Older adults have been demonstrated to exhibit special needs with regards to web interface design. Technological experience and aging-associated cognitive and physical changes can all contribute to decreased system usability by older adults, particularly with regard to browsing and navigation. Thus, websites that serve older adults in addition to other populations should be designed with an emphasis on older adults’ navigational needs in addition to their informational needs.

The purpose of this study was to characterize the information-seeking behaviors and information needs of a health information website’s primary target audiences, university researchers and community-dwelling older adults, and determine whether the current website design supported those behaviors and needs. Data about these user groups’ information behaviors was gathered via focus groups and individual interviews and qualitatively analyzed. The results of this assessment were used to develop initial recommendations for website redesign.

Headings:

Information-seeking behavior

Needs assessment

Community information services

Library websites

Medical libraries
ASSESSING THE HEALTH INFORMATION NEEDS OF OLDER ADULTS AND ACADEMIC RESEARCHERS FOR DEVELOPMENT OF A HEALTH INFORMATION WEBSITE

by
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A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Library Science.

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Approved by

_______________________________________
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1 Introduction

Navigating online health information is a complex process, whether the information seeker is a consumer, academic researcher, or clinician. This complexity can be alleviated to some extent by effective web design. There are many “best practices” for design, such as consistency, error prevention, and minimalism, that have been demonstrated to promote website usability for most users (Nielsen, 1995). However, the needs of older adults are not entirely met by these all-purpose design standards. There are a number of areas in which this population tends to differ from the general public, including technology experience, education and literacy. Aging-related visual, auditory, or cognitive impairment may also impact system usability (Fisk et al, 2009).

The health information needs exhibited by older adults are also distinct from those of clinicians and researchers. This distinction extends to both the topical areas of information and the reading level at which that information is presented. A scholarly article about the molecular pharmacology of an Alzheimer’s disease medication would be incomprehensible to the average patient, just as a dosing instruction sheet would be irrelevant to a neurochemistry basic researcher. In light of the divergent information needs exhibited by patients and professionals, and the evidence for older users having unique requirements for website navigability and accessibility, the navigational needs of the older user must be a primary consideration in the web content structure design of health information websites aimed at both older adults and academic researchers.
This paper describes the results of a user needs assessment conducted on the website of the UNC Institute on Aging information center and some implications for the website’s design. The aim of this assessment was to characterize the information-seeking behaviors and information needs of the website’s primary target audiences, university researchers and community-dwelling older adults, and determine the extent to which the current website design meets those needs. The hypothesis of the researcher was that the two groups would demonstrate significant disparity in both the types of information sought and the information-seeking context, suggesting a need for a website design that creates greater distinction between the resources for these audiences.

2 Literature Review

The Internet has increased the volume of health information available to both academic researchers and the public. A recent Pew Research poll indicated that 72% of Internet users used the Internet to search for health information online in 2012 (Fox & Duggan, 2013). However, users may still have difficulty locating useful health information, not because of its scarcity, but rather because of the “information overload” phenomenon (Keselman, Browne, & Kaufman, 2008). The majority (77%) of those who sought online health information initiated searches with a web search engine like Google or Bing, a strategy that is conducive to information overload (Fox & Duggan, 2013).

Searching for consumer health information is a major Internet use case for older adults and their caregivers, both rapidly growing segments of America’s online population. However, older adults are more likely to encounter “virtual barriers,” such as
barriers to reading comprehension or website navigation, that prevent them from accessing needed information (Becker, 2004).

Some barriers to older adults accessing online consumer health information are related to literacy and technological experience. It is recommended that consumer health information be written to be accessible to audiences with a wide range of education and health literacy levels, but many online sources fall short of that standard (Risoldi Cochrane, Gregory, & Wilson, 2012). Overly technical language or complex sentences are even more likely to prevent access by older adults, since literacy tends to decline with age (Becker, 2004). Older adults also have, on average, less experience with technology than younger groups, which can affect use of any web system (Fisk et al., 2009; Kurniawan & Zaphiris, 2005).

Other “virtual barriers” are a result of the physiological changes associated with age, such as decline in visual acuity and dexterity. This can make it difficult for older adults to see and select text or links on a webpage, affecting navigational and reading capabilities (Becker, 2004). Older adults often exhibit cognitive differences from younger individuals, most notably reduced working memory, attention span, and learning ability (Hart, Halcomb, & Chaparro, 2008). The cognition factor can greatly impact the ability of an older adult to navigate a website, particularly one with a navigation structure that is not clearly evident (Fisk et al., 2009). For this reason, designers are recommended to minimize the amount of irrelevant information on webpages for older adults, to avoid distraction or unnecessary cognitive load (Hart et al., 2008). Thus, though user needs are an important consideration for any website, designers of consumer health websites for
older adults must take special care to understand the unique ergonomic needs of older adult users in addition to their information content needs.

The information needs factor is particularly complex for health information websites serving diverse audiences. Even within a very specific health topic, different user groups (such as basic researchers, healthcare providers, and patients) can be expected to have radically different information needs. For example, within the topic of Alzheimer’s disease medications, academic researchers might seek scholarly articles or information about research grants, while health providers might seek prescription guidelines, and the general public might seek consumer information about drug safety and side effects. This diversity of information needs between laypeople and academics results in different search workflows and source formats (e.g. electronic journal article vs. patient education brochure). However, experts and academics may underestimate the extent of the difference in information need. Health professionals may be unconsciously inclined to provide the objective, technical information sources that they themselves prefer, “while patients, their families, and their friends often prefer more subjective, informal information about the realities of coping with illness in daily life” (Abrahamson, Fisher, Turner, Durrance, & Turner, 2008). A recent meta-analysis of caregiver information needs assessments indicated that medical jargon and over-technical language posed “a major barrier to comprehension” of information provided by health professionals, potentially leaving caregivers underequipped to perform their tasks (Washington, Meadows, Elliott, & Koopman, 2011). A study of users of the NC Health Info consumer health information portal indicated that the type of health information sought most frequently was “information on a specific condition.” The most frequently
requested content for the NC Health Info website was “more information on financial assistance, health insurance, and other social services” (Abrahamson et al., 2008). A 2008-9 study of Caring.com, a website for senior caregivers, surveyed users about their reasons for visiting the website. The responses were strongly weighted towards practical, consumer-oriented information; common categories included practical caregiving tips, and signs and symptoms of particular health conditions, like heart disease or Alzheimer’s disease (Kernisan, Sudore, & Knight, 2010). A 2007 study of older adults’ health information needs identified four distinct types: “basic,” the desire for background information about a condition (to aid mental preparation and coping); “advanced,” detailed information to help them “understand and monitor doctors’ decisions;” “alternative,” information about complementary medicine; and “provider-related,” information about a doctor’s credentials (Xie, 2009). The common theme in all of these categories is that the information-seeking episode tended to be motivated by an emergent health condition or diagnosis: personal interest, not academic curiosity.

Academic researchers’ motivations for searching for health information are generally less personal. A recent study by HighWire Press indicated that books and scholarly journal articles are still the main sources of information for scholars, the majority of scholarly journals, particularly those in science and medicine, are now accessed in electronic form rather than in print (Newman & Sack, 2013). Kibiridge and DePalo (2000) identified “accessibility, timeliness, readability, relevance, and authority” as the “five basic elements” that academic researchers sought for their electronic information resources. A 2005 interview study conducted at the University of Vermont found that basic sciences researchers “strongly preferred online resources to print
resources,” citing convenience and speed as primary advantages (Haines, Light, O’Malley, & Delwiche, 2010). Despite the fact that electronic scholarly resources are largely provided through institutional subscriptions through academic libraries, researchers are not always aware of this connection, perhaps because the prevalence of electronic resources has lessened the need for use of the physical library (Kuruppu & Gruber, 2006). Similarly, the “end-user searching” promoted by electronic indexes can ‘alienate’ users from librarians, and the prevalence of powerful web search engines like Google may discourage the use of library databases, which may be seen as more difficult to use (Du & Evans, 2011). The University of Vermont researchers tended to avoid using the library website, instead starting their searches with PubMed or Google Scholar when seeking scholarly articles (Haines et al., 2010). They also sought information from a variety of other sources including Wikipedia and funders’ websites. The study also found that though the basic sciences researchers had a low awareness of library services and the library’s role in subscription information resources, they did express an interest in the library as a “centralized” source of “university-wide information” and resources; the study’s authors suggested that placing more library resources and information on departmental websites might decrease the gaps between the library and the researchers’ workflows (Haines et al., 2010).

The focus of this study is a library website that seeks to provide a similar array of centralized resources and library-oriented information to academic researchers, as well as health and wellness resources relevant to the general public. In such a broadly-scoped health information website, effective information architecture is important for helping users navigate efficiently to the information they need. To promote successful browsing,
this information architecture should match users’ mental models when possible, and facilitate creation and retention of a mental model (Sharit, Hernandez, Nair, Kuhn, & Czaja, 2011; Zaphiris & Kurniawan, 2003). Because of the wide range of health topics of interest to older adults and academic researchers, websites serving both of these user groups are often constructed with deep hierarchies categorized primarily by topic. However, this can pose usability problems for older users, who are more likely to become lost in deep menu structures (Fisk et al., 2009), and have been shown to value navigational characteristics of websites more highly than other aging-optimized design features (Lynch, Schwerha, & Johanson, 2013). Creating a website hierarchy that is accessible to browsing by older users is one step towards reducing the “digital divide” between generations (Zaphiris & Kurniawan, 2003).

3 Setting

The focus for this needs assessment is the website of the information center at the UNC Institute on Aging.¹ The Institute on Aging (IOA) is a research center that fosters interdisciplinary gerontology research throughout the state of North Carolina. Though it was created “under the general umbrella” of the entire UNC system, it is located at UNC-Chapel Hill, and most of its research affiliates are also affiliated with one or more departments at the university.² In keeping with its mandates to promote research and “provide state-of-the-art information to policy makers, program managers, service providers, clinicians, and the general public,” the IOA maintains an information center,

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¹ “Library Information Center,” http://aging.unc.edu/info-center
which currently consists of a small print collection and an array of online research resources. The information center is staffed for a few hours each week by the Institute’s designated liaison librarian from the Health Sciences Library at UNC-Chapel Hill (HSL).

The IOA website was moved to the WordPress content management system in late 2013. As part of this redesign process, the portion of the website relating to the IOA information center was condensed and reorganized. A major change in this reorganization was the transfer of the majority of the information center’s web content to the LibGuides content management system on the UNC HSL website. The redesigned information center LibGuides website (or “guide”) contains information resources for academic researchers as well as the general public. This study was proposed to evaluate the website’s new organizational structure and inform the choices of resources to include in the guide.

4 Methods

This study assessed the information and web interface needs of the IOA website’s target audience demographics through qualitative analysis of both primary and secondary data. The health information needs of older adults were assessed using data from senior adult focus groups recently conducted by the “Hydrate 4 Health” research team at the IOA. During December 2013, 21 adults over the age of 65 participated in a series of 90-minute focus groups held at the Seymour Senior Center and the Central Orange Senior Center in Chapel Hill and Hillsborough (see Appendix: Focus Group Demographics). The primary aim of these focus groups was to evaluate the understandability and perceived utility of a set of consumer health educational pamphlets recently developed by
the research team. During these focus groups, participants were asked directly about the types of health information they seek and how they select sources for health information. However, in addition to these questions, many topics discussed during the focus groups were related to health information and information seeking. The focus groups were transcribed and coded using ATLAS.ti 7 by members of the hydration research team at the IOA.

To assess the information needs of the academic researchers, individual interviews were conducted with students, faculty, and staff conducting aging-related research or coursework at UNC-Chapel Hill or the Institute on Aging. Subjects were recruited via email announcement on the email lists for IOA staff and UNC’s Certificate on Aging program and invited to participate in interviews lasting approximately half an hour. Eight participants (the “researchers” or “researcher group”) were recruited for semi-structured interviews, which were conducted in-person or via phone. Five participants held faculty or staff positions; the remaining three participants were UNC graduate students. Interview questions were focused on researchers’ academic information-seeking practices, use of the IOA website, and the recent reorganization of the information center website. The final portion of the semi-structured interview script was similar to a reverse card-sort exercise; users were asked to describe the contents on each page of a hypothetical IOA information center website after being prompted with the menu title (see Appendix: Interview Script). Interviews were transcribed and analyzed using ATLAS.ti 7.
Final design recommendations were also informed by literature recommendations for system design for older adults, as well as web traffic data collected from both the Google Analytics plugin and the LibGuides content management system.

5 Results

Focus groups

Analysis of the older adult focus groups revealed the following themes about health information preferences, drawn both from the responses to the direct questions about information seeking and other relevant comments:

Diversity of health information sources

“I know a lot of older folks do not like computers period. So that eliminates a lot of good information that you can get on the internet. But that’s old school, and they are old school and they don’t like computers.”

“I get my health information from the Internet. I Google everything.”

Focus group participants tended to use multiple information sources to seek health information. Many mentioned their doctor as a major source of health information, either from direct conversation or via patient education sheets. Internet sources were mentioned a few more times than the doctor’s office. A common response was “Google,” or other web search engines, with some citing particular websites (e.g. WebMD, the Mayo Clinic website) as frequent sources. Even participants that were heavy Internet users stressed a preference for reading print materials: “I use the Internet a lot but I would not read over the Internet.” “I like to read text.” Participants sought health information from a variety of print sources, including books, encyclopedias, magazines, and newspapers. Newspapers and magazines were also seen as a way to stay current (“they constantly have articles for people over 65…a lot of it is on health, and…identity theft, and anything
you can think of.”). Several participants noted that reading about a topic in a magazine or newspaper might prompt them to seek more information online.

**Reliability**

“The thing about all this is...how do we determine as senior citizens what is bogus and what isn’t bogus?”

Focus group participants were concerned about the reliability of their health information, especially the issue of reconciling conflicting results from multiple published medical studies. No participants specified that they considered information from the Internet as being intrinsically less reliable than print sources. Those who were reluctant to read health information on the Internet merely stated a preference for reading from a hard copy rather than from a screen (“That’s an age thing,” one commented). Participants wanted to know the credentials of the factsheet creators as well as source of the information presented on the factsheets (“where did this information come from...was this a study done over a period of years with a couple thousand people or was it done in a couple of months with 10 people?”). They also expressed suspicion about potential biasing factors (especially pharmaceutical industry interests) that could affect the quality of the health information presented to them from all sources, including their healthcare providers. “…Those horrible commercials they have on television now...just those pharmaceutical companies pushing [me to talk to my doctor about a drug]...I rebel against that a lot.”

**Interest in targeted information**

*Participant A:* “…all we talk about is the medicines we are on and what illnesses we have and what has happened since yesterday to our health...and I am
surprised how many people are reeling off all kinds of factual info about drugs... they know what they are talking about because they are interested.”

Participant B: “And because they are taking it.”

Focus group participants indicated that questions about their own health or medications, rather than general curiosity, were the most frequent incentive for seeking out health information: “I read newsletter articles that relate to health problems that I have.” “I only look for something if something’s bothering me, or if [a doctor orders a test I’m not familiar with],” said one participant. Others mentioned that their top health information needs were related to specific health conditions that they either had or knew themselves to be predisposed to. They also sought information about family and friends’ health conditions: “[my spouse] has severe progressive dementia, so I read a lot about dementia.” “I listen to what my friends already have, and I wonder if and when I will be getting whatever they are suffering from.”

Readability

“The simpler the better... I want something that is quick and easy.”

In addition to the quote above, participants made a few other comments related to readability: “You don’t want to overwhelm them [with too much information on the consumer health handouts].” Many of the specific sources they mentioned, such as WebMD, the People’s Pharmacy, and AARP Magazine, are aimed at consumers and are at a lower reading level than scholarly information sources. “I go for Prevention magazines. I don’t look up WebMD; it’s got some good stuff, but I don’t search the internet for anything that takes more than 15 minutes.” Additionally, feedback on the hydration fact sheets indicated an appreciation for “general audience” level and brevity
(“there is too much stuff going on [in this pamphlet]”), though this preference was in some conflict with the desire for more targeted, personally relevant information (e.g. “How much water do you need if you weigh 140 lbs?”).

**Researcher Interviews**

**Information sources**

“I’m always on the HSL website.”

Participants cited a variety of preferred information sources search tools for their academic research, most frequently Google/Google Scholar, PubMed, and CINAHL. All participants described themselves as frequent users of the UNC Library or HSL websites, which they used primarily as a gateway to subscription resources, such as databases and journals. Google Scholar was a preferred resource for initial research and retrieval of known items. “I find it the most accessible,” said one researcher. Two specifically mentioned that they had experienced difficulties exporting citations to RefWorks from PubMed, and had an easier time performing this task from Google Scholar. Other information sources included organizational and government websites, such as the Alzheimer’s Association and the National Institute on Aging (NIA). Researchers used these sites for current reports and data, or for reference when creating consumer health materials: “[I visit the NIA website] to see how they’re framing the message [to the public], what vocabulary they’re using...”

**Convenience & Ease of Access**

“All of us are busier than we want to be, and getting access to the information we want quickly...it’s important.”
When asked what frustrated them about their research processes or research tools, researchers frequently cited processes and systems that slowed their workflow, such as difficulties with narrowing search results in PubMed, accessing the full text of articles, and using citation managers. One described PubMed’s search interface as “awkward….unwieldy to find what I’m looking for. I’m too impatient.” Researchers said they are usually capable of solving these problems without assistance, but “it slows me down,” said one. “The only thing I dislike is when I can’t find an article or when I can’t get to an article…sometimes it’s quite a few steps to get there,” said another participant, describing the process of locating full-text without a library link resolver.

One participant said that ease of use was their main consideration in selecting a search tool (“It’s got to be easy to function…[so] I can access it quickly”). Several mentioned that they appreciated the recent redesign of the HSL homepage, which now features a direct search box for major databases like PubMed and Web of Science. Other features that afforded greater speed also received positive mentions, like citation linking and automated “related article” searches.

**Detail & Audience Orientation**

Researchers valued information sources that provided information about their specific research area, at a level of detail appropriate to their advanced research. The researcher discussing their use of the NIA website mentioned that the articles there were of limited utility for research: “[they are] something that older adults can read…as a researcher, I want more…I go to other resources for professionals.” Without immediate cues that a website would provide targeted content for them, researchers were likely to seek something else:
“[the site is trying to] appeal to the public…I don’t think that academic people would be interested seeing things like, “how do you apply for long-term care insurance?” …If that was prominent on the page I would go to something else because that’s not the information I need for my work.”

Another participant made a similar comment with regard to the IOA website homepage’s consumer health feature article: “If I’m going to the UNC Institute on Aging, I want to get more research-oriented things.”

Currency

“What makes a website useful is its currency.”

This factor was the most frequently mentioned by the researcher group. One researcher mentioned that the main question guiding their resource selection was “am I working off of updated and recent information?” This criteria was used to judge websites as well; researchers indicated that the perceived currency of a website impacted their trust in the organization as well as their likelihood to return to the website. “[Consistently providing useful, current information] grooms the audience to want to use the website.”

Menu Title Feedback: Highlights

Seniors & Caregivers

Of the six researchers who performed the reverse card-sort exercise, two initially described the “Seniors & Caregivers” page as being for an academic audience rather than for the general public. However, after hearing the next title (“Researchers & Clinicians”), both stopped and revised their previous answer (“that makes me think the first one was for the public”), describing resources “for seniors,” such as the Alzheimer’s Association website or the National Family Caregivers’ Alliance website.
Researchers & Clinicians

Participants generally understood this page to have resources specifically for researchers: “I guess students [would use the page], but primarily faculty.” One commented that ‘Clinicians’ should be dropped from the page title: “it sounds so scientific…it’s more of a hospital-based thing, and I don’t think that’s what you’re trying to get across.” Expected page contents included current research projects at the IOA, or how to find current research articles, and information on searching for research grants.

Aging Facts & Figures

Researchers responded positively to this menu title, stating a need for current information about statistics on the aging population. Several commented that this page would be of broad interest: “it would work for people in the public, and even people who are in academia who just aren’t in aging… anyone who lacks familiarity with aging research.” They expected to see links to current reports from trusted sources (three mentioned the Alzheimer’s Association’s annual report). Some also expressed an interest in reading current information condensed from multiple reports: “as a quick reference guide.”

Research Tips

This page was seen primarily as a resource for students: “people who are new to research.” Page contents were expected to be tips on choosing databases, using Boolean operators, and reference managers (two interviewees mentioned using similar guides on the HSL website). One participant said they would not have expected this kind of page on the IOA website, but added, “[if I saw it on the IOA website] then I would expect it to be somehow tied to aging research and not just general research tips… Anything that
might differ from your standard research protocol, that’s specific to geriatrics or
gerontology.”

**Library Resources**

Several participants were hesitant in describing this page’s contents, or considered it to be irrelevant to the IOA website. Most concluded that the page would have links to information about the UNC Library, the HSL, and associated services: “who you would contact for help…with RefWorks, with finding articles, with PubMed, with [interlibrary loan].”

**Websites**

Almost all participants expressed confusion about this page’s purpose, or clarified that they had “expected to see links on all the other pages too.” “That sounds like a lot of tabs that may not be necessary,” said one.

**Library Information Center**

“[pause]…That would be a little bit like library resources, right?” “…I don’t know how that would differ from the other ‘library’ page you mentioned.” “[pause]…Would that be different than ‘Library Services?’ I guess it would, if there’s a different page for it.” Five of six participants expressed some level of cognitive overlap between this menu title and the previous “library resources” (the sixth did not appear distressed, but did repeat most of the contents previously specified for the library resources page). Two preferred “library resources” over “library information center,” the others thought that the former phrase implied library collections, while the latter implied information about hours, services, and librarian contacts.
6 Study Limitations

The generalizability of this study’s results are limited by the size and demographics of the sample. The study population size is 29, with 8 being drawn from the IOA’s academic affiliates and the remaining 21 being community-dwelling older adults. Neither sample is of sufficient size to draw firm conclusions about larger populations’ information needs. Though the researcher sample was likely large enough to identify major usability problems with the titles in the website menu structure, the reverse card-sorting exercise may have been biased by the order in which the menu titles were presented. A larger sample size would have enabled investigation of the effects of ordering on the researchers’ reactions to the titles. Other qualities of the study population may also affect the extent to which the study results can be applied to other populations and settings. The senior adult focus group participants were recruited at the Seymour Senior Center in Chapel Hill and the Orange County Senior Center in Hillsborough, so the focus groups are expected to be made up primarily of Chapel Hill and Orange County residents. According to 2011 data provided by the U.S. Census Bureau, the population of Chapel Hill is, in general, more highly educated than the statewide population, with about three quarters of the population holding at least a bachelor’s degree, compared to about one quarter of the state and national populations at large. This study sample was even more highly educated than the average Chapel Hill resident; over half of the focus group participants had at least a bachelor’s degree. Additionally, the median household income in Chapel Hill was higher than that of North Carolina or the United States (U.S. Census Bureau, 2013). These factors will likely impact the level of health and technological literacy among the study population. Additionally, this sample is subject to
any selection bias arising during the original recruitment for the focus groups; for example, individuals who volunteered to participate in the focus groups might have a higher level of health literacy and interest in health topics than those who chose not to be in the study.

Similarly, due to sample size, the group of participants from the Institute on Aging’s research population is unlikely to be representative of the larger population of health and social researchers at the university. Furthermore, the population at UNC-Chapel Hill may differ from the researcher populations at other universities. However, the themes identified in the focus group and interview data may be applicable to the design of health information websites intended for use by both older adults and other groups, including library guides, health organization websites, and other health research websites with public-facing pages.

7 Discussion

Though the two groups differed in their primary topics of interest, the common themes from this analysis suggests that IOA Information Center website could serve as a useful resource for both audiences, and is in fact already providing access to some of the specific information sources cited by study participants. Both the older adult group and the researchers expressed preferences for quick access to reliable information. This aligns well with the model of the library guide as a centralized access point to authoritative information sources. The current IOA information center website already includes many of the types of information that the users indicated an interest in using, such as links to funding sources, government websites, and UNC library databases.
However, though the website does span its users’ interest areas as indicated by the assessment, it is less successful with regard to some of their other requirements. The website’s somewhat obscure location (split between two larger websites) and its internal organization are not conducive to ease of use and navigation. Furthermore, the colocation of information for researchers and older adults disregards both groups’ preference for targeted information.

The results of this needs assessment indicate that there is very little overlap between the interest areas and preferred information sources of the two groups. Older adults were primarily interested in finding consumer-oriented information about a variety of specific health topics, while the researcher group was most interested in finding scholarly journal articles, statistical data, and funding information. A single library guide website containing resources to support each of these diverse interests is likely to violate one or more established web design guidelines for older adults. The number of distinct interests represented on such a website would require either a highly complex menu structure or a large amount of content on each page. In either case, only a subset of the information on the website would be of interest to users from either group. The current IOA information center provides extensive information for each user group, but most menu titles do not clearly denote a distinction between the groups (Figure 1). Navigating this website would require extra cognitive effort from all users, but this effort likely poses a more significant barrier to the older users.
A website design that requires users to sort through irrelevant information is also incongruent with the preferences expressed by this study population. Both groups valued convenience and ease of navigation in their health information seeking processes. The researchers placed especial emphasis on the importance of speed in their online research, and some among the researcher group commented that excessive prominence of irrelevant information might alienate them from using a site. Thus, designing for efficient navigation and information retrieval may not only increase accessibility for older adult users, but also encourage use by other groups.

The disparity between these two groups and their information needs warrants testing of a dual website hierarchy that creates greater separation between web content written for the two groups. The proposed hierarchy will have a narrow top-level menu structure based on user role, and a shallow, topic-based secondary menu structure (Figure 2). This top-level menu, accessible from the information center landing page, will act as a portal to differentiate between different user groups, i.e. “For Researchers” and “For Seniors & Caregivers.” This effectively creates two websites, allowing more horizontal menu space for topics relevant to each group. This will decrease the depth of the menu structure and minimize visibility of irrelevant menu categories, so navigating the site will
require less cognitive effort, promoting usability by older users (Fisk et al., 2009). In response to the feedback from the researcher group, the “Websites” page will be removed and “Library Information Center” will be renamed to “Information Center.” The other lower-level page contents will remain largely unchanged, since these page titles were well-understood by the researcher group.

2 Proposed Website Hierarchy

In contrast to the current website, which indicates the intended audience within the webpage body text, the separation of user groups earlier in the hierarchy of the
proposed website will allow each lower-level pages to contain only the information relevant to the specified user group. This minimizes the amount of text on the page, the amount of rarely used information, and the need for vertical scrolling, all design elements that can be problematic for older users (Chisnell, Redish, & Lee, 2006; Lynch et al., 2013). In the case of certain webpages containing information relevant to both groups, such as the Aging Facts & Figures page, this alternate menu design will cause some elements lower in the site hierarchy to be duplicated on each ‘side’ of the site. Objectively, this makes the site organization less “clean,” but the navigational benefits of implementing a flat menu structure for each user group should outweigh this potential disadvantage.

**Future Directions**

One additional observation from this study is that both groups displayed low awareness of both the website and the information center itself. This is corroborated by the site traffic data, which indicates that the information center webpages received only about five percent of the total site hits in the month of February 2014.³ This indicates that the potential utility of the IOA’s information center resources has been hindered by a lack of user awareness. As some interview participants noted, the resources that the IOA information center website currently provides are also available through other websites, like the other HSL research guides and the N.C. Department of Health and Human Services Aging Division, so users may have little incentive to seek them from the IOA. Website usage might be improved through direct marketing of the website to both

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³ Google Analytics data: http://aging.unc.edu/info-center/ received 36 hits during February 2014; pages on the entire site domain were viewed 2729 times. LibGuides statistics data: The nine sub-pages of the information center site, hosted on hsl.unc.edu, received 101 views.
community members and academic researchers: one researcher suggested that making it the default browser homepage on Institute computers would increase visibility and encourage use among IOA staff. The current website design may also be a contributing factor to this lack of awareness. Because the information center webpages are organized under a single tab of the larger IOA website, users must hover over the tab or navigate deeper into the website hierarchy to survey the information center’s online resources. Also, since most of the information center webpages are hosted on an external website, this web content is not indexed by the IOA website’s internal search, a tool which half of the research group mentioned using in the past. Future assessments of the IOA information center website might evaluate whether moving the content from the HSL website to the IOA website has an effect on usability or website traffic. Further investigation of the site menu titles through a web-based card-sorting survey might also be useful for the site’s development.

8 Conclusion

The documented “best practices” for designing web interfaces for older adults differ from the standards for interfaces intended for the population at large. The aging process tends to cause a number of changes that may impact an individual’s ability to interact with an interface, such as cognitive impairment, visual or auditory impairment, or a decrease in dexterity. Furthermore, the current population of older adults tends to have lower levels of technological and health literacy when compared to younger populations. This can cause a differential in system usability between age groups and affect the maximum complexity of written content that is appropriate for a website’s user group
(Becker, 2004). Previous research has indicated that using the design standards recommended for web accessibility for older adults does not have significant negative effects on system usability for other user groups (Johnson & Kent, 2007). However, in the case of a website serving multiple audiences with disparate information needs, the ensuing complexity of the web content structure may preclude adherence to the standard of simple navigability, a particularly important factor in a system’s usability by older adults.

This study assessed the information-seeking practices and information needs of the two target audiences for the information center website at the UNC Institute on Aging. Analysis of focus groups and interviews with older adults and academic researchers indicates that while these groups share some information preferences, such as ease of access and currency, they exhibit very different needs with regard to topical content and presentation. This disparity in information needs suggests that a revised website hierarchy could create more distinction between these user groups without resulting in redundant pages. The proposed dual site structure will allow the website to display only the most relevant information to each user group, as well as accommodate further design features for older adults (e.g., larger font size) without compromising the experience of other types of users who do not require these elements.
Bibliography


Appendix

Library Information Center Page on the IOA website

Library Information Center

Welcome to our Library Information Center!

Our Institute on Aging Librarian is Brenda Linares, MLS, AHIP.

Ms. Linares is responsible for providing synchronous and asynchronous orientations to the Institute on Aging's library resources and services; conduct mediated searches as requested by institute researchers and staff and the North Carolina Division of Adult and Aging Services; provides targeted research information services supporting individuals and teams, both onsite and electronically; she also provides RefWorks and EndNote support for researchers.

She is available at the Institute on Aging every Thursday morning from 8am to 1pm.

You can contact via email at linares@unc.edu, or via phone at 919-865-6741.

For information about health in aging or aging research, please see the IOA research guide:

- Seniors & Caregivers: health information written for seniors and their caregivers
- Researchers & Clinicians: information for geriatrics researchers and practitioners
- Aging Facts & Figures: Statistics about aging in NC, the United States, and worldwide
### Aging Research Guide on HSL website

**Aging Research Guide**

**Home**  | **Seniors & Caregivers**  | **Researchers & Clinicians**  | **Aging Facts & Figures**  | **Research Tips**
---|---|---|---|---

**Library Resources**  | **Websites**  | **Recursos en Español**  | **UNC Institute on Aging**
---|---|---|---

### Information for Seniors & Caregivers

The websites listed on this page are sources of reliable information about health and aging, written especially for the public.

### Consumer Health Resources

- **Healthing.org**
  Created by the American Geriatrics Society Foundation for Health in Aging and overseen by an editorial board of experts in the field. This websites has information on common diseases and disorders that affect older adults. Useful features include the "What to Ask" series that provides tips on how to talk with your doctor to create a care plan that's best for you or loved one, and the section on how to handle healthcare decisions and issues.

- **Healthfinder.gov - Your Source for Reliable Health Information**
  Created by the U.S. Department of Health and Human Services. Try using the "my-Healthfinder" tool to get personalized health advice, or browse for a topic you want to learn more about using the A-Z index. The site also has interactive tools to assess your health.

- **MedlinePlus: Seniors’ Health**
  A collection of health information of interest for seniors from MedlinePlus, a website produced by the National Library of Medicine that offers reliable, up-to-date health information, anytime, anywhere, for free.

- **NC Division of Aging and Adult Services**

- **Seniors’ Health: NC Health Info**
  NC Health Info is an online guide to web sites of quality health and medical information and local health services throughout North Carolina compiled by NC librarians.

- **NIH SeniorHealth**
  This site is jointly produced by the National Institute on Aging and National Library of Medicine, and has written information and videos on a variety of health topics of interest to the elderly.

- **Health Information for You (UNC Health Sciences Library guide)**
  How to find reliable information about health and healthcare.

- **Healthy People 2020**
  From the 2020 Topics & Objectives page on "Older Adults" to see list of all the objectives that focus on health, function, and quality of life for seniors.

- **Health & Aging Topics A-Z**
Focus Group Demographics

### Sex

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Female</td>
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<tr>
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</tbody>
</table>

### Age

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<th></th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>70-74</td>
<td>4</td>
</tr>
<tr>
<td>75-79</td>
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</tr>
<tr>
<td>80-84</td>
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</tr>
<tr>
<td>85+</td>
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</tr>
<tr>
<td>Total</td>
<td>21</td>
</tr>
</tbody>
</table>

### Race

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>16</td>
</tr>
<tr>
<td>Black or African American</td>
<td>3</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
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</tbody>
</table>

### Education Level

<table>
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</tr>
<tr>
<td>9th-12th grade, no diploma</td>
<td>3</td>
</tr>
<tr>
<td>High School graduate</td>
<td>3</td>
</tr>
<tr>
<td>Some college and/or associates</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>8</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
</tr>
</tbody>
</table>
Interview Materials

Recruitment Email: Researcher Group

Dear UNC IOA Researchers and Community,

I am emailing you to invite your participation in a research study that will be conducted by one of the graduate students at the Institute on Aging (IOA). The purpose of this study is to learn about ways to improve the IOA web presence. This project involves interviewing UNC researchers about their use of the IOA website and other aging-related research resources.

The study will be conducted by Erin Morris, a graduate student in the School of Information & Library Science at UNC-Chapel Hill and former graduate assistant and intern at the IOA. This project is part of a research study for her master’s project, which is focused on the IOA Information Center website (http://www.aging.unc.edu/info-center/).

We hope you volunteer to participate. Your participation in this study is voluntary and confidential. Your name and other identifying information will not be connected with your response. When you volunteer to participate, Erin Morris will interview you for about 30 minutes. During the interview you will be asked to discuss your online research practices, including use of the UNC Library websites, IOA website, and other research tools.

If you wish to participate in this study, please contact Erin Morris at morrisen@live.unc.edu. She will contact you to schedule an interview. Interviews will take place during the month of February 2014 and will be scheduled at a time and place that is convenient to you.

Your input is important to us and will help us to provide you with better services and resources through the IOA website. Please feel free to contact the IOA librarian if you have any questions or comments.

Thank you,

[IOA Librarian]
Interview Script: Researcher Group

What is your level of education?

What is your affiliation with UNC-Chapel Hill?

What is your UNC departmental affiliation? (e.g. "School of Nursing")

What is your affiliation with the UNC Institute on Aging?

When did you begin your affiliation with the UNC Institute on Aging?

How do you get information about the Institute on Aging? Please describe.

How much time do you spend at the Institute on Aging office on MLK Blvd?
   A. More than 30 hrs/wk
   B. 20 hrs/wk
   C. 10hrs/wk
   D. 1-10 hrs/wk
   E. Never, I conduct my work from another location

Where is your primary office or workspace located?
   A. UNC main campus
   B. UNC Health Affairs campus
   C. UNC Institute on Aging
   D. Sheps Center for Health Services Research
   E. Other _________________________________

Research

What is your research area of interest?

Please list 5 resources (e.g. websites, search tools) that you have used for your research during the past week.

The next questions are about one of the websites that you have used for your research during the past week:

- Website name :
- For what purpose do you use this website?
- What do you like most about this website?
- What do you dislike about the website?
• What could be better about the website?

In the questions below, please describe a tool that you have used for research during the past week.

• Tool name:
• For what purpose do you use this tool?
• What do you like most about this tool?
• What do you dislike about the tool?
• What could be better about the website?

*UNC Libraries/HSL Website*

When did you last access the UNC library website?

What information were you looking for when you last accessed the UNC Library website?

How much time in minutes did you spend looking for information when last accessed the UNC Library website?

*IOA Website:*

The next portion of the survey relates to the UNC Institute on Aging (IOA) website (http://www.aging.unc.edu/)

Without looking at the IOA website, could you describe the kinds of information that you would expect to find there?

Who do you believe to be the intended audience(s) for the IOA website?

Among the intended audience(s) of the IOA website, who uses it the most?

On a scale of 1 to 5 (with 1 being “not at all important” and 5 being “extremely important”):

• How important is the IOA website to your research?

Select: 1 2 3 4 5

• How important is the IOA website to your professional life?

Select: 1 2 3 4 5

How often do you access the IOA Website?

• Daily
• Weekly to several times a week
- Monthly to several times a month
- Quarterly to more than 4 times a year
- Yearly
- Never

In the past 6 months, have you accessed the IOA website?
- From outside the UNC wireless network (e.g. from out of town, or from home?)
  - Yes   No
- Using a smartphone
  - Yes   No
- Using a tablet (e.g. iPad)
  - Yes   No

The following questions are about the most recent time you accessed the IOA website (http://www.aging.unc.edu/)

When did you last access the IOA website?
How did you access the IOA website?
- Typed web address (http://www.aging.unc.edu/)
- Selected bookmark or "Favorites" link
- Clicked hyperlink from email or other website
- Other (please describe)

What information were you looking for on the IOA website?
How many minutes did you spend using the IOA website?

On a scale of 1 to 5, where 1 is “never” and 5 is “always,” how often do you feel you are able to find what you are looking for on the IOA website?
Select: 1 2 3 4 5

Have you ever used the internal search function on the IOA website?
- Yes
- No

What is most useful about the IOA website? Please describe.
What is not useful about the IOA website? Please describe.

What is frustrating about the IOA website? Please describe.

*IOA Information Center Site Menu*

Without looking at the IOA library website, please describe briefly the types of information you would expect to find in each section of the IOA library website:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>About Us</td>
<td></td>
</tr>
<tr>
<td>Programs</td>
<td></td>
</tr>
<tr>
<td>Research Development</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td></td>
</tr>
<tr>
<td>Events</td>
<td></td>
</tr>
<tr>
<td>News &amp; Publications</td>
<td></td>
</tr>
<tr>
<td>Info Center</td>
<td></td>
</tr>
<tr>
<td>Links</td>
<td></td>
</tr>
</tbody>
</table>

Is there anything else you would like to share?