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Understanding Predictors of Computer Communication Technology Use by Older Adults

John S. Burnett¹, Tracy L. Mitzner¹, Neil Charness², and Wendy A. Rogers¹

¹Georgia Institute of Technology, Atlanta, Georgia, USA

²Florida State University, Tallahassee, Florida, USA

Abstract

Technologies have evolved to allow older adults the ability to communicate in a variety of ways, yet little work examines the perceptions that older adults have of these technologies. Our research explored older adults' use of computers for communication activities. We analyzed questionnaire data from two hundred and eighty-one participants with computer experience who answered questions about their background; the amount of experience they had with computers and other technologies, their perception of the importance of several communication activities for their quality of life, and how useful a computer is for those activities. A regression analysis explored the degree to which demographic variables, the importance of activities for their quality of life, and prior experience predicted respondents' attitudes about the computer's usefulness for communication activities. The findings, based on a group of older adult computer users, suggest that the importance of communication activities for an older adult's quality of life and their prior experience with computers are significant predictors of the perception of a computer's usefulness for communication activities. Previous research has found that one's experiences with a computer system are critical for adoption. Our work reaffirms that tenet, yet finds that the degree to which an activity is important for one's quality of life is also predictive of how useful a computer will be for that activity. Our findings also suggest that certain communication activities, such as email, are more preferred than other activities, such as chat groups. This present survey of experienced older adult computer users can guide development of training materials and products for older adults by informing designers of the ways by which older adults form perceptions about the usefulness of technologies.

INTRODUCTION

Computers and communication technologies have evolved to include features that allow individuals to develop and maintain relationships in a variety of modes. Some of these features may be particularly useful for older adults. For example, by assisting in searches for old friends, connecting with family members via a video conference, or sharing photos of loved ones with far away friends, computers and other communication technologies may provide older adults with a broader social support structure.

Many older adults use the Internet, as well as email. The Pew Internet and American Life project indicated that 58% of older adults between the ages of 65–73 go online, and that 30% of adults over the age of 74 go online. Of this sample of older adults, 90% and 88% (respectively) use the Internet for email (Zickuhr, 2010). These data make clear that many older adults utilize the Internet for communication activities.

Despite the benefits of using computers for communication activities, a significant percentage of older adults remain nonusers. There are a variety of potential reasons for this population of nonusers. Understanding the factors related to older adults' use of computers may provide insight into why some older adults do not adopt computers for communication.

A number of variables contribute to the adoption of communication technologies. Technology experience has been shown to significantly influence general technology adoption in a number of studies (e.g., Czaja & Sharit, 1998). Perceived benefits have also been found to impact adoption of a communication technology. For example, Melenhorst, Rogers, and Bouwhuis (2006) found that perceived benefits, along with technology experience, were decisive factors in determining adoption of email.

Other researchers have found demographics, such as age, education, and gender, to be predictive of adoption of computer technologies (Ellis & Alliare, 1999). In addition, older adults employ a cost-benefit approach to adoption of a technology, one that relies on characteristics of the technology and of the user (Sharit, Czaja, Perdomo, & Lee, 2004). In short, a number of variables predict technology adoption by older adults, however the ways in which older adults form or maintain perceptions vital to adoption is not well understood.

Communication technologies hold great potential for improving the lives of older adults. Communication activities can significantly improve the quality of life for older adults (Selwyn, 2004). Activities, such as email or social networking, can potentially help older adults establish, build, and maintain relationships. Computers have the ability to significantly improve one's social connections.

This study was designed to examine variables associated with older adults' beliefs that a computer is useful for performing communication-related activities. Specifically, we focused on the relationship between the perceived importance of a communication activity and perceived usefulness of computers for that activity.

METHOD

Participants

Three hundred and twenty-one older adults (57% female) between the ages of 60 and 93 ($M = 74.62$; $SD = 5.98$) returned questionnaires for this study. Respondents received no compensation of any kind. The respondents were drawn from databases of older adults residing in two southeastern cities, and reported to be in good health. A total of 662 questionnaires were mailed (with 15 returned as undeliverable), and 321 were returned, yielding a response rate of 49.6%. Of the respondents, 281 reported themselves to be computer users, and were included in the present analyses.

Materials

The questionnaire contained five sections. The demographics section collected data about participants such as age, gender, education, income, and housing type. The technology experience section collected data about the level of exposure respondents had to specific household technologies, such as a microwave, Mp3 player, and answering machine.

The third section contained items designed to measure the attitudes older adults have regarding the importance of various tasks and activities in their life, using a six point Likert-type scale with a neutral point (Not Very Important to Very Important). The tasks and activities included communication activities (such as communicating with family, friends, sending or receiving photos), which are the focus of the current study.

In the fourth section of the questionnaire respondents were asked to report how useful they thought a computer would be for assisting with the activities and tasks presented within the third section.

In the fifth and final section, respondents were introduced to a fictional computer system, called PRISM. PRISM was described, in short, as a Personal Reminder, Information, and Social Management computer system designed specifically for older adults. Respondents were instructed to imagine they were adequately trained to use this system and were then asked questions about the importance of having access to various activities and tasks through PRISM. Respondents were also asked about design characteristic preferences, such as interface design.

RESULTS

Overview of Variables

Several composite variables were created from the questionnaire responses. A technology experience composite variable was created using questions that probed a respondents' experience with a number of different technologies (not just limited to computer technologies). A computer experience composite score was created using responses from questions that probed respondents' experience with computers. Importance and usefulness composite scores were formed using the data gathered from the questions that queried respondents' perceptions of the importance of specific communication activities (section three of the questionnaire), and the usefulness of a computer for performing those activities (section four of the questionnaire).

Overview of Results

Respondents had varying preferences about computer communication technologies. However, a number of patterns emerged when we examined their preferences for specific computer communication activities. Overall, the importance respondents placed on specific activities had a significant impact on how useful they thought a computer would be for those activities. Additionally, the amount of experience that respondents had with a computer and with technology, in general, influenced their attitudes about how useful a computer was for performing communication activities.

Usefulness of a Computer for Communication Activities

We explored the relationship between demographic variables, the importance of communication activities for one's quality of life, computer experience, technology experience, and the degree to which these variables predict one's perception of the usefulness of computers for communication activities. To accomplish this, a regression analysis was conducted. The results of this analysis can be found in Table 1. A number of respondents had missing or incomplete answers, though these occurred completely at random, as determined by Little's MCAR test (Little, 1988). A listwise deletion procedure was used to remove those subjects, reducing the number of subjects included within the equation to 119.

The dependent variable was perceived usefulness of a computer for communication activities, defined as the degree to which an older adult thought a computer was useful for communication activities. The importance that older adults viewed communication activities for their quality of life was a strong predictor of usefulness. Even within this older adult sample, chronological age was a significant predictor of usefulness. The strongest predictor of older adults' perceptions about the usefulness of computers for communication activities was the amount of experience an individual had with a computer.

Respondents' Views of Specific Communication Activities

Melenhorst, Rogers, and Bouwhuis' (2006) findings showed that the perception of benefits of a technology is critical for technology adoption. However, the data presented in Table 2 suggest that another contributing factor in the adoption of technology by older adults is the attitude that certain capabilities of that technology are important to have in a new computer system. Older adults generally rated chat groups, dating websites, forums, social networking, and video conferencing as activities that were not very important. Conversely, they rated emailing and emailing photos to be the most important activities. This finding, paired with the knowledge that more than 88% of older adults who use computers use them for emailing (Pew Internet and American Life Project, 2010), suggests that email is perceived as an important communication technology for many older adults.

DISCUSSION

The data from the present survey of older adults show that prior experience and the perceived importance of an activity for one's quality of life are significant predictors of the perception of usefulness of a computer for communication activities. Previous work (see Melenhorst et. al., 2006) has found computer experience to be a significant predictor of technology adoption. We found converging evidence that computer experience is a significant predictor of computer adoption for certain activities, with a caveat that the user must also believe that the activity for which to use the technology is important for their quality of life. Our data supported this hypothesis with respect to communication activities.

An additional significant predictor of perceived usefulness was the perceived importance of communication activities. These results provide insight into how older adults develop a

perception of usefulness. Older adults that view tasks as important are more likely to use a computer to engage in them.

An assessment of potential users' attitudes about the importance of different activities and their computer experience is a critical first step to facilitate technology adoption. Human factors professionals can guide development of training materials and products by understanding and assessing these experiences and attitudes. Because computer experience predicts attitudes about usefulness, understanding the level of users' experience can enable designers to develop technologies that fit the users, and by doing so, improve their perceptions of a technology's usefulness. It is important to maximize perceived usefulness given that positive attitudes about usefulness have been shown to be significant predictors of technology acceptance (Davis 1989).

An issue relevant to researchers and designers is the trend we found within specific communication technologies. I already talked to you about the last few paragraphs Older adults generally strongly preferred specific communication technologies. For designers, this would suggest a notion of making technologies more usable by older adults. Older adults generally use computers, in terms of communicating, for emailing. Including video conferencing or forums that are difficult to use or poorly understood by the user may only increase the complexity of a computer, making its use less likely. A comprehensive assessment of user needs and preferences for activities can assist designers in developing technologies that users perceive as being more useful.

Another explanation for the variation found regarding the usefulness of computers for different activities could be that older adults do not yet know how to use these features, or that they have had negative past experiences with the use of certain features. It is possible that training courses, e-learning modules, or support materials that describe these features in greater depth could increase adoption of these feature buy older users.

Older adult computer users provided insights into their perceptions of the importance and usefulness of computers to support communication activities. These data can inform design and training for current non-users of computers.

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Table 1

Summary of Regression Analysis for Variables Predicting Usefulness of Computers for Communication activities ($n=119$)

Variable	<i>b</i>	<i>SE b</i>	β
Age	.22	.09	.17*
Gender	-.86	1.03	-.06
Education Level	-.37	.38	-.07
Income	-.05	.30	-.01
Communication Activities Importance	.53	.12	.32*
Technology Experience Composite	-.04	.08	-.05
Computer Experience Composite	.27	.04	.61*

Note: $R^2 = .546$, Adjusted $R^2 = .518$

* $p < .05$

Table 2

Specific Computer Communication Activities

Communication-Related Computer Characteristics	<i>N</i>	<i>M</i>	<i>SD</i>	95% Confidence Interval
Emailing	276	4.67	.83	(4.5, 4.8)
Emailing Photos	271	3.80	1.33	(3.5, 3.9)
Mass Emailing	260	2.93	1.59	(2.6, 3.0)
Emailing Videos	260	2.88	1.51	(2.6, 3.1)
Instant Messaging	259	2.64	1.58	(2.3, 2.8)
Forums	252	2.30	1.35	(2.0, 2.4)
Social Networking	254	2.29	1.40	(2.1, 2.5)
Video Conferencing	224	2.22	1.41	(2.0, 2.4)
Chat groups	251	1.74	1.12	(1.6, 1.9)
Dating websites	239	1.45	.95	(1.3, 1.5)

Note: On a scale of 1–5, with 1 representing “Not Very Important” and 5 representing “Very Important.”

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