic of instruction was search engines. At 3 months, the process was repeated again, except that the topic of instruction was newsgroups. Internet communication tools often serve information functions, and information tools often involve communication. We categorized Internet tools as communication or information based on their primary use and on how personal they appear to the user. Thus, e-mail, mailing lists and chat were categorized as communication tools, and the Web, Web search and newsgroups as information tools. Although mailing lists provide information, their mode of delivery and posting is e-mail, the quintessential communication tool of the Internet. Although newsgroups provide a means of communicating, their mode of delivery and posting is impersonal, and emphasizes information rather than communication.

**Basic instructions condition.** Participants in this condition received only basic instructions about how to use the computer and Internet. Thus, at pre-trial, 1 month, and 3 months, they received verbal instructions from the visiting technology facilitator, a facilitator-led tour of how to use the computer, Internet and e-mail, and handouts prepared by project staff about how to use the computer, Internet and e-mail.

**Internet use**

Four measures of Internet use were automatically recorded for 16 months for each participant: time online (minutes per day), number of sessions (logins per day), number of domains visited (per day) and number of e-mails sent (per day). To examine

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**Table 1. Online Tutorials**

<table>
<thead>
<tr>
<th>Category</th>
<th>URL</th>
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<tr>
<td>E-mail</td>
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<tr>
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<tr>
<td></td>
<td>Exploring Usenet Groups: <a href="http://www.deja.com/usenet">http://www.deja.com/usenet</a></td>
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changes over time each of these measures were divided into five time periods, three that corresponded to survey administration points plus half-year and 1-year points. The time periods were as follows: time 1 (1–3 months), time 2 (4–6 months), time 3 (7–9 months), time 4 (10–12 months), time 5 (13–16 months).

Survey measures

Surveys administered after the three-month home visit included the following measures, adapted from previous research.[3,14,15,29] Computer experiences (three items; e.g., How successful have you been in using your computer? 1 = very unsuccessful, 5 = very successful); Internet experiences (five items; e.g., How successful have you been in finding information on the Internet? 1 = very unsuccessful, 5 = very successful); Computer affect: positive affect (five items; e.g., Using a computer is fun, 1 = strongly disagree, 5 = strongly agree), negative affect (five items; e.g., I get nervous when I use a computer, 1 = strongly disagree, 5 = strongly agree), technophobia (11 items; How anxious (nervous) do you feel when you are doing, or thinking about doing each of the following? e.g., Getting an "error message" on a computer? 1 = not at all anxious, 5 = very anxious); Internet affect (10 items); positive affect (five items; e.g., I enjoy using the Internet, 1 = strongly disagree, 5 = strongly agree), negative affect (five items, e.g., I feel tense when I use the Internet, 1 = strongly disagree, 5 = strongly agree); Computer attitudes (four items; e.g., Using computers helps children to do better in school, 1 = strongly disagree, 5 = strongly agree); Internet attitudes (nine items, e.g., Using the Internet helps children to do better in school. 1 = strongly disagree, 5 = strongly agree).

Pre-trial measures were obtained of previous experience/skills using computers (three items; e.g., How would you rate the extent of your experience with computers? 1 = no experience, 5 = a great deal of experience), previous experience/skills using the Internet (three items; e.g., Overall, how would you rate your skills at using the Internet? 1 = no skills, 5 = very good skills) and demographic characteristics (race, gender, age, income, marital status, education).

RESULTS

Preliminary analyses

Before examining the effects of instructional set on Internet use we examined whether there were pre-existing differences among the instructional set groups in their experience/skills using computers and the Internet. Composite scores (arithmetic averages) were computed for previous experience/skills using computers (alpha = .91, M = 2.71, Md = 2.67, Mode = 1, sd = 1.25) and previous experience/skills using the Internet (alpha = .92, M = 1.94, Md = 1.84, Mode = 1, sd = 1.03). Because these composite measures were highly correlated (r = .70), and because the focus of this research was on Internet use rather than computer use, previous experience/skills using the Internet was the measure used in subsequent analyses.

One-way analysis of variance (ANOVA) indicated differences among the instructional set groups in their previous experience/skills using the Internet, F(2,110) = 7.72, p < .001. Participants in the communication condition had more Internet experience/skills (M = 2.42) than did participants in the information (M = 1.85) or basic instructions conditions (M = 1.53), which did not differ from each other. Therefore, previous experience/skills using the Internet was included as a covariate in the analyses examining the effects of instructional set on Internet use.

Composite measures (arithmetic averages) of computer affect (positive, negative, technophobia) and Internet affect (positive and negative) were computed. Coefficient alphas for these measures ranged from .80 to .89, indicating good reliability.

Instructional set and Internet use

Multivariate ANOVAS were used to examine the effects of instructional set on Internet use (i.e., time online, number of sessions, number of domains visited, number of e-mails sent) during each time period (i.e., time 1 to time 5). Because of high variability and skewed distributions, log transformations of Internet use measures were used in all analyses. Previous experience/skills using the Internet was included as a covariate.

A significant multivariate effect of instructional set was obtained at time 2, F(2,46) = 2.09, p < .05 (Wilks’ Lambda). Univariate statistics revealed main effects of instructional set for time online, F(2,49) = 3.48, p < .05, number of sessions, F(2, 49) = 4.02, p < .05, and number of domains visited, F(2, 49) = 4.99, p < .01, but not for number of e-mails sent, F(2, 49) = 0.22, p < .80. Means for the instructional set groups are presented in Table 2. Participants in the information condition spent more time online than did those in the communication or basic instructions conditions. Participants in the information condition engaged in more Internet ses-
sions and visited more domains than did those in the basic instructions condition.

Although differences did not reach statistical significance for the other time periods, they were consistently in the same direction. Participants in the information condition used the Internet most, and those in the basic instructions condition used it least.

Mediatational effects of computer and Internet experiences, affect and attitudes

Given the evidence that instructional set influenced Internet use, we examined whether instructional set also influenced computer and Internet experiences, affect and attitudes. If so, then these measures may mediate the relationship between instructional set and Internet use. MANOVAs were performed for each set of measures, with previous experience/skills using the Internet as a covariate.

Instructional set influenced computer experiences and attitudes. Participants in the communication condition reported more success using e-mail ($M = 3.24$) than did those in the information condition ($M = 2.50$), but not compared to those in the basic instructions condition ($M = 3.12$; $F(2,103) = 3.12$, $p < .05$). Participants in the communication and information conditions believed that computers were more important to children’s success in school ($Ms = 4.53$, $4.25$, respectively) than did participants in the basic instructions condition ($Ms = 4.01$; $F(2,103) = 3.15$, $p < .05$). There were no differences among the three instructional set groups on pre-trial measures of computer and Internet affect or attitudes.

Next we examined whether e-mail success and attitudes about the importance of computers to children’s success in school predicted Internet use at time 2. If so, they would be viable candidates for mediating the relationship between instructional set and Internet use. Regression analyses were performed separately for each measure to predict Internet use, controlling for previous experience/skills using the Internet. Results indicated that neither e-mail success nor attitudes about the importance of computers to children’s school success predicted Internet use, regardless of which measure of Internet use was considered. Thus, e-mail success and beliefs about the importance of computers to children’s school success cannot explain the relationship between instructional set and Internet use. Results of analyses to examine the effects of demographic characteristics on Internet use and survey measures, and results of analyses of survey measures obtained at nine months and post-trial may be found in Jackson et al.30

DISCUSSION

Instructions about how to use the Internet provided to low-income users influenced their Internet use in the months that followed. Consistent with predictions, instructions that focused on the Internet’s information tools resulted in greater Internet use than only basic instructions about how to use the Internet. However, contrary to predictions, instructions that focused on the Internet’s communication tools did not result in greater Internet use than basic or information-focused instructions.

One explanation for the failure of communication-focused instructions to increase Internet use may lie in the infrequent use of the Internet’s communication tools. HomeNetToo participants seldom used e-mail, sending an average of only two to three e-mails per week throughout the 16-month trial. Evidence presented elsewhere indicated that chat and instant messaging were similarly infrequent activities for both adults30–32 and children in the project.33 Thus, while instructions about how to use the Internet’s communication tools were clearly helpful, contributing to e-mail success, use of these

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TABLE 2. INSTRUCTION SET AND INTERNET USE

<table>
<thead>
<tr>
<th></th>
<th>Communication (n = 38)</th>
<th>Information (n = 43)</th>
<th>Basic instruction (n = 35)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>sd</td>
<td>Mean</td>
</tr>
<tr>
<td>Time online (min)</td>
<td>42.46</td>
<td>70.18</td>
<td>56.41</td>
</tr>
<tr>
<td>Number of sessions</td>
<td>0.82</td>
<td>0.96</td>
<td>0.82</td>
</tr>
<tr>
<td>Number of domains visited</td>
<td>11.31</td>
<td>12.66</td>
<td>13.70</td>
</tr>
<tr>
<td>Number of e-mails sent</td>
<td>0.21</td>
<td>0.33</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Internet use was automatically recorded. Values are per day at time 2 (4–6 months) n, sample size; sd, standard deviation.
tools was too infrequent to contribute to overall Internet use.

Why did HomeNetToo participants make so little use of the Internet’s communication tools? An answer to this question may be so obvious as to be easily overlooked. HomeNetToo participants were poor. Their families and friends were likely to be poor. Poor people do not typically have home Internet access. Moreover, HomeNetToo adults were not employed in occupations that required or encouraged e-mail communication with colleagues. Thus, in the absence of family, friends and co-workers online, it is not surprising that HomeNetToo participants made so little use of the Internet’s communication tools. These findings underscore the importance of considering socio-economic status in research on Internet use. Findings obtained for one socio-economic group may not generalize to other groups.

As an alternative explanation for the infrequent use of the Internet’s communication tools observed in the sample is that using such tools tends to require more complex typing and writing skills than are required to simply find information. Chat, Instant Messaging and online group communication may be particularly demanding and complex modes of communication for which our participants were not yet socialized. Taken together with a general reluctance to communicate with strangers, evidenced in our ethnographic data, it is again unsurprising that participants made so little use of the Internet’s communication tools.

Yet another possibility is that the instructions provided in the information condition were somehow “better” than those provided in the communication condition, accounting for the greater overall Internet use in the former condition. While we cannot rule out this explanation entirely, the design of the two instructional sets argues against it. Both included online tutorials that were chosen specifically to have similar difficulty levels. Both required about the same amount of time to administer. Nor was there any indication in the behavior of our participants that they found one instructional condition more difficult to understand than the other (e.g., questions asked during the instructional sessions).

Participants made good use of the Internet’s information tools (i.e., the Web). Instructions that focused on how to use these tools resulted in greater Internet use than when only basic instructions about how to use the Internet were provided. Emphasizing the Internet’s information tools may be especially important in introducing the Internet to low-income groups, who typically have fewer resources with which to access information. Thus, one implication of our findings is that more emphasis should be given to the Internet’s information functions rather than its communication functions in introducing the Internet to low-income users and in encouraging Internet use. This is not to say that communication functions should be ignored. Indeed every effort should be made to encourage low-income users to use the Internet’s communication tools so that they too may benefit from the social connectedness that such use seems to foster in higher-income users. However, it may still be the case that contrary to previous claims, e-mail may not be the driving force behind Internet use for all socioeconomic groups.

Instructional set influenced participants’ computer experiences and attitudes during the first three months of home Internet access. Instructions focused on the Internet’s communication tools resulted in greater success using e-mail than instructions focused on information tools. Instructions focused on either communication or information tools resulted in stronger beliefs about the importance of computers to children’s success in school than did basic instructions. Although attitudes about the importance of computers to children’s school success did not influence parents’ Internet use, they may influence the extent to which parents encourage their children to use computers and the Internet. Given the complex relationship between attitudes and behavior, more research is needed to understand how computer and Internet attitudes influence computer and Internet use by parents, and the extent to which parents encourage their children’s computer and Internet use.

Findings from the HomeNetToo project underscore the importance of longitudinal studies to understand everyday Internet use. Our findings suggest that factors influencing early Internet use may become less important over time. Factors influencing later Internet use are seldom considered in cross-sectional studies that examine correlates, but not causes of Internet use. More research is also needed on Internet “churn” – the cessation of Internet use over time—and the implications of differential churn rates for the digital divide. If low socioeconomic groups are leaving the Internet at more rapid rates than are higher socioeconomic groups, then the digital “use” divide may be widening at the very same time that the digital “access” divide is narrowing.

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