

USABILITY TESTING OF A WEBSITE AND A WEB USER SURVEY

Barbara Foley Wilson and Margot Palmer, The National Center for Health Statistics
Barbara Foley Wilson, 6525 Belcrest Road, Hyattsville, MD 20782

Key words: Internet, Customer satisfaction, Cognitive

Statement of the Problem

The National Center for Health Statistics (NCHS), which releases statistics through the World Wide Web, is conducting a survey of its Web users. In an effort to evaluate the site's success in disseminating health data, the survey questionnaire explores how users access the site, their purpose in visiting, and their satisfaction with the outcome. Plans are that survey results will be published on the site and changes made to the site based on the results.

The purpose of this study was to test the questionnaire in the NCHS Questionnaire Design Research Laboratory (QDRL). The QDRL was established in 1984 in the Office of Research and Methodology as a place to conduct studies of the cognitive aspects of survey methodology and to apply such studies to the many health surveys conducted by NCHS and to the dissemination of health data from those surveys.

Methods

A literature search and a Web search were conducted to find relevant work or examples of Internet surveys (1, 2). Other government agencies were contacted to learn about their experiences with Internet surveys and satisfaction surveys (3). The search established that theory is being borrowed and adapted from other arenas and modes of testing and that consensus about standard approaches is developing. Testing techniques need to adjust to the explosive growth and change in technology.

Subjects were recruited: 9 NCHS employees for Round 1, 10 paid volunteers for Round 2. There were 9 men and 10 women; 14 were white, 4 were African Americans, and 1 was Asian; they ranged in age from 20 to 60 years; 4 had Ph.Ds, 5 had masters degrees, 9 were college graduates, and 1 was a high school graduate; their occupations included librarian, researcher, student, and statistician; they identified themselves as familiar with and regular users of the Internet.

A brief survey was drafted and posted on the network server.

The Website Customer Satisfaction Survey Survey Instrument

Note: the precoded answers were provided in pop-up menus

Please take 5 minutes to help NCHS assess customer satisfaction with our Internet service by answering the questions below. This survey is voluntary, and the information you provide will be used solely for the purpose of assessing and improving customer service. No individually identifiable data will be published or released. When you complete the survey, click on the "Submit" button to send us your answers. Thank you for your cooperation.

1. How do you rate your overall satisfaction with the NCHS Website?
Very dissatisfied, Dissatisfied, Undecided, Satisfied, Very Satisfied
2. Please indicate your overall level of agreement or disagreement with the following statement.
Information on the NCHS Website -
is easy to find and access....
is well organized.....
is in an easy-to-use format..
(Repeat response categories from question 1.)
3. How often do you visit the NCHS Website?
First-time user
Daily
Weekly
Monthly
Quarterly
Annually or less
4. On this occasion, how did you locate our Website?
Search engine (e.g., Yahoo, Alta Vista, Lycos)
Bookmark
Link from other site
Was given Web address
Other
5. How often do you use other NCHS products?
Repeat response categories from Question #3

6. How do you use NCHS information? Check all that apply.

- For reference
- For value-added repackaging
- To complete/complement other information
- To provide data to end users
- To make decisions and set policy
- To prepare articles or studies
- For personal interest

We are interested in comparing our site users with the general Web user population. The information you provide will be used solely for the purpose of assessing and improving customer service. No individually identifiable data will be published or released.

7. Indicate your level of knowledge in the following areas:

- Internet
- Statistics.
- NCHS

(Subjects would click on one of five buttons: Novice, Casual, Average, Knowledgeable, or Expert)

8. Mark the one box that most closely describes your organization category.

- Library
- Federal, State or Local Government
- University
- Media
- Health Facility
- Business
- Other

9. Which of the following categories best describes your primary occupation?

- Computer-related
- Management
- Professional
- Educator and/or Student
- Other

10. Please indicate the highest level of education completed:

- Grammar school
- High school
- Vocational/Technical school (2 year)
- Some college
- College Graduate (4 year)
- Master's Degree
- Doctoral Degree (Ph.D.)
- Professional Degree (M.D., J.D., etc.)
- Other

11. What is your sex? Male Female

12. Age

- Under 18
- 18-24
- 25-34
- 35-44
- 45-64
- 65 and over
- Rather not say

13. If you care to, please tell us briefly any other reaction you have to the NCHS Website (for example, what you liked best or least; if you found what you were looking for; etc.)

Round 1

The first round of usability testing of the customer satisfaction survey was done in February 1997. In designing the protocol for testing the customer satisfaction survey, we thought it would be important that subjects were familiar with the Website contents and navigation. Although in Round 1 the subjects were NCHS employees, many had never visited the site. To provide some standard experience for the QDRL subjects, six questions were developed that were to be answered from pages on the Website before they took the customer satisfaction survey. The questions were chosen to be typical of questions asked by callers to the NCHS Help Desk.

For the first half-hour subjects were asked to examine the Home Page and to use the Website to find answers to the questions. While the subjects used the Website, QDRL staff conducted cognitive interviews, primarily with the "think aloud" technique and cognitive probes to gain some understanding of how perception, comprehension, judgment, and memory were involved in using the site.

The NCHS Home Page is a vividly colored graphic of "statistics city," a bar graph that looked like a city sky line, with a line graph superimposed. There are logos for NCHS and the Centers for Disease Control and Prevention (CDC). There are hot-linked buttons, varying in size and font, that fit into a rectangular area in the middle of the page. The buttons were labeled: How to..., About the Center; What's New; Coming Events; NCHS Products; Data Warehouse; News Releases and Fact Sheets; Frequently Asked Questions; Other Sites; White House Social Statistics Briefing Room; Queries, Suggestions, and Comments; Search.

During the second half-hour, subjects responded to the customer satisfaction survey based on their experience with the site. The questionnaire asked about

general satisfaction with the Website, specific aspects of the organization of the site, frequency of use, purpose of visit, familiarity with NCHS, with statistics, and demographic characteristics of the user. The survey questions were not altered for the employee subjects, although some questions did not apply to them.

The results of the first round of interviews were evaluated and the most obvious problems with the site were fixed before the second round. In April the changes were then tested in a second round of cognitive interviews.

Questions for Round 1

1. Name three (3) NCHS data systems.
2. What is the latest Advance Data report from NCHS?
3. How many colds were reported in the United States in 1994?
4. How many children visited an emergency room after being injured at school or at a day care center in 1994?
5. How many persons drowned in 1993?
6. How many persons got lead poisoning from drinking water at the work site in 1994?

Results for Round 1

The first round of testing demonstrated that the problems with the customer satisfaction survey were minor compared with the cognitive problems subjects had in using the Website to answer the questions.

The labels used on the Home Page buttons were confusing. For example, the collection of information from operation and maintenance of a repeated periodic survey may be referred to as a "data system" (as in Question 1) by some NCHS staff, but the term carries little meaning for others. Consequently, some lab subjects had difficulty locating data systems, which are listed under "About the Center." On the other hand, some terminology reflected language associated with the Internet. For example, "Data Warehouse" is an Internet term referring to a place having actual numbers. Lab subjects looking for the "latest Advance Data report" (as in Question 2) went to the "Data Warehouse." The subjects keyed on the word "data." The report was actually listed under "What's New." Other more familiar terms were buried under categories that are less familiar. The number of colds (Question 3) was included in "Frequently Asked Questions," but most subjects had to search around the site to find it. Subjects also had to know that a cold is categorized as an "acute condition." In short, the labels used for the contents of the Website confused the subjects in their search strategies. Despite the fact that the Home Page had a hot-linked button that was labeled "Search", it was disabled and the site had

neither a search mechanism nor an index for Round 1.

Despite their difficulty in finding answers to specific questions, in their responses to the customer satisfaction survey, subjects said the Website design was attractive and the information interesting. They thought that if they had had a lot of time they could have found answers to the questions.

A few problems were uncovered with the customer satisfaction survey. Question 7 asked subjects to rate themselves from novice to expert in their knowledge of several areas. Such a rating required very subjective standards that made some subjects uncomfortable. In question 9 some subjects found it hard to find an occupation code that seemed appropriate.

On the whole, subjects were pleased with the Customer Satisfaction Survey. They easily worked out aspects of it that might have been novel such as pop-up menus. Subjects discovered that even if the question itself was ambiguous, the precoded answers defined the question's meaning. For example, "Where are you located?" came with the choices: US, Europe, Asia, and so on.

Recommendations from Round 1:

Change some labels on the Home Page.

Drop test questions 4 and 6 which were unanswerable with available data.

Provide an Index, or a Search function.

Develop questions to test the index.

Change the occupation, industry, and location questions on the Web survey.

Do another round of subjects to see if the changes are improvements.

Round 2 Methods

Because the Round 1 subjects had so much trouble associating the content of the questions to the labels on the Home Page buttons, the first task for the subjects in Round 2 was to describe what they expected to find when they clicked on the hot-linked buttons. One subject thought that "Advance Data" referred to surveys that are in the planning stage. Another subject thought that "Frequently Asked Questions" and "Fast Facts" (the newly created index) would pertain to information about NCHS. Most subjects explained that they would only click on "How to.." if they were stymied in a more direct search. Most subjects correctly anticipated the contents of "About the Center," "News Releases," and "What's New." On the other hand, "Data Warehouse" confused most subjects. "NCHS Products" confused subjects as a label, but they were very interested once they clicked onto that page. "Frequently Asked Questions" evoked the widest

variety of descriptors, with subjects expecting directions, phone numbers, search engines, site descriptions, factoids. The most typical response to “White House Social Statistics Briefing Room” button, was “I have no idea.”

After the Round 2 subjects had described what they expected behind the hot-linked buttons, they were asked to find the answers to questions 1, 2, 3, and 5 from Round 1 and six new questions to test an Index and Search tool.

1. You need to find basic statistics on asthma.
2. You want to find in-depth statistical information on the impact of the AIDS epidemic among African-American youth.
3. You are doing research on the health status of North Carolina and you need a variety of statistics comparing it to the rest of the U.S.
4. You want to know how many Americans die in car accidents each year.
5. You want to see whether prostate cancer kills more Americans than lung cancer, and compare those death totals with other leading causes of death.

Then the subjects were asked to take the Customer Satisfaction Survey.

Results of Round 2

The redesigned Home Page was an improvement, but it was too crowded and terminology was still a problem. The NCHS Website reflects the language, terminology and organization of the Center that have evolved over time and which may not be clear to the general public. The populace at large thinks of the information in much more general terms.

As far as the customer satisfaction survey, the occupation and industry questions were improved. They received some but fewer complaints. Still, it is very difficult to develop a short but comprehensive list of occupation codes.

Instructions and disclaimers at the beginning of the survey were scanned briefly or skipped entirely, while instructions in the middle of the survey were carefully read. Subjects explained that the location made them seem important.

Subjects were very pleased with the Index. It is, however, in early stages of development and requires an immense commitment to keep it current.

The Search mechanism overwhelmed subject with too many “hits.”

Recommendations from Round 2:

- Redesign the Home Page
- Complete and maintain an Index.
- Tailor a search engine to the NCHS Website.

Shorten the instruction for the Customer Satisfaction Survey

Discussion and Conclusion

An unanticipated outcome of the study was the amount of information the organization gained regarding the structure of the Website. This information is being used to redesign the flow of content, rename some parts of the site and enhance searching capabilities.

Testing was successful in the Questionnaire Design Research Laboratory. In general, the questionnaire was easily understood, and the lab subjects had no problems with the pop-up menus, fill in boxes and so on. The few questions that posed some problem also provided a choice that was not ideal but the subjects could accept. The act of taking the survey appeared to be pleasant for the subjects, which may have accounted for their apparently generous assessment of the Website.

The apparently generous assessment of the site by the subjects despite some frustration raises the issue of survey data quality. In other words, is the customer satisfaction survey an adequate indicator of customer satisfaction? If not, what can we do to make it so?

The URL for the NCHS Website is:
www.cdc.gov/nchswww/nchshome.htm

Acknowledgments

We are grateful to our reviewer and colleague Ronald Wilson for his constructive comments.

The NCHS Internet Survey was developed by a team from the Division of Data Services, the Office of Management and the Office of Research and Methodology at the National Center for Health Statistics. Richard Connor provided technical expertise required for developing the survey interface; Terry Drizd oversaw the technical requirements for the survey and participated in questionnaire development; Elizabeth Jackson participated in questionnaire development; Jeff Lancashire designed the search engine used in the second round of testing; Julia Selby provided coding expertise; Tommy Seibert designed the poster; Karen Stakes and Harnethia Cousar provided literature searches; Margot Palmer initiated this study, participated in questionnaire design and provided team management; Patricia Vaughan designed and redesigned the Website; Linda Washington participated in questionnaire development and developed a test protocol; Robert Weinzimer participated in questionnaire development and provided clearance packages; Karen Whitaker participated in designing the methods and procedures and managed the operation of the Questionnaire

Design Research Laboratory for this usability testing; Barbara Wilson participated in questionnaire design, designed the methods and procedures for usability testing, conducted cognitive interviews, and analyzed the testing results; Paul Beatty, Susan Schechter and Gordon Willis also conducted cognitive interviews. Survey results will be forthcoming.

References

1. Pitkow, J. E., and Recker, M. 1994. Results from the First World Wide Web Survey. *Journal of Computer Networks and ISDN Systems*, Vol 27 no. 2.
2. Commerce Net/Nielsen. 1995. *Internet Demographics Survey*. URL:<http://www.commerce/information.surveys/>.
3. Dickinson, J. Dec. 1996. Survey of Census Bureau Internet Users. Draft Report, Marketing Services Office, Office of the Director Bureau of the Census.