Published in final edited form as:
Libr Inf Sci Res. 2012 January 1; 34(1): 63–71. doi:10.1016/j.lisr.2011.07.006.

Improving older adults' e-health literacy through computer training using NIH online resources

Bo Xie
2117G Hornbake Library, South Wing, College of Information Studies, University of Maryland, College Park, MD 20740, U.S.A

Bo Xie: boxie@umd.edu

1. Introduction

Health literacy is a relatively new concept; the term first appeared in the health care literature only 35 years ago (Simonds, 1974). It was not until 1999 that definitions of this concept begun to emerge (American Medical Association, 1999). The U.S. Department of Health and Human Services (2000) defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (p. 11-20). Building on this definition, and motivated by the widespread adoption of information and communication technologies (ICTs) in health care (Oh, Rizo, Enkin, & Jadad, 2005), Norman and Skinner (2006b) promoted the concept of e-health literacy, or "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem."

E-health literacy is a critical issue for a rapidly aging population in an increasingly technology-driven society. While the vast majority of American adults have lower than proficient levels of health literacy, *health illiteracy* is even more severe among older adults who have the lowest level of health literacy among all adult age groups (Kutner, Greenberg, Jin, & Paulsen, 2006). The Internet holds great potential for improving health literacy; however, older adults are at risk of being left further behind, since their adoption of the Internet still lags behind other age groups (Zickuhr, 2010).

2. Problem statement

There is already extensive knowledge about the existence and prevalence of health illiteracy among the older population, and the impact of poor health literacy on health outcomes and health care costs (Institute of Medicine, 2004). Little is known, however, about what interventions might be effective in improving older adults' access to and use of high quality health information on the Internet. This research aims to address this gap in the literature and is unique in its theory-driven approach, and explicit focus on developing and assessing the effectiveness of a public library-based e-health literacy intervention designed specifically for older adults age 60 and above. These findings can generate valuable knowledge about what strategy, method, or approach may work for improving the health literacy of older adults. They can also help health care practitioners and educators

implement effective e-health literacy interventions for older adults in an informal learning environment (e.g., public libraries). With improved health literacy, older adults are likely to experience improved health communication with medical professionals and improved decision-making in their own health care and, subsequently, improved health outcomes. Health care costs for the older population may be reduced as well, which will have broader impacts on individuals of all ages and society as a whole.[1]

3. Literature review

Despite the short history of the recognition and development of the health literacy concept, there is already extensive knowledge about the existence and prevalence of health illiteracy: A national survey showed that 36 percent of American adults over 18 had basic or below basic health literacy, 53 percent had intermediate health literacy, and only 12 percent had proficient health literacy; the health illiteracy problem is even more severe among older adults, as only three percent of Americans age 65 and above had proficient health literacy (Kutner et al., 2006). The impact of poor health literacy on health outcomes and health care costs has been well-documented (Institute of Medicine, 2004). The main reasons for nationwide health illiteracy are also well known: lack of education, and medical professionals having high expectations of their patients' health literacy (Institute of Medicine, 2004).

There is little knowledge, however, about effective interventions (i.e., what really works?) and implementation strategies (i.e., how to do it?) (Mika, Kelly, Price, Franquiz, & Villarreal, 2005). There is even less knowledge about how different interventions might have different effects on individuals with varying characteristics (e.g., age). Older adults have a great need for interventions that can improve their health literacy, given that their needs for health information and services are typically high, and yet their health literacy levels are low. Interventions that target younger age groups (e.g., health education in formal educational settings) are unlikely to reach or have similar impact on older adults, because of age-related changes in their cognitive and physiological abilities, and in their social environments.

The increasing use of ICTs in health care presents both opportunities and challenges for developing and implementing effective health literacy interventions. Government agencies such as the National Institutes of Health (NIH) have increasingly put health information online, and the Internet has become an important source of this information (Bylund, Sabee, Imes, & Sanford, 2007; Fox, 2007; Huntington, Nicholas, Jamali, & Russell, 2007). But individuals who have low health literacy, such as older adults, are likely to also have low Internet literacy, and thus may have difficulty making use of Internet health information (Fox, 2006; Jaeger & Xie, 2009; Kaiser Family Foundation, 2005; Xie, 2008a). Further complicating the situation is that there is a wide variety of health information on the Internet, with varying degrees of quality, and this poses another major challenge, particularly for individuals who have low levels of e-health literacy (Childs, 2005; Kunst, Groot, & Latthe, 2002; Robins, Holmes, & Stansbury, 2010; Stvilia, Mon, & Yi, 2009).

What effective interventions can help improve older adults' access to and use of high-quality health information? Multiple approaches have been examined and reported in the literature. Existing interventions focus predominantly on simplifying medical materials and

[1]This study is part of the Electronic Health Information for Lifelong Learners (*e*HiLL) research project that aims to advance scientific knowledge about optimal learning methods in informal learning settings (e.g., public libraries) that can effectively improve older adults' e-health literacy. The *e*HiLL research project consists of a series of experimental studies designed to test the effects of various learning methods through theory-driven, hypothesis-testing rigorous experiments. For more information about the *e*HiLL project, see Xie, 2011a; 2011b; Xie & Bugg, 2009.

instructions (Andrus & Roth, 2002; Parker & Kreps, 2005; Schaefer, 2008). Along this line, consumer health informatics researchers have recently begun to explore how technology can be designed to make it easier for users to access and use high-quality health information (Alpay, Verhoef, Xie, Te'eni, & Zwetsloot-Schonk, 2009; Given, Ruecker, Simpson, Sadler, & Ruskin, 2007; Robins et al., 2010; Stvilia et al., 2009). These approaches can certainly help narrow the gap between expected and actual health literacy levels. Unfortunately, they can do so only to a certain degree, given the complexity of medical and technical information and its sometimes arcane terminology. Education and training that aim to raise actual health literacy levels are essential to help close the gap from the other side (Kickbusch, 2004).

Developing an educational intervention for older adults requires, on the scientific level, a systematic understanding of the individual and social circumstances of the older population. There are considerable differences between younger and older adult learners. For instance, older adults tend to require more time to complete the training, and they do better when the training is built upon their existing knowledge base, and gradually increases in complexity (Belbin & Belbin, 1972; Glass, 1994; Hayslip & Kennelly, 1985; Sterns & Doverspike, 1987). Older adults are more likely than younger learners to have a self-concept of being responsible; they are considerably more experienced; they are more task- or problem-oriented; and they learn better when they perceive the training content as relevant (Knowles, 1990). An effective e-health literacy intervention for older adults needs to take these learning styles and preferences into consideration.

To be practical and scalable, an effective e-health literacy intervention also needs to integrate and make use of the existing public infrastructure. This may include the public library system, and the rich and reliable Internet health information resources developed by the NIH. By tapping into the well-established public infrastructure, an e-health literacy intervention can have great potential for scaling-up, as well as significant social and economic implications. This research reports the findings of such an intervention for older adults. These findings are from the first two years of the *e*HiLL research project (September 2007 to June 2009), which focused specifically on training older adults to use two particular NIH resources, NIHSeniorHealth.gov and MedlinePlus.gov, to access reliable Internet health information. Preliminary data from the September 2007 to July 2008 period were reported in Xie & Bugg (2009).

4. Research questions and hypotheses

The overall research question (RQ) was:

- What are the effects of this intervention on improving older adults' e-health literacy?

Based on the definition of e-health literacy (Norman & Skinner, 2006b), the effectiveness of this e-health literacy intervention was investigated at four levels. Level 1 included two components: First, basic knowledge about computers and the Web, as such basic knowledge is the foundation of more advanced use of the technology; and second, general computer attitudes including anxiety, interest, and efficacy, since prior research shows that computer anxiety is negatively associated with computer use and adoption, while interest and efficacy are positively associated with computer use and adoption (Czaja et al., 2006; Jay & Willis, 1992).

The following research questions were asked:

- RQ1a: Is this intervention effective in improving older adults' general computer and Web knowledge?

- RQ1b: Is this intervention effective in improving older adults' computer attitudes including anxiety, interest, and efficacy?

Level 2 focused on potential changes in "the ability to seek, find, understand, and appraise health information from electronic sources" (Norman & Skinner, 2006b) as a result of the intervention. The curriculum used in the intervention covers NIHSeniorHealth.gov and MedlinePlus.gov, both are credible resources provided by the NIH. To date, however, there is no other known empirical research testing the use of either site by older adults. The following research question was thus asked:

- RQ2: Is this intervention effective in improving older adults' use of the NIHSeniorHealth.gov and MedlinePlus.gov sites?

Level 3 focused on using the health information gained "to addressing or solving a health problem" (Norman & Skinner, 2006b):

- RQ3: To what extent do older adults use what they have learned from the intervention to find needed health information, and to use the information to guide their health decision-making?

Level 4 focused on participants' subjective evaluation of various aspects of the intervention:

- RQ4: What are older adults' perceptions of and satisfaction with this e-health literacy intervention?

Because this study was carefully designed to accommodate the learning needs and preferences of older adults, it was expected that it would be effective in a number of ways. Thus, the following hypotheses were tested:

- H1: Computer and Web knowledge increase significantly from pre- to post-intervention at the .05 level.
- H2: Computer anxiety decreases significantly from pre- to post-intervention at the .05 level.
- H3: Computer interest and efficacy increase significantly from pre- to post-intervention at the .05 level.

Because NIHSeniorHealth.gov was specifically designed with careful consideration for older adults' cognitive, physical, and sensory abilities (Morrell, Dailey, & Rousseau, 2003), while MedlinePlus.gov is a more general purpose tool, one would reasonably expect that the former would be more effective for older adults. Yet, to date there is no known empirical evidence regarding this comparison. Thus, the following hypotheses were tested:

- H4: NIHSeniorHealth.gov is more usable by older adults than MedlinePlus.gov.
- H5: NIHSeniorHealth.gov is more useful to older adults than MedlinePlus.gov.

5. Method

5.1. Research sites

The Hyattsville and New Carrollton Branch Libraries of the Prince George's County Memorial Library System were the research sites for this study. This publicly-funded library system serves more than 830,000 residents in Prince George's County, Maryland, and has 18 branch libraries. All the branches provide free, high-speed Internet and wireless access for public use. The Hyattsville and New Carrollton branches provided networked computers, space, and staff support to facilitate the implementation of this study. These libraries were selected as the research sites because both serve many members of ethnic minority groups, particularly African Americans, thus ensuring the impact of this e-health literacy

intervention on these individuals. Another important reason for selecting these libraries is their convenient location to potential research participants in the community, and are easily accessible by car and public transportation.

5.2. Participants

Participants were recruited using standard recruiting techniques, including advertisements in the libraries' newsletter and local newspapers, and flyers posted in the libraries and local organizations, such as senior centers, community centers, and religious organizations. Word-of-mouth by participants was also effective. A total of 218 older adults between the ages of 60–89 (M = 70.0, SD = 8.7) participated in this study during September 2007 to June 2009. Most of the participants were women (61%), African Americans (62%), and had at least some college education (55%). A notable percentage of them had yearly household incomes of less than $20,000 (26%) and were non-native English speakers (8%). The demographic characteristics of the participants are summarized in Table 1.

Forty-two percent of participants had no prior computer experience. Among the computer users, the majority had never or rarely used the Internet for health information, and few had used the NIHSeniorHealth.gov or MedlinePlus.gov site. Of 27 yes/no items measuring familiarity with computer/Internet terms that ranged from basic ones such as "keyboard" to more advanced ones like "URL," only one percent of participants were familiar with all 27 (Table 2).

5.3. Measures

The pre-training questionnaire measured demographics, computer/Internet experience, and knowledge about computer/Internet. The post-training questionnaire measured satisfaction with the training and changes in participation in one's own health care.

Both the pre- and post-training questionnaires included computer attitude measures: the 10-item Computer Anxiety Scale (Gressard & Loyd, 1986; Loyd & Gressard, 1984; Woodrow, 1991) and the efficacy and interest subscales (5 items in each subscale) of the Attitudes Toward Computers Questionnaire (Jay & Willis, 1992). Participants were asked to indicate the degree to which they agreed or disagreed with 20 statements on a 5-point Likert-type scale that had anchors of strongly agree to strongly disagree. Sample statements included: "Computers do not scare me at all" (anxiety); "I know that if I worked hard to learn about computers, I could do well" (efficacy); and, "Learning about computers is a worthwhile and necessary subject" (interest).

Objective measures of computer and Web knowledge tests were added for the period of September 2008 to June 2009. These measures involved knowledge about a total of 10 computer and Web page terms. For the computer components, an illustration of the computer and accessories was provided, and participants were asked to indicate which parts in the illustration are the computer, monitor, keyboard, mouse, and speakers. For the Web page components, a screenshot image of the NIHSeniorHealth.gov homepage was shown, and participants were asked to match parts of the image with the following terms: Link (or hyperlink); Back Arrow; Web Address or URL; Button; and Scroll Bar.

5.4. Instructional materials

The *Helping Older Adults Search for Health Information Online: A Toolkit for Trainers* tutorial (http://nihseniorhealth.gov/toolkit/toolkit.html) developed by the National Institute on Aging (NIA) of the NIH was used as the curriculum. The freely available Toolkit aims at improving older adults' ability to seek, find, and understand health information from NIHSeniorHealth and MedlinePlus, and to apply the knowledge gained to addressing or

solving a health problem of personal interest. It includes detailed lesson plans, interactive in-class exercises, take-home practice exercises, and other supportive handouts (e.g., glossary of computer and Internet terms). The Toolkit has a total of nine modules: Modules 1 through 5 focus on NIHSeniorHealth, and Modules 6 through 8 on MedlinePlus. These eight modules were used in the intervention, with one class session covering one module. Module 9, which focuses specifically on improving the ability to appraise health information, was used in classes where participants had a higher level of computer literacy to begin with, and were able to get through the previous modules quickly. Together, these modules help cover the e-health literacy skills as defined by Norman and Skinner (2006b). Lesson plans and goals of the Toolkit are summarized in Table 3.

5.5. Procedure

In Session 1, participants first signed the consent form (approved by the Institutional Review Board of the University of Maryland) and then completed the pre-training questionnaire, which typically took no more than 20 minutes. The training began upon completion of the pre-training questionnaire. During the last 20 minutes of the last class session (Session 8), the post-training questionnaire was administered. Each training class met twice a week on Mondays/Wednesdays or Tuesdays/Thursdays, two hours each, from 9:00–11:00 a.m. —the libraries are not open to the public until 10:00 a.m. and the class could get the first hour uninterrupted—for a total of four weeks, at each of the two library sites. Class size was small, with no more than seven trainees per class. The instructor, a graduate student in the Master of Library Science Program in the College of Information Studies at the University of Maryland, provided frequent, immediate, positive, and useful feedback when needed. Each trainee had one computer to work on during each class session. Hands-on practice was emphasized throughout the training, and handouts (e.g., in-class exercises, glossary of computer/Internet terms) were provided for each class session.

Table 4 is an outline of the class sessions, which were adapted from Van Fleet & Antell, 2002 to reflect the specific design of this research. For more details about the procedure, see Xie and Bugg (2009).

6. Findings

6.1. Computer and Web knowledge

For participants who completed the computer and Web knowledge tests at both the pre- and post-intervention data collection points, dependent *t*-tests indicated that both computer and Web knowledge significantly increased from pre- to post-intervention: Computer knowledge $t(19) = -3.10$, $p < .01$ (pre = 3.40; post = 4.25); and Web knowledge $t(14) = -3.08$, $p < .01$ (pre = 3.40; post = 4.87). H1 was supported.

6.2. Changes in computer anxiety, interest, and efficacy from pre- to post-intervention

Dependent *t*-tests indicated that computer anxiety significantly decreased from pre- to post-intervention, while computer interest and efficacy significantly increased: anxiety $t(144) = 9.69$, $p < .001$ (pre = 2.38; post = 1.96); interest $t(145) = -5.02$, $p < .001$ (pre = 4.29; post = 4.48); efficacy $t(145) = -5.21$, $p < .001$ (pre = 4.02; post = 4.24). These findings support both H2 and H3.

6.3. Usability and usefulness of the NIHSeniorHealth.gov and MedlinePlus.gov websites

Participants reported positive experiences with the two NIH sites covered in the intervention, as summarized in Tables 5 and 6.

6.4. Comparing the NIHSeniorHealth.gov and MedlinePlus.gov websites

Dependent *t*-tests detected a trend suggesting participants' ability to find needed information, and perception of ease of use of the site decreased from the NIHSeniorHealth.gov site to the MedlinePlus.gov sites. The differences were not significant, however; ability to find needed information: $t(139) = -1.70$ (NIHSeniorHealth = 1.79; MedlinePlus = 1.90); and ease of use: $t(144) = .97$ (NIHSeniorHealth = 3.85; MedlinePlus = 3.81). H4 is not supported. There was significant difference in the perceived usefulness of information found on these two sites, however: $t(143) = 2.420$, $p < .05$ (NIHSeniorHealth = 4.47; MedlinePlus = 4.35). This supports H5.

6.5. Changes in participation in own health care

Most participants (78%) reported that what they learned from the training had affected their participation in their own health care in a number of ways (Table 7).

6.6. Satisfaction with the intervention

Participants had overwhelmingly positive feedback on all aspects of the training, including the two-hour length of each session, twice-a-week class frequency, class size, handouts, and hands-on practice. The vast majority of participants reported "learning a lot", and all said they would recommend the class to age peers. The only constructive criticism was that the training was not long enough: More than two-thirds of the participants wished that the training had lasted longer than four weeks (Table 8). Such feedback demonstrates that there is great need for this type of intervention for these older adults, and that this program can effectively help meet this need.

6.7. Other findings

Other findings shed light on issues related to developing and implementing effective and feasible e-health literacy interventions for older adults:

Expectations for and views of public libraries: The data suggested that public libraries that have not yet provided this type of service should do so (Table 9).

Willingness to serve as a volunteer instructor in the future: In the post-intervention questionnaire, participants were asked to indicate their willingness to serve as a volunteer instructor in the future. This was originally intended to provide an estimate for the sustainability of the intervention—if some older adults might become confident and comfortable with teaching their age peers about computers, then the training could continue without additional funding. As it turned out, this measure also provided another indication of participants' confidence in their current computer literacy (Table 10).

7. Discussion

The findings of this study support the effectiveness of the intervention tested here, as evidenced in the following four ways: First, at a more foundational level of the e-health literacy concept, both knowledge about computers and the Web, and attitudes toward computers overall improved significantly from pre- to post-intervention, supporting H1, H2, and H3.

Second, the majority of participants were able to (always or most of the time) find needed information on both the NIHSeniorHealth.gov and MedlinePlus.gov sites. Most participants found these sites easy or very easy to use, and the information on the sites useful or very useful. These findings are striking, especially considering that most participants had limited prior experience with computers and the Internet, and few had ever used either the

NIHSeniorHealth.gov or MedlinePlus.gov site prior to the intervention. Because NIHSeniorHealth was specifically designed for older adults (Morrell et al., 2003), it was expected that it would be more usable and useful to older adults than MedlinePlus. The findings only partially supported this: There was no statistically significant difference between the usability of these two sites. Interestingly, though, there was a significant difference in the usefulness of the information found on these two sites. Although MedlinePlus is more comprehensive and has more information than NIHSeniorHealth, participants of this study reported that the information they found on NIHSeniorHealth was more useful than that on MedlinePlus. The disparity between these two indicators is worthy of further examination. One possible reason is that there were ceiling effects in older adults' reports of their use of the sites. It will be interesting to add task-oriented measures in future research to examine objectively if there might be any significant difference between the usability of these two sites. Also, a larger sample might reveal significant differences. Further research is needed to examine the generalizability and potential implications of these findings (e.g., when it comes to online health information for older adults, perhaps more information may not necessarily be better).

Third, the findings suggest the intervention has affected how participants use the knowledge they've gained to play a more active role in their own health care. Since the start of participating in the study, a quarter of the participants had already discussed the information they'd learned at least once with their health care provider. Considering that the training lasted just four weeks, during which time many participants might not have had any doctor's appointment, it is likely that an even higher percentage of participants would use the information learned in the training to participate more actively in their own healthcare in the future. In fact, another 73% of participants indicated they did plan to talk with their physician, or probably would do so in the near future. These findings are particularly meaningful in the context of contemporary health care practice, which increasingly promotes shared medical decision-making. That is, the patient is expected to play a more active role in his or her own medical decision-making through, for instance, improved access to health information and communication with medical professionals (Xie, 2009).

Fourth, in terms of subjective evaluation of the intervention, the findings show participants were overwhelmingly positive about all aspects of the intervention. The only constructive criticism was that the training was not long enough: Most participants wanted the training to last longer than four weeks. These findings suggest there is a great need for this type of intervention for these older adults, and that this intervention can effectively help meet this need.

These positive findings can be attributed to the careful design and selection of various aspects of the intervention. General adult learning theories (Knowles, 1990) and empirical research on older adults' computer learning (Czaja et al., 2006; Selwyn, 2004) suggest that personal relevance or perceived usefulness is a key predictor of older adults' learning outcomes. Health information was deliberately selected as the specific content area of the computer training, as part of an explicit effort to increase the perceived usefulness of computer technology. Only NIH-developed online health information resources were used in the study, in order to avoid potential problems associated with the quality of online health information (Childs, 2005; Kunst et al., 2002; Robins et al., 2010; Stvilia et al., 2009).

Research on older adults' computer learning shows that actively engaging trainees in the learning process through hands-on practice, self-directed learning, or discovery-oriented/ problem-solving exercise is more effective than conventional learning that relies primarily on lecturing (Charness, Schumann, & Boritz, 1992; Cody, Dunn, Hoppin, & Wendt, 1999; Czaja & Drury, 1981; Gist, Rosen, & Schwoerer, 1988; Jay & Willis, 1992; Mayhorn,

Stronge, McLaughlin, & Rogers, 2004). Thus, active learning was promoted in the intervention described here. Further, the NIA Toolkit was chosen because it has a number of features that are conducive to promoting computer self-efficacy and reducing computer anxiety, as recommended in the literature. These include the use of lessons that build upon previous lessons and gradually increase in complexity, thus allowing for gradual expansion of knowledge and skills (Jay & Willis, 1992). Additionally, participants learn to use NIHSeniorHealth, which was designed with careful consideration for older adults' cognitive, physical, and sensory abilities (Morrell et al., 2003). Teaching older adults to begin their health information searches with this site ensures that they can experience at least some level of success at the initial stage of the training, which is another important factor that can promote computer self-efficacy and reduce computer anxiety (Cody et al., 1999; Czaja et al., 2006; Mayhorn et al., 2004).

This study also revealed interesting findings about participants' expectations of public libraries, and their views of them. While 73% did not expect public libraries to be providing this type of program, when asked if public libraries should do so, all participants said, yes, public libraries should. In the past, however, few were able to get this type of training from a public library. After taking a computer class at a public library, nearly all participants developed more positive views of public libraries. These findings stress the importance of using public libraries as sites for providing e-health literacy interventions. While the older population as a whole is at risk of being left behind in the ICT age, this risk is even more pronounced among disadvantaged older adults (Fox, 2004). Public libraries are ideal places to provide free or low-cost services for disadvantaged communities, social groups, and individuals (Xie & Jaeger, 2008a). By tapping into the well-established public library infrastructure, this intervention has great potential for scaling-up, and significant social and economic implications for a diverse range of communities and individuals.

Only 14% of participants were willing to serve as volunteer instructors in future classes to help improve their age peers' e-health literacy. Nearly 40% of participants felt they would need more training first before they could feel confident helping others. More than 30% felt they would never be knowledgeable enough to be a peer instructor. When looking at these findings in the context of the study participants' prior computer experience (42% had no prior computer experience), it is not a total surprise that only a small percentage of these older adults were willing to be peer instructors. These findings, however, do suggest the need for additional training for these older adults if peer-training is to be included in an e-health literacy intervention for older adults.

Health literacy is relatively new and rapidly growing. The scientific significance and practical implications behind this concept have recently drawn a tremendous amount of attention from a vast diversity of disciplines and fields. In reviewing the literature, however, it has become clear that the field of information science has not yet played a significant role in advancing scientific knowledge about health literacy, or contributing to setting the agenda in pursuing such knowledge. This is surprising, given that the information science focuses on information, and the core of health literacy is also information (e.g., as defined by the U.S. Department of Health and Human Services, 2000).

The widespread adoption of ICTs in health care calls for active participation and leadership by information science researchers and educators in advancing scientific knowledge about health literacy. With information scientists striving to understand and promote the use of ICTs by everyone, adding a specific focus on health information would be an ideal approach to test existing information theories and practices in the health care domain. The e-health literacy concept aligns well with the scope and mission of the field of information science. Thus, an important goal of the present paper is to raise awareness of the health literacy

concept, and particularly the concept of e-health literacy, among information scientists. Together, the information science field can put a stamp onto the emerging and important area of health literacy, as well as take advantage of funding from federal agencies like the National Library of Medicine of the NIH.

The health literacy and particularly the e-health literacy conceptualization works well for the older population, since older adults have not only low health literacy but also low computer literacy. This new conceptualization allows information researchers and practitioners to target both types of literacy at once by promoting the personal relevance of computer learning, a factor proven to be predictive of technology adoption (Czaja et al., 2006; Selwyn, 2004).

This study has some limitations. It was unable to control for an important factor that might have affected the training outcomes: the instructors. During the course of this study, 13 different graduate students served as instructors for the training classes, through a variety of mechanisms: as part-time research assistants, getting course credits, or simply volunteering. While these students' enthusiasm speaks for the sustainability of the training program, from the point of view of an experimental study, individual differences among these instructors (e.g., personality, teaching style, experience, time commitment, and incentive) likely introduced unnecessary confounding variation into the study. Providing full-time support for instructors may be the best approach to reducing instructor turnover.

While objective measures of computer and Web knowledge were added during the second year of this study, no objective tests of general computer and Web skills, or specific online health information searching skills were conducted. Additional specific measures of e-health literacy can be added in future research (e.g., the e-health literacy scale that measures e-health literacy efficacy; Norman & Skinner, 2006a).[2] Also, no follow-up study was conducted to assess if and how the impact of this e-health literacy intervention lasts beyond the training period. These issues will be addressed in future research.

Further, the sample of this study was likely a nonrepresentative sample, as the sample was a convenience sample. Participants were self-selected, willing, and able to go to a public library regularly to attend the computer training sessions, suggesting these older adults are active, mobile, healthy, and interested in learning. Thus, the findings of this study should not be generalized without caution, although it is worth noting that while this sample may not be representative of the overall older population, nonetheless it might be a good reflection of the older adults that a public library computer training program would typically attract.

This study identified important issues worthy of further examination. Informal feedback from some participants suggests the differences in individuals' prior computer experience might have at least partly affected the learning experience and outcomes. Some more experienced users got frustrated and felt they were not making the best use of their time when the instructor had to stop frequently to help new users to keep up with the most basic procedures (e.g., move the mouse). The opposite happened as well: New users sometimes became embarrassed and frustrated, and even intimidated by more experienced users. Thus, there were a number of cases where a participant—experienced or new user—said to the instructor at the end of an early session "I don't think this is the right class for me" and never came back. This observation lends support for other researchers' recommendation that it may be necessary to separate older adult computer learners into different classes based on their prior computer experience (Mayhorn et al., 2004).

[2]Objective tests of e-health literacy skills and efficacy have been added in more recent *e*HiLL studies. For more information, see Xie (2011 Xie (in press).

Interestingly, informal observation in a few classes with mixed levels of prior computer experience also revealed that more experienced users voluntarily started helping new users during the session. The attrition rate tended to be low in those classes, and participants, experienced or new users, were satisfied with the training experience. These findings echo prior research on older computer learners that suggest potential relationship between social interactions in computer classes and the learning process and outcomes (Xie, 2007; 2008b; 2008c). Because this study focused on only one intervention with no comparison group, it was not possible to go beyond these informal observations to scientifically examine whether there were statistically significant differences in learning outcomes. In addition, since the vast majority of participants in this study reported overwhelmingly positive feelings about the training (ceiling effects), it was not possible to determine whether those who engaged more in peer interaction and learning had more positive subjective feelings about the intervention than those who did not. These issues are addressed in more recent *e*HiLL research projects examining different learning methods (Xie, 2011; Xie, in press).

8. Conclusion

Results of the pre- and post-intervention testing provide support for the effectiveness of this e-health literacy intervention in four ways: First, at a foundational level of the e-health literacy concept, knowledge about computers and the Web and attitudes toward computers improved significantly from pre- to post-intervention. Second, while most participants had limited prior experience with computers and the Internet, and few had ever used either NIHSeniorHealth.gov and MedlinePlus.gov prior to participating in this study, after taking part in the four-week intervention, most of them reported that they found the NIHSeniorHealth.gov and MedlinePlus.gov websites both useable and useful. Third, the findings suggest the intervention has affected how participants used the knowledge gained to play a more active role in their own health care. Finally, in terms of subjective evaluation of the intervention, the findings show participants were overwhelmingly positive about all aspects of the intervention. This supporting evidence suggests that there is a great need for this type of e-health literacy intervention for older adults, and this intervention can effectively help meet this need.

The growing literature on lifelong learning has reached a consensus that learning is important for the well-being of older adults (Boulton-Lewis, Buys, & Lovie-Kitchin, 2006; Dench & Regan, 2000; Duay & Bryan, 2006; Purdie & Boulton-Lewis, 2003; Schneider, 2003; World Health Organization, 2002; Xie, 2006; Xie & Jaeger, 2008b). Improving health literacy requires an understanding of health literacy as an active, lifelong learning process that goes beyond formal educational settings in early life stages and features continuous learning of new, valid information, and unlearning of outdated, harmful information (Kickbusch, 2004). Such an understanding is especially important in the context of ICTs being increasingly used by health consumers, professionals, and policy makers alike in health care (Institute of Medicine, 2009; Oh et al., 2005). As Norman (2009) points out, as technology changes, so do the requirements for health literacy skills.

This intervention provided opportunities to facilitate older adults' lifelong learning, focusing on health information and technology. It involved seamless integration and optimal use of existing public library infrastructure and NIH online resources. Conducting the experiments in a naturalistic setting familiar to older adults (i.e., public libraries in their own community) has obvious advantages, including increasing participation, which makes the intervention more readily transferable than those generated in a research laboratory. Using the health information resource maintained by the NIH ensures the quality of information. By tapping into these well-established public infrastructure and resources, this e-health literacy intervention has great potential for scaling-up, and significant social and economic

implications (e.g., it can be easily rolled out to older adults across the country to improve their e-health literacy). By focusing the content of learning on e-health literacy knowledge and skills, this study broadens current understanding of the health literacy concept, and interventions to address the increasing importance of technology in health care. By developing and testing the effectiveness of an e-health literacy intervention, this research helps shape this newly emerging component of health literacy that has increasing significance in contemporary health care.

Acknowledgments

This project was funded with federal funds from the National Library of Medicine, National Institutes of Health, under Contract No NO1-LM-6-3502. The University of Maryland provided supplemental funds through a Community Partners Program Seed Grant. I thank the participating librarians and graduate students for their efforts, enthusiasm, and dedication in teaching and coordinating the computer training classes.

References

Alpay L, Verhoef J, Xie B, Te'eni D, Zwetsloot-Schonk JHM. Current challenge in consumer health informatics: Bridging the gap between access to information and information understanding. Biomedical Informatics Insights. 2009; 2:1–10. [PubMed: 20419038]

American Medical Association. Health literacy: Report of the Council on Scientific Affairs. JAMA. 1999; 281:552–557. [PubMed: 10022112]

Andrus MR, Roth MT. Health literacy: A review. Pharmacotherapy. 2002; 22(3):282–302. [PubMed: 11898888]

Belbin, E.; Belbin, R. Problems in adult retraining. London: Heinemann; 1972.

Boulton-Lewis GM, Buys L, Lovie-Kitchin J. Learning and active aging. Educational Gerontology. 2006; 32:271–282.

Bylund CL, Sabee CM, Imes RS, Sanford AA. Exploration of the construct of reliance among patients who talk with their providers about Internet information. Journal of Health Communication. 2007; 12(1):17–28. [PubMed: 17365346]

Charness N, Schumann CE, Boritz GM. Training older adults in word processing: Effects of age, training technique, and computer anxiety. International Journal of Technology and Aging. 1992; 5:79–105.

Childs S. Judging the quality of Internet-based health information. Performance Measurement and Metrics. 2005; 6(2):80–96.

Cody MJ, Dunn D, Hoppin S, Wendt P. Silver surfers: Training and evaluating Internet use among older adult learners. Communication Education. 1999; 48(4):269–286.

Czaja SJ, Charness N, Fisk AD, Hertzog C, Nair SN, Rogers WA, Sharit J. Factors predicting the use of technology: Findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). Psychology and Aging. 2006; 21(2):333–352. [PubMed: 16768579]

Czaja SJ, Drury CG. Age and pre-training in industrial inspection. Human Factors. 1981; 23:485–494. [PubMed: 7275111]

Dench, S.; Regan, J. Learning in later life: Motivation and impact. Nottingham, England: Department for Education and Employment Publications; 2000. Retrieved from http://www.employment-studies.co.uk/summary/summary.php?id=rr183

Duay DL, Bryan VC. Senior adults' perceptions of successful aging. Educational Gerontology. 2006; 32:423–445.

Fox, S. Older Americans and the Internet. Washington, DC: Pew Internet & American Life Project; 2004. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2004/PIP_Seniors_Online_2004.pdf.pdf

Fox, S. Online health search. Washington DC: PEW Internet & American Life; 2006. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2006/PIP_Online_Health_2006.pdf.pdf

Fox, S. E-patients with a disability or chronic disease. Washington DC: PEW Internet & American Life; 2007. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2007/EPatients_Chronic_Conditions_2007.pdf.pdf

Gist M, Rosen B, Schwoerer C. The influence of training method and trainee age on the acquisition of computer skills. Personnel Psychology. 1988; 41:255–265.

Given LM, Ruecker S, Simpson H, Sadler EB, Ruskin A. Inclusive interface design for seniors: Image-browsing for a health information context. Journal of the American Society for Information Science and Technology. 2007; 58:1610–1617.

Glass JC. Factors affecting learning in older adults. Educational Gerontology. 1994; 22:359–372.

Gressard C, Loyd BH. The nature and correlates of computer anxiety in college students. Journal of Human Behavior and Learning. 1986; 3:28–33.

Hayslip, B.; Kennelly, K. Cognitive and noncognitive factors affecting learning. In: Lumsden, D., editor. The older adult as learner. Washington DC: Hemisphere Publishing; 1985. p. 73-98.

Huntington P, Nicholas D, Jamali HR, Russell C. Health information for the consumer: NHS vs the BBC. Aslib Proceedings. 2007; 59:46–67.

Institute of Medicine. Health literacy: A prescription to end confusion. Washington DC: The National Academies Press; 2004.

Institute of Medicine. Workshop summary. Washington DC: The National Academies Press; 2009. Health literacy, ehealth, and communication: Putting the consumer first.

Jaeger PT, Xie B. Developing online community accessibility guidelines for persons with disabilities and older adults. Journal of Disability Policy Studies. 2009; 20:55–63.

Jay GM, Willis SL. Influence of direct computer experience on older adults' attitudes toward computers. Journal of Gerontology: Psychological Sciences. 1992; 47(4):250–257.

Kaiser Family Foundation. E-health and the elderly: How seniors use the Internet for health information. Menlo Park, CA: Author; 2005. Retrieved from http://www.kff.org/entmedia/upload/e-Health-and-the-Elderly-How-Seniors-Use-the-Internet-for-Health-Information-Key-Findings-From-a-National-Survey-of-Older-Americans-Survey-Report.pdf

Kickbusch, I. Improving health literacy—A key priority for enabling good health in Europe. European Health Forum Gastein, 2004. 2004. Retrieved from http://www.ilonakickbusch.com/health-literacy/health-literacy-gastein.pdf

Knowles, M. The adult learner: A neglected species. 4. Houston: Gulf Publishing; 1990.

Kunst H, Groot D, Latthe P. Accuracy of information on apparently credible websites: Survey of common health topics. British Journal of Medicine. 2002; 324:581–582.

Kutner, M.; Greenberg, E.; Jin, Y.; Paulsen, C. The health literacy of America's Adults: Results from the 2003 national assessment of adult literacy (NCES 2006-483). Washington DC: National Center for Education Statistics; 2006.

Loyd BH, Gressard C. Reliability and factorial validity of computer attitude scales. Educational and Psychological Measurement. 1984; 44:501–505.

Mayhorn CB, Stronge AJ, McLaughlin AC, Rogers WA. Older adults, computer training, and the systems approach: A formula for success. Educational Gerontology. 2004; 30:185–203.

Mika VS, Kelly PJ, Price MA, Franquiz M, Villarreal R. The ABCs of health literacy. Family & Community Health. 2005; 28(4):351–357. [PubMed: 16166862]

Morrell, RW.; Dailey, SR.; Rousseau, GK. Applying research: The NIHSeniorHealth project. In: Charness, N.; Schaie, KW., editors. Impact of technology on successful aging. New York: Springer; 2003. p. 134-161.

Norman, CD. Skills essential for ehealth. In: Hernandez, L., editor. Health literacy, ehealth, and communication: Putting the consumer first. Workshop summary. Washington DC: National Academies Press; 2009. p. 10-15.

Norman CD, Skinner HA. eHEALS: the ehealth literacy scale. Journal of Medical Internet Research. 2006a; 8(4) Retrieved from http://www.jmir.org/2006/4/e27/.

Norman CD, Skinner HA. Ehealth literacy: essential skills for consumer health in a networked world. Journal of Medical Internet Research. 2006b; 8(2) Retrieved from http://www.jmir.org/2006/2/e9/.

Oh H, Rizo C, Enkin M, Jadad A. What is ehealth?: A systematic review of published definitions. World Hospitals and Health Services. 2005; 41(1):32–40. [PubMed: 15881824]

Parker RM, Kreps GL. Library outreach: Overcoming health literacy challenges. Journal of the Medical Library Association. 2005; 93(4):S81–S85. [PubMed: 16239962]

Purdie N, Boulton-Lewis GM. The learning needs of older adults. Educational Gerontology. 2003; 29:129–149.

Robins D, Holmes J, Stansbury M. Consumer health information on the Web: The relationship of visual design and perceptions of credibility. Journal of the American Society for Information Science and Technology. 2010; 61:13–29.

Schaefer CT. Integrated review of health literacy interventions. Patient Education Corner. 2008; 27(5): 302–317.

Schneider K. The significance of learning for aging. Educational Gerontology. 2003; 29:809–823.

Selwyn N. The information aged: A qualitative study of older adults' use of information and communications technology. Journal of Aging Studies. 2004; 18:369–384.

Simonds SK. Health education as social policy. Health Education Monograph. 1974; 21:1–10.

Sterns, H.; Doverspike, D. Training and developing the older worker: Implications for human resource management. In: Dennis, H., editor. Fourteen steps in managing an aging workforce. Washington DC: Lexington Books; 1987. p. 96-110.

Stvilia B, Mon L, Yi YJ. A model for online consumer health information quality. Journal of the American Society for Information Science and Technology. 2009; 60:1781–1791.

U.S. Department of Health and Human Services. Healthy people 2010: Understanding and improving health. Washington, DC: Author; 2000.

Van Fleet C, Antell K. Creating cyber seniors: Older adult learning and its implications for computer training. Public Libraries. 2002; 41:149–155.

Woodrow JEJ. A comparison of four computer attitude scales. Journal of Educational Computing Research. 1991; 7(2):165–187.

World Health Organization. Active ageing: A policy framework. 2002. Retrieved from http://whqlibdoc.who.int/hq/2002/WHO_NMH_NPH_02.8.pdf

Xie B. Perceptions of computer learning among older Americans and older Chinese. First Monday. 2006; 11(10) Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1408/1326.

Xie B. Using the Internet for offline relationship formation. Social Science Computer Review. 2007; 25(3):396–404.

Xie B. Older adults, health information, and the Internet. ACM Interactions. 2008a; 15(4):44– 46.

Xie B. The mutual shaping of online and offline social relationships. Information Research. 2008b; 13(3)

Xie B. Civic engagement among older Chinese Internet users. Journal of Applied Gerontology. 2008c; 27(4):424–445.

Xie B. Older adults' health information wants in the Internet age: Implications for patient-provider relationships. Journal of Health Communication. 2009; 14(6):510–524. [PubMed: 19731124]

Xie B. Older adults, e-health literacy, and collaborative learning: An experimental study. Journal of the American Society for Information Science and Technology. 2011a; 62(5):933–946.

Xie B. Experimenting on the impact of learning methods and information presentation channels on older adults' e-health literacy. Journal of the American Society for Information Science and Technology. 2011b; 62:1797–1807.

Xie B, Bugg JM. Public library computer training for older adults to access high-quality Internet health information. Library & Information Science Research. 2009; 31:155–162. [PubMed: 20161649]

Xie B, Jaeger PT. Computer training programs for older adults at the public library. Public Libraries. 2008a; 47(5):42–49.

Xie B, Jaeger PT. Older adults and political participation on the Internet: A cross-cultural comparison of the United States and China. Journal of Cross-Cultural Gerontology. 2008b; 23:1–15. [PubMed: 17957462]

Zickuhr, K. Generations 2010. Washington DC: PEW Internet & American Life; 2010. Retrieved from http://www.pewinternet.org/~/media//Files/Reports/2010/PIP_Generations_and_Tech10.pdf

Highlights

1. An e-health literacy intervention for older adults was developed and assessed.
2. The curriculum covered the NIHSeniorHealth.gov and MedlinePlus.gov websites.
3. Computer and web knowledge significantly improved from pre- to post-intervention.
4. Computer attitudes significantly improved from pre- to post-intervention.
5. Participants reported increased active participation in their own health care.

Table 1

Demographic characteristics of participants (some data are missing)

Race/ethnicity	%	Health	%	Language	%
		Poor	3		
African American	62	Fair	16	Native English speaker	92
White	26	Good	57	Non-native English speaker	8
Latino	5	Very Good	20		
Others	7	Excellent	4		
Education	**%**	**Yearly household income**	**%**	**Transportation**	**%**
< high school	5	Less than $20,000	26	Drive own vehicle	84
high school	36	$20,000–$29,999	14	Public transportation	13
some college	23	$30,000–$39,999	13	Rely on others	4
>=bachelor's	32	$40,000–$99,999	28		

Libr Inf Sci Res. Author manuscript; available in PMC 2013 January 01.

Table 2

Participants' prior computer/Internet experience & knowledge

Prior computer experience	%	Prior use of the NIHSeniorHealth.gov site	%
Yes	58	Yes	6
No	42	No	94
Computer use duration	**%**	**Prior use of the MedlinePlus.gov site**	**%**
< one year	44	Yes	9
1–3 years	21	No	91
3–5 years	9		
> 5 years	26		
Computer use frequency	**%**	**Use of the Internet for health information during the past year**	**%**
< once a month	32		
> once a month, < once a week	17	never	60
once a week	18	< once a month	19
every 2–3 days daily	23	> once a month, < once a week	13
	11	at least once a week	9
Internet use duration	**%**	**Familiarity with number of computer/Internet terms (total number of terms: 27)**	**%**
< one year	53	none	15
1–3 years	17	< 10 terms	24
3–5 years	15	10–19 terms	43
> 5 years	15	20–26 terms	17
		27 terms	1

Table 3

NIA Toolkit lesson plans & goals

Class Session	Lesson Goals	
Module 1: Internet Basics	**1**	Learn basic computer terms.
	2	Practice using the mouse.
	3	Learn basic Internet terms.
	4	Learn how to get to a website.
	5	Learn how to explore a website.
	6	Learn how to use a search box.
	7	Learn how to use a site map.
Module 2: Introduction to NIHSeniorHealth	**1**	Use the home page to find health topics on NIHSeniorHealth.
	2	Use the table of contents of a health topic to find specific information.
	3	Navigate through a health topic.
	4	Enlarge, view, and close images.
	5	Find answers to health questions of personal interest.
Module 3: NIHSeniorHealth Quizzes and Videos	**1**	Recall how to use the home page of the NIHSeniorHealth website.
	2	Recall how to use the All Topics A–Z page to find health topics on the NIHSeniorHealth website.
	3	Recall how to use the special features (optional).
	4	Learn how to take online quizzes.
	5	Learn how to open, watch, and close a video.
	6	Learn how to open, read, and close a video transcript.
	7	Learn how to find answers to health questions of personal interest.
Module 4: NIHSeniorHealth FAQs and Site Index	**1**	Recall how to use the home page of the NIHSeniorHealth website.
	2	Recall how to use the All Topics A–Z page to find health topics on the NIHSeniorHealth website.
	3	Recall how to use the special features (optional).
	4	Learn how to use the frequently asked questions.
	5	Learn how to use the site index.
	6	Find answers to health questions of personal interest
Module 5: Exercise for Older Adults on NIHSeniorHealth	**1**	Recall how to use the home page and the All Topics A–Z page of the NIHSeniorHealth website.
	2	Recall how to use to find health topics on the NIHSeniorHealth website.
	3	Recall how to use the table of contents of a health topic.
	4	Recall how to take an online quiz.
	5	Read about the benefits of exercise and exercise safety for older adults.
	6	Read about suitable exercises for older adults and see them demonstrated.
	7	Read stories by older adults who enjoy a variety of exercise activities.
Module 6: Introduction to MedlinePlus	**1**	Learn the main features of the home page of MedlinePlus.
	2	Learn how to find a topic on the health topics page.
	3	Learn to use the search box.
	4	Learn how to use the medical dictionary.

Class Session	Lesson Goals
	5 Learn about the quality guidelines MedlinePlus uses to select the information it includes on the website. **6** Find answers to health questions of personal interest.
Module 7: MedlinePlus: Drugs and Supplements, Medical Encyclopedia	**1** Recall the main features of the MedlinePlus home page. **2** Learn how to find information on drugs on the drugs and supplements page. **3** Learn how to find information on supplements on the drugs and supplements page. **4** Learn how to use the medical encyclopedia. **5** Find answers to health questions of personal interest.
Module 8: MedlinePlus: News and Directories	**1** Recall the main features of the MedlinePlus home page. **2** Learn how to find news stories about health in the news section. **3** Learn how to find information about doctors, dentists, and hospitals in the directories section. **4** Find answers to health questions of personal interest.
Module 9: Evaluating Health Websites	In this lesson, students will learn to recognize and locate: **1** Reliable health information websites. **2** The sponsor of a health website. **3** The purpose of a health website. **4** The authors of the health information. **5** The reviewers of the heath information. **6** The most recent update of the health information. **7** The privacy policy of a health website. **8** Clues about the accuracy of a website's health information. **9** The contact information for a health website.

Table 4

Class outline (duration of each class session: 2 hours).

Activity/Time	Class outline
Housekeeping: 5 minutes	• Welcome • Instructor self-introduction • Participants self-introduction • Practical information – How long the class session will last; – Where the restrooms are located; • Environment check – Everyone has a computer, can see and hear instructor
Overview: 6 minutes	• Goal statement – What the participants will know or be able to do after this class session; • Agenda – What will happen during this session and in what order; – Instructor encourages participants to ask any questions that they might have during the session
Introduction to topic of the session: 5 minutes	• Terminology, history, background information
Lecture and demonstration, step-by-step instruction (Part 1): 20 minutes	• Follow exactly the instructions and examples used in the NIA Toolkit to present the instructional materials and demonstrate; • Encourage questions • Check to ensure participants' understanding of each step
Brief reflection: 2 minutes	• Instructor pauses briefly and instructs participants to check their own notes and reflect independently
Continue lecture & demonstration: 20 minutes	• Same as Part 1 above
Brief reflection: 2 minutes	• Same as the first independent reflection session above
Break: 5 minutes	• Instructor distributes handouts that have practice exercises and detailed, step-by-step instructions for completing the exercise
Hands-on practice: 50 minutes	• Participants perform hands-on practice activity independently • Participants are encouraged to ask instructor questions
Closing: 5 minutes	• Summarize content covered in this class session • Distributes handouts for take-home exercises, which have detailed, step-by-step instructions for completing the exercises • Preview the topic of next class session • Thank participants for coming to this class session, remind them to come to the next class session

Table 5

Usability and usefulness of the NIHSeniorHealth.gov site.

Able to find needed information on the site	%	Ease of use	%	Usefulness of information found on the site	%
Always	42	Difficult	2	Completely useless	1
Most of the time	45	Neither difficult nor easy	34	Somewhat useful	4
Sometimes	6	Easy	43	Useful	42
Occasionally or never	7	Very easy	21	Very useful	54

Table 6

Usability and usefulness of the MedlinePlus.gov site.

Able to find needed information on the site	%	Ease of use	%	Usefulness of information found on the site	%
Always	40	Difficult	1	Completely useless	1
Most of the time	41	Neither difficult nor easy	36	Somewhat useful	7
Sometimes	10	Easy	44	Useful	47
Occasionally or never	9	Very easy	19	Very useful	45

Table 7

Participation in own health care.

Has anything learned from this class affected you decision about a health- or medically-related issue?	%	Has anything learned from this class changed the way you take medicine?	%
Yes	78	Yes	55
No	22	No	46
During the course of this training class, how many times total outside of the class did you use the NIHSeniorHealth.gov website to find health and medical information for yourself or loved ones?	%	Since the start of the course, have you taken any information learned from the course to discuss with a doctor/nurse/ pharmacist?	
More than 10 times	17	Yes, at least once so far	25
5–10 times	19	No, but plan to do so in the near future	42
2–4 times	38	No, but probably will do so in the future	31
Once	9	No, will never do that	2
Never	17		

Table 8

Satisfaction with the training

The 2-hour length of each session:	%	The class size (< = 7 people per class):	%
Just right	80	Just right	83
Wish it was longer than 2 hours	18	Didn't matter/didn't care	9
The twice a week class frequency:		The 4-week duration of training:	
Just right	75	Just right	29
Wish the class met more often	22	Wish the class lasted longer than 4 weeks	68
The handouts contributed to learning		The hands-on practice contributed to learning	
Strongly agree or agree	100	Strongly agree or agree	100
I have learned a lot from the training		I would recommend this course to age peers	
Strongly agree or agree	97	Strongly agree or agree	100
Neither agree nor disagree	3		

Table 9

Expectations for and views of public libraries.

Expecting the public library to provide this type of program	%	Public libraries should provide this type of programs for older adults	%
Yes	27	Yes	100
No	73		
In the past, were able to get this type of training from any public library	**%**	**Have developed more positive views of public libraries after taking this class**	**%**
Yes	5	Yes	98
No	95	No	2

Table 10

Willingness to serve as a volunteer instructor in the future.

Willingness to serve as a volunteer instructor in our future training classes?	%
Yes	14
Yes, but would need more training first	39
No, don't have time for it	12
No, not interested	5
No, don't think would ever be knowledgeable enough to teach others	31