

STUDY SERIES
(*Survey Methodology* #2010-05)

**A Usability Evaluation of the Online National
Survey for College Graduates (NSCG)**

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Report Issued: April 19, 2010

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A Usability Evaluation of the Online National Survey for College Graduates (NSCG)

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ABSTRACT

The National Survey for College Graduates (NSCG) is an online data collection Web site that collects education and job information from diverse users who have received bachelor's degrees from American schools or abroad. In October and November 2009, the Statistical Research Division (SRD) evaluated the usability of the NSCG online survey. The testing evaluated the success and satisfaction of eight participants who attempted to complete the survey developed by the Special Surveys Branch (SSB) of the Demographic Surveys Division (DSD). Usability testing revealed a few usability problems, including illogical placement of survey items and difficulty entering information. This report summarizes the methods and findings of this usability evaluation.

Key Words: Web survey, Internet form

This report is released to inform interested parties of research and to encourage discussion of work in progress. Any views expressed on the methodological issues are those of the authors and not necessarily those of the U.S. Census Bureau.

Executive Summary

In October and November 2009, the Statistical Research Division (SRD) Usability staff evaluated the usability of the National Survey of College Graduates (NSCG) online survey. The testing evaluated the success and satisfaction of eight participants with the survey developed by the Special Surveys Branch (SSB) of the Demographic Surveys Division (DSD). Testing took place at the Census Bureau's Usability Laboratory in Suitland, MD.

Purpose. The primary purpose of this usability test was to identify elements of the user-interface design that were problematic and led to ineffective, inefficient, and unsatisfying experiences for people completing the survey.

Method. Eight people, with a mean age of 39 years (range: 26-62 years), participated in the study. Participants read a log-in letter and followed the instructions to access the online survey. While completing the survey, they were asked to verbalize what they were thinking about. For example, participants were encouraged to voice questions or opinions about the survey. If at any time the participant became quiet, the test administrator reminded the participant to think aloud. After completing the first portion of the survey, the participants were instructed to exit out of the survey to complete a questionnaire. They were then asked to log back into the survey to complete it. After the participant completed the survey, he or she completed a Satisfaction Questionnaire and answered debriefing questions. Overall, each session lasted about one hour.

Results. The following are highlights of high-priority issues:

- 1. The Next and Previous Buttons are not in logical order.** More than half of the participants remarked that the locations of the Next and Previous buttons were counterintuitive and that they should be switched. Participants were observed first moving their cursor towards or over the Previous button before bringing the cursor over to the Next button, while progressing through the survey.
- 2. The Web site URL address was difficult to enter.** Four of the eight participants failed to correctly enter the Web site URL on the first try.
- 3. The log-in password was too complex.** Two of the eight participants failed to correctly enter their unique password on the first try. Participants specifically said that the symbols were difficult to see and enter. All participants said that they would prefer a simpler password.
- 4. It is not intuitive for participants to select only one answer on the Principal Employer question (A11).** Participants said that they believed that they needed to select one choice out of each sub-set of options. When participants were asked why they believed they needed to select more than one option, they said that the formatting of the question led them to believe each option set was a separate question part.
- 5. For multiple items, the "Other" text box is not large enough for participants to enter a valid response.** Participants remarked that the "Other" text box was not long enough to provide an adequate response. Some people deleted text after realizing the box was too short for their initial reply.

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A Usability Evaluation of the Online National Survey of College Graduates (NSCG)

1.0 Introduction

The National Survey of College Graduates (NSCG) is an online data collection Web site that collects education and job information from respondents who have received bachelor's degrees in science or engineering fields from American schools or abroad. This report specifies the methods and materials that the Statistical Research Division (SRD) used in evaluating the usability of the NSCG online survey.

This usability testing evaluated the success and satisfaction of test participants with the online survey developed by the Special Surveys Branch (SSB) of the Demographic Surveys Division (DSD). Participants completed the online survey during testing (see Figure 1 for selected screen shots of the instrument). Findings are provided in this report to inform the site sponsor and designer(s) on areas of satisfaction, as well as areas where the participants struggled while completing the NSCG online survey.

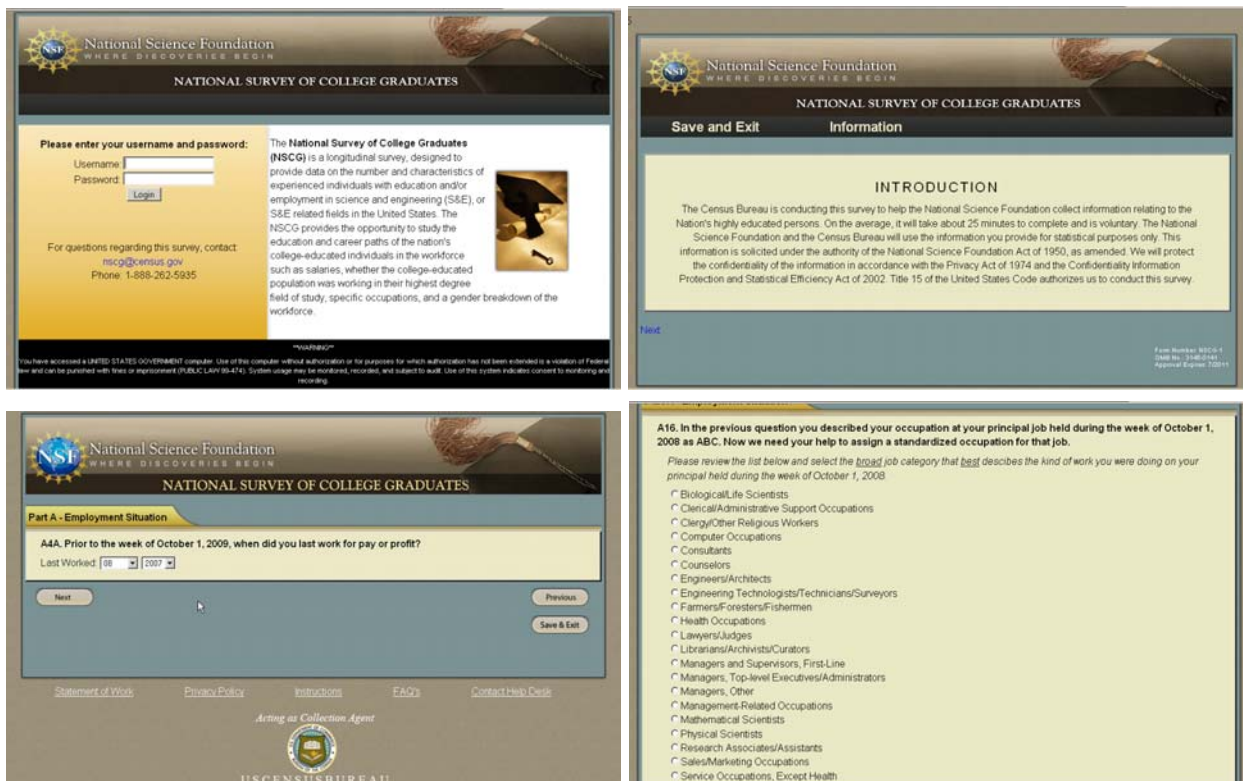


Figure 1. Selected screen shots of the NSCG online survey.

1.1 Background

The user interface is an important element to the design of a Web-based survey. For the instrument to be successful, the interface must meet the needs of its users in an efficient, effective, and satisfying way. The design of the instrument must support users' navigation. Success is defined in terms of being able to successfully respond to questions in the survey. In

addition, the overall experience of completing the survey should be satisfying for users. The present study was designed to examine the user interface of the NSCG online survey.

Eight people participated in the usability study between October 29 and November 19, 2009. Members of SRD's Usability Lab prepared and disseminated a brief report of major findings and recommendations to DSD on November 16, 2009. The DSD team responded to the findings and recommendations on December 23, 2009. Responses from the DSD team to SRD's findings are included in this report following each high-priority finding.

1.2 Purpose

The primary purpose of this evaluation was to identify elements of the user-interface design that were problematic and led to ineffective, inefficient, and unsatisfying experiences for people completing the survey. Several features of the survey were of particular interest. They were:

1. The log-in procedure using a unique ID and password
2. The occupation code and education code data collection method
3. The feature that allows respondents to complete the survey in multiple sessions

1.3 Usability Goals

We defined the usability goals for this study in three categories: user accuracy, efficiency, and satisfaction. In this study, these goals reflect the extent to which the user interface was expected to support user performance and satisfaction.

Goal 1, Accuracy: To achieve a high level of accuracy in recording the answers on the NSCG online survey. The respondent should successfully respond to 100% of the answers on the survey by using the response options correctly and without encountering unsolvable problems. Note that this study did not assess whether the participants chose the *correct* response options, but instead it assessed whether participants could use the form. The user should be able to correctly navigate through the entire questionnaire.

Goal 2, Efficiency: To achieve a seamless transition between log-in sessions. Respondents should be able to complete the survey in more than one sitting without encountering any problems. The experience of logging in and out of the survey should be easy and efficient.

Goal 3, Satisfaction: To experience a moderate to high level of satisfaction from experience using the NSCG online survey. The overall mean of the Satisfaction Questionnaire ratings should be well above the mid-point (5 on a nine-point scale, where 1 is the lowest rating and 9 is the highest rating). The same should be true for the individual Satisfaction Questionnaire items.

2.0 Method

2.1 Participants and Observers

Eight people (four males), with a mean age of 39 years (range: 26-62 years), participated in the usability study. Four people were recruited externally through a database maintained by the Usability Lab, and four people were recruited internally by the Usability Team. See Table 1 for complete demographics. All participants reported having at least one year of prior Internet and

computer experience and prior knowledge of how to navigate a Web site (see Table 4 in [Appendix G](#)). Participants qualified for taking the NSCG based on the following:

- Participants were college graduates from either an American or international school
- Participants earned a bachelor’s degree or higher in a science or engineering field (including social sciences)
- Participants currently resided in the United States

Observers from DSD and Special Sworn Status employee staff from the National Science Foundation (NSF) watched the usability tests on a television screen and computer monitor in a room separate from the participant and test administrator (TA). At the end of each test session, the TA and observers discussed the findings from that session and compared them to findings from other sessions.

Table 1. Participant Demographics

	N		Age Range		Education		Race	
Male	4	21-29	3	Bachelor’s	4	White*	4	
Female	4	30-45	3	Master’s	2	Black	4	
		46-60	1	Doctorate	2	Native Hawaiian or Other		
		61+	1			Pacific Islander*	1	
Average		39 years**						

*One participant marked both ‘White’ and ‘Native Hawaiian or Other Pacific Islander.’

**The mean age was calculated from the exact values for each participant. The exact self-reported values were places in ranges in Table 1 to help the reader get an overview of the data.

2.2 Facilities and Equipment

Testing took place in the Usability Lab (Room 5K512) at the U.S. Census Bureau in Suitland, MD.

2.2.1 Testing Facilities

The participant sat in a small room, facing one-way glass and a wall camera, in front of a standard monitor that was on a table at standard desktop height. During the usability test, the TA sat in the control room on the other side of the one-way glass. The TA and the participant communicated via microphones and speakers.

2.2.2 Computing Environment

The participant’s workstation consisted of a Dell personal computer with a Windows XP operating system, a standard keyboard, and a standard mouse with a wheel. The screen resolution was set to 1024 x 768 pixels, and participants used the Internet Explorer browser.

2.2.3 Audio and Video Recording

Video of the application on the test participant’s monitor was fed through a PC Video Hyperconverter Gold Scan Converter, mixed in a picture-in-picture format with the camera

video, and recorded via a Sony DSR-20 Digital Videocassette Recorder on 124-minute, Sony PDV metal-evaporated digital videocassette tape. One desk and one ceiling microphone near the participant captured the audio recording for the videotape. The audio sources were mixed in a Shure audio system, eliminating feedback, and were then fed to the videocassette recorder.

2.3 Materials

2.3.1 Researcher Script for Usability Session

The TA read some background material and explained several key points about the session. See [Appendix A](#).

2.3.2 Consent Form

Prior to beginning the usability test, the participant completed a consent form. See [Appendix B](#).

2.3.3 NSCG Log-in Letter

The log-in letter contained directions about how to access the online survey and log in. See [Appendix C](#).

2.3.4 Questionnaire on Computer and Internet Experience and Demographics

Prior to the usability test, the participant completed a questionnaire on his/her computer and Internet experience and demographics. See [Appendix D](#).

2.3.5 Satisfaction Questionnaire

Members of the Usability Lab created the Satisfaction Questionnaire, which is loosely based on the Questionnaire for User Interaction Satisfaction (QUIS), (Chin, Diehl, & Norman, 1988). In typical usability tests at the Census Bureau, we use 10 to 12 satisfaction items that are tailored to the particular user interface we are evaluating. In this study, the Satisfaction Questionnaire includes 10 items worded for the NSCG online survey. See [Appendix E](#) for the complete questionnaire.

2.3.5 Debriefing Questions

After completing all tasks, the participant answered debriefing questions about his/her experience using the NSCG online survey. See [Appendix F](#).

2.4 Procedure

Following security procedures, external participants individually reported to the visitor's entrance at the U.S. Census Bureau Headquarters and were escorted to the Usability Lab. Internal participants met the TA at the Usability Lab. Upon arriving, each participant was seated in the testing room. The TA greeted the participant and read the general introduction. Next, the participant read and signed the consent form. After signing the consent form, the TA showed the log-in letter to the participant and explained that the participant should act as if they had received the letter in the mail and should follow the instructions in the letter to access the survey. The TA then placed the NSCG log-in letter and Satisfaction Questionnaire on the desk beside the participant and left the testing room. The TA went to the control room, did a sound check, and began the video recording. The internet browser was pre-set to the Census Bureau home page

(www.census.gov), and the TA instructed the participant to read the log-in letter aloud and proceed as they normally would at home.

While completing the survey, the TA encouraged the participants to think aloud and to share their thoughts about the survey. For example, participants were instructed to voice questions and opinions about what they liked and did not like about the survey. The participant's narrative allowed the researchers to gain a greater understanding of how the participant completed the survey and to identify issues with the survey. If at any time the participant became quiet, the TA reminded the participant to think aloud, using prompts such as "What are you thinking as you look at this page?," "What are you expecting to see?," and "Tell me your thoughts." During the sessions, the TA noted any behaviors that indicated confusion, such as hesitation, backtracking, and frowning. At a pre-determined point during the session (following Section A of the survey), the TA interrupted the participant and asked them to exit out of the survey and to fill out the Questionnaire on Computer and Internet Experience and Demographics. They were then asked to return to the Web site to resume completing the partially-completed survey. After survey completion, the TA asked the participant to complete the Satisfaction Questionnaire.

While the participant completed the Satisfaction Questionnaire, the TA met with the observers to see if they had any additional questions for the participant. The TA then returned to the testing room to ask debriefing questions. See [Appendix F](#) for the debriefing questionnaire. This debriefing provided an opportunity for a conversational exchange with participants. The TA remained neutral during this time to ensure that they did not influence the participants' reactions to the survey. At the conclusion of the debriefing, the TA stopped the video recording. Overall, each usability session lasted approximately 60 minutes. External participants were paid \$40 each.

2.5 Performance Measurement Methods

2.5.1 Accuracy

After each participant completed the survey, the TA rated the completion as a success or a failure. In usability testing, successful completion of a task means that the design supported the user in reaching a goal. Failure means that the design did not support task completion. In this usability study, a success involved the participant answering 100% of the items that they encountered on the survey by using the response options appropriately and without encountering unsolvable problems. If the participant struggled to complete the survey but eventually was able to, this was a success.

2.5.2 Efficiency

After the participant completed the first portion of the survey, the TA interrupted the participant and asked them to "exit out of the survey" to complete the Questionnaire on Computer and Internet Experience and Demographics. They were then asked to log back in to complete the survey. The efficiency of the re-log-in was recorded by noting the number of times it took participants to enter the log-in information before successfully accessing the survey. The number of times participants entered the URL, the log-in code, and the password were counted. This experience of logging back in should be easy and efficient. Ideally, users should only need to enter each piece of log-in information once to access the survey.

2.5.3 Satisfaction

After completing the usability session, each participant completed the tailored ten-item Satisfaction Questionnaire. Participants were asked to rate their overall reaction to the survey by circling a number from 1 to 9, with 1 being the lowest possible rating and 9 the highest possible rating. Other items on the questionnaire included assessing the screen layouts, the use of terminology on the Web site, the instructions and questions displayed on the screens, the arrangement of information on the screens, and the overall experience of completing the survey. See [Appendix E](#) for the complete questionnaire. The Usability Team calculated ranges and means for the various rated attributes of the survey. Prior to usability testing, the DSD team and the Usability Team set satisfaction goals for the overall mean and the individual item means to be well above the mid-point of the nine-point scale (e.g., 6 or above).

2.6 Identifying and Prioritizing Usability Problems

To identify design elements that caused participants to have problems completing the survey, the TA recorded detailed notes during the usability session. When notes were not conclusive, the TA used the videotape recordings from each session to confirm or disconfirm findings. By noting participant behavior and comments, the Usability Team inferred the likely design element(s) that caused participants to experience difficulties. The team then grouped the usability issues into categories based on severity and assigned each problem a priority code, based on its effect on performance. The codes are as follows:

- *High Priority* – These problems have the potential to bring the participant to a standstill. (e.g., Participant was not able to successfully complete the survey because they could not log in, re-log-in after interruption, or select the correct job code.)
- *Medium Priority* – These problems caused some difficulty or confusion, but the participant was able to successfully complete the survey.
- *Low Priority* – These problems caused minor annoyances but did not interfere with the completion of the survey.

3.0 Results

In this section, we discuss the findings from the usability study. We present the qualitative and quantitative data, usability issues, and possible future directions based on the DSD team's responses to the findings.

3.1 Participant Accuracy

All participants were able to successfully complete the NSCG online survey. However, one participant encountered programming errors that were associated with the job category she chose. When she chose 'Clergy,' an error message appeared. When she made a second selection, another error appeared. The TA instructed her to choose another category, and the survey finally progressed to the next screen. We are not including this as a "failure" as it was a known defect in the system prior to testing and has since been resolved, and once the participant got past this step, she was able to complete the survey on her own with no additional help from the TA.

3.2 Participant Efficiency

Seven out of the eight participants were asked to exit out of the survey after completing the first portion. Of the seven people who were instructed to exit, six used the Save and Exit button, and

one closed the browser. As shown in Table 2, of the six people who attempted to re-log-in by entering the log-in information, five were able to do so, on their first try. However, at the very start of the session, only four of the eight participants were able to successfully log in on their first try. So, it seems that although some participants were able to successfully log back into the survey following interruption, it was only after they were accustomed to the log-in procedure that they were able to do so efficiently. See Issue 3 in [Section 3.5.1](#) of this report for more discussion on this topic.

Similarly, only three of the seven participants who entered the URL were able to successfully enter it on their first attempt. See Issue 2 in [Section 3.5.1](#) of this report for more discussion on this topic.

Table 2. Number of Attempts at Entering URL and Log-in Information by Participant

Participant	Number of attempts to type the URL at the start	Number of attempts to type the log-in information at the start	Number of re-log-in attempts, following interruption
1	2	3	1
2	2	1	1
3	2	1	3
4	1	5	1
5	*	1	*
6	1	2	1
7	1	1	1
8	2	1	**
Mean	1.57	1.88	1.33
Median	2	1	1

NOTE: *Due to an error in the URL text on the log-in letter, the test administrator, instead of the participant, entered the URL. This participant also had problems later choosing a job category. The test administrator did not interrupt the participant, in order to avoid increasing frustration.

**Participant closed browser when prompted to exit. To re-log-in, he entered the URL, and the survey opened to the place where he was last.

3.3 Participant Satisfaction

The mean satisfaction score across all questions, across all participants was 6.41 out of 9 (1= low; 9 = high). See Table 3. This average is above the mid-point rating of 5 and demonstrates that overall, users were satisfied with the survey. The highest scoring item was “suspending and resuming the survey (impossible – easy),” with an average rating across participants of 8.13 and a median of 9. As previously reported, of the six people who attempted to re-log-in by entering the log-in information, five were able to do so, on their first try, but one participant tried three times before she successfully logged back in. Ironically, she rated “suspending and resuming the survey” as easy (the highest rating), even though she attempted to re-log-in three times. The lowest scoring item on the Satisfaction Questionnaire was “arrangement of information on screens (illogical – logical),” with a mean rating of 4.57 and a median of 3.00, across participants. This low score may be due to the perceived “illogical” layout of the Next and Previous buttons. See Issue 1 in [Section 3.5.1](#) of this report for more discussion on this topic.

Table 3. User Satisfaction (1 = low, 9 = high)

Satisfaction Questionnaire Items												
Participant	Overall reaction to site: terrible - wonderful	Screen layouts: confusing - clear	Use of terminology throughout site: inconsistent - consistent	Information displayed on the screens: inadequate - adequate	Questions displayed on the screens: inadequate - adequate	Arrangement of information on the screens: illogical - logical	Questions can be answered in a straight-forward manner: never - always	Organization of question, instruction & response categories: confusing - clear	Forward navigation: impossible - easy	Suspending and resuming the survey: impossible - easy	Overall experience of completing the survey: difficult - easy	Mean rating by participant
1	7	7	9	9	9	N/A	8	9	8	9	9	8.40
2	7	8	7	5	5	3	4	4	8	9	6	6.00
3	5	5	9	7	3	5	5	5	9	9	6	6.18
4	6	8	7	7	7	6	7	8	9	9	8	7.45
5	3	3	3	3	3	3	3	3	3	2	5	3.09
6	7	5	5	9	5	3	5	3	3	9	8	5.64
7	9	9	7	8	9	9	8	8	9	9	9	8.55
8	6	6	8	4	7	3	8	8	2	9	7	6.18
Mean rating by question across all participants	6.25	6.38	6.88	6.50	6.00	4.57	6.00	6.00	6.38	8.13	7.25	6.41
Median rating by question across all participants	6.50	6.50	7.00	7.00	6.00	3.00	6.00	6.50	8.00	9.00	7.50	7.00

Note: One participant consistently rated items much lower than the other participants, with a mean rating of 3.09. This participant, previously mentioned, encountered programming errors that other participants did not encounter. For example, for her job category, she chose ‘Clergy,’ and an error message appeared. She made a second selection, and another error appeared. The TA instructed her to choose another category, and the survey finally progressed to the next screen. This participant’s satisfaction scores dramatically lowered the average satisfaction score. Removing her satisfaction ratings from the data pool yields an overall satisfaction score of 6.89.

3.4 Positive Findings

- All participants, but one, completed the survey without being brought to a standstill.
- Participants quickly identified how to save and exit the survey.
- Participants had little or no difficulty logging back in to resume the survey.
- Seven of eight participants rated the Satisfaction Questionnaire item “Suspending and resuming the survey” as easy (with a rating of 9, on a nine-point scale).
- Participants said that for the most part, selecting their job code was not difficult.
- According to the DSD team, all participants selected the correct job category.
- All participants said that they thought the design and layout of the site was attractive.
- The overall design of the survey worked for participants.

3.5 High-Priority Usability Issues

Explanations for the performance deficits are discussed in the list of usability violations that follows. We generally prioritize usability issues from high to low based on their effects on participant performance. Testing identified five high-priority usability issues listed below. No medium and low-priority issues were identified. We include the DSD team responses with each high-priority finding. The usability issues deal primarily with illogical placement of survey items and difficulty entering information. Fixing the high-priority problems should result in improvement in the participants’ performance and satisfaction.

1. The Next and Previous Buttons are not in logical order. Most participants remarked that the locations of the Next and Previous buttons were counterintuitive and that they should be switched. One participant, in particular, was “really irritated about the Next button being on the left side.” While completing the survey, she periodically commented on how she was “distracted” and how it “really bothered [her].” In fact, she accidentally clicked on the Save and Exit button the first time she tried to navigate to the next survey question. Another participant said, during debriefing, that the positions of the buttons were “not natural” and that the locations of the two should be swapped. Most participants were observed first moving their cursor towards or over the Previous button before bringing the cursor over to the Next button, while progressing through the survey. See Figure 2 for a screen shot of the buttons.

The Satisfaction Questionnaire item “Arrangement of information on the screens,” with a range from illogical to logical, had the lowest average satisfaction rating. This is likely due to the locations of these two main buttons, as participants remarked that they liked the overall layout of the screens and information.



Figure 2. ‘Next,’ ‘Previous,’ and ‘Save and Exit’ buttons on the bottom of one of the survey pages.

DSD Team Response: The order of the Previous and Next buttons will be reversed. The display will change too, such that an arrow will be displayed with the text, as follows:

- The ‘← Previous’ and ‘Next →’ buttons will be displayed to the left side of the screen, immediately below the response area.
- The ‘Suspend’ button, will replace the ‘Save & Exit’ button, and it will be displayed at the bottom of the screen, directly below the ‘← Previous’ button.

2. The Web site URL address was difficult to enter. Four of the eight participants failed to correctly enter the Web site URL on the first try. This potential barrier to completing the survey should be minimized as much as possible so that users can easily start and complete the survey. If users cannot easily access the survey, they are likely to leave the site, introducing non-response error and bias.

DSD Team Response: DSD will work with the web programmers to use a simpler URL and to include an entry of ‘http:’ in the URL that will reroute to ‘https:’ automatically.

3. The log-in password was too complex. Three of the eight participants failed to correctly enter their unique password on the first try. During debriefing, a few participants remarked that they did not believe the information they provided on the survey was personal enough to merit such a difficult password. Participants specifically said that the symbols were difficult to see and enter. All participants said that they would prefer a simpler password. This barrier may prevent people from completing the survey.

Team Response: DSD will work with the Census security office to allow shorter and/or simpler passwords.

4. It is not intuitive for participants to select only one answer on Item A11. When they first looked at the question, participants believed that they needed to select one choice out of each sub-set of options. See Figure 1 for a screenshot of Item A11. Some participants clicked on one item from each sub-set; others mentioned amazement that they were only supposed to select one. When participants were asked during debriefing why they believed they needed to select more than one option for Question A11, they said that the formatting of the question led them to believe each option set was a separate question part.

Part A - Principal Employer

A11. Which one of the following best describes your principal employer during the week of October 1, 2009? Were you

SELF EMPLOYED or a BUSINESS OWNER

- In a non-incorporated business, professional practice, or farm
- In an incorporated business, professional practice, or farm

PRIVATE SECTOR employee

- In a for-profit company or organization
- In an non-profit organization (including tax-exempt and charitable organizations)

GOVERNMENT employee

- In a local government (e.g., city, county, school district)
- In a state government (including state colleges/universities)
- In the U.S. military service, active duty or Commissioned Corps (e.g., USPHS, NOAA)
- In the U.S. government (e.g., civilian employee)

OTHER type of employee

- Other — Specify type of employer

Figure 1. Screen shot of NSCG item A11, in which users tried to select more than one response.

To fix this issue, the question could be broken down into two parts. For example, the first question would ask if the user is a (1) self employed or business owner, (2) private sector employee, (3) government employee, or (4) other type of employee, with yes/no responses for each. The second, follow-up question would ask the user to select the business or government type.

Alternatively, the question-wording can remain as it currently is, but the line breaks could be adjusted so the question parts appear unified. Radio buttons could be in front of the first parts of the response, and once a user selects their answer, the second set of radio buttons would appear for the second part of the response. See Figure 2 for a mock up.

Part A - Principal Employer

A11. Which one of the following best describes your principal employer during the week of October 1, 2009? Were you

- SELF EMPLOYED or a BUSINESS OWNER
 - In a non-incorporated business, professional practice, or farm
 - In an incorporated business, professional practice, or farm
- PRIVATE SECTOR employee
 - In a for-profit company or organization
 - In an non-profit organization (including tax-exempt and charitable organizations)
- GOVERNMENT employee
 - In a local government (e.g., city, county, school district)
 - In a state government (including state colleges/universities)
 - In the U.S. military service, active duty or Commissioned Corps (e.g., USPHS, NOAA)
 - In the U.S. government (e.g., civilian employee)
- OTHER type of employee
 - Other — Specify type of employer

Figure 3. Mock up item A11. The radio buttons have been moved to the first part of the response. In this mock up, “OTHER type of employee” was first chosen, then the radio button next to “Other-Specify type of employer” appeared and was selected.

DSD Team Response: The line between the heading and the associated response categories will be removed, and the headings will be indented to align with the response categories.

5. The “Other” text box is not large enough for participants to enter a valid response.

Several issues arose when participants tried to use the “Other” text box during the survey. See Figure 3 for a screen shot of the “Other” text box in a response set. The issues stemmed from the fact that participants typically wanted to use the text box for explaining why they answered the questions the way they did and not for briefly specifying another category not listed in the response set. Sometimes participants wanted to enter information in the “Other” text box even when they selected “No” for “Other.” When typing a rationale, participants quickly discovered that the “Other” box was limited to 40 characters. They then deleted what they had typed to enter something shorter, or entered nothing at all. Participants often remarked that the “Other” text box was “too short” to provide useful information. The current design violates two of the usability goals: the design is ineffective for participants, in that they had to delete and re-type, and when they did not re-type information, the accuracy of the data was diminished.

11. Sales, purchasing, marketing, customer service, public relations	<input type="radio"/> Yes	<input type="radio"/> No
12. Quality or productivity management	<input type="radio"/> Yes	<input type="radio"/> No
13. Teaching	<input type="radio"/> Yes	<input type="radio"/> No
14. Other - Specify	<input type="radio"/> Yes	<input type="radio"/> No
	<input type="text"/>	

Figure 4. Screen shot of NSCG item that includes a small “Other” text box.


DSD Team Response: The Other-Specify text box will be removed from the answer set and will selectively appear on a separate screen depending on the participant’s answer to the question. The text box will only appear if the participant selects the “Other” option and will also allow for longer answers.

3.6 Other Usability Findings

Listed below are other pertinent usability findings. These were not reported in the brief report that was disseminated to the DSD team, so there are no DSD team responses here.

1. Italicized sentences distract participants. Most participants mentioned that the italicized items throughout the survey were visually distracting. Some were observed reading and re-reading sections that contained many different font styles

2. People prefer a two-column job code format. After running two participants, a question (7c) was added to the Debriefing Questionnaire to determine the preferred format for displaying job codes. Six participants were shown the job code question (Item A16) and asked if they would prefer the answer set of this question to be displayed in one column or two columns. Four of six said that they preferred a two-column format for selecting job codes. See Figure 4 for the two-column layout. Participants often said that a two-column format would reduce the need for scrolling and would be easier to scan.


National Science Foundation
WHERE DISCOVERIES BEGIN

NATIONAL SURVEY OF COLLEGE GRADUATES

Part A - Employment Situation

A16. Now we need your help to assign a standardized occupation for the job you described.

Please review the list below and select the broad job category that best describes the kind of work you were doing on your principal held during the week of October 1, 2009.

Note: Consultants or Research Associates/Assistants: - Select the category that comes closest to your field.

<input type="radio"/> Biological/Life Scientists	<input type="radio"/> Managers, Top-Level Executives and Administrators
<input type="radio"/> Clerical/Administrative Support Occupations	<input type="radio"/> Managers, Other
<input type="radio"/> Clergy and other religious workers	<input type="radio"/> Management-Related Occupations
<input type="radio"/> Computer Occupations	<input type="radio"/> Mathematical Scientists
<input type="radio"/> Counselors	<input type="radio"/> Physical Scientists
<input type="radio"/> Engineers/Architects	<input type="radio"/> Sales/Marketing Occupations
<input type="radio"/> Engineering Technologists/Technicians/Surveyors	<input type="radio"/> Service Occupations, Except Health
<input type="radio"/> Farmers/Foresters/Fishermen	<input type="radio"/> Social Scientists
<input type="radio"/> Health Occupations	<input type="radio"/> Social Workers
<input type="radio"/> Lawyers, judges	<input type="radio"/> Teachers/Professors
<input type="radio"/> Librarians, archivists, curators	<input type="radio"/> Other Professions
<input type="radio"/> Managers/Supervisors, First Line	

Figure 5. Two-column format for job-code selection.

3. Participants do not use the links at the bottom of the page. Many links that would lead to more information about the survey are present on the bottom of each page. These links are below the “fold” of the page, meaning that they are only visible after scrolling down. In addition, the links are separated from the other content of the page because they are outside of the box that encapsulates the main content, as shown in Figure 6. When six participants were asked what they would do if they had a question about the survey during debriefing, only one person said they would use the Help Desk button at the bottom of the page. Three people said they would call the phone number that was on the letter; one person said he would log out and open the survey in a new window and use the number that was on the introductory screen, and one person said he would use Google to search for ‘National Survey of College Graduates’ to find the contact number. When asked if they noticed the links on the bottom of the page, most participants said they did not.

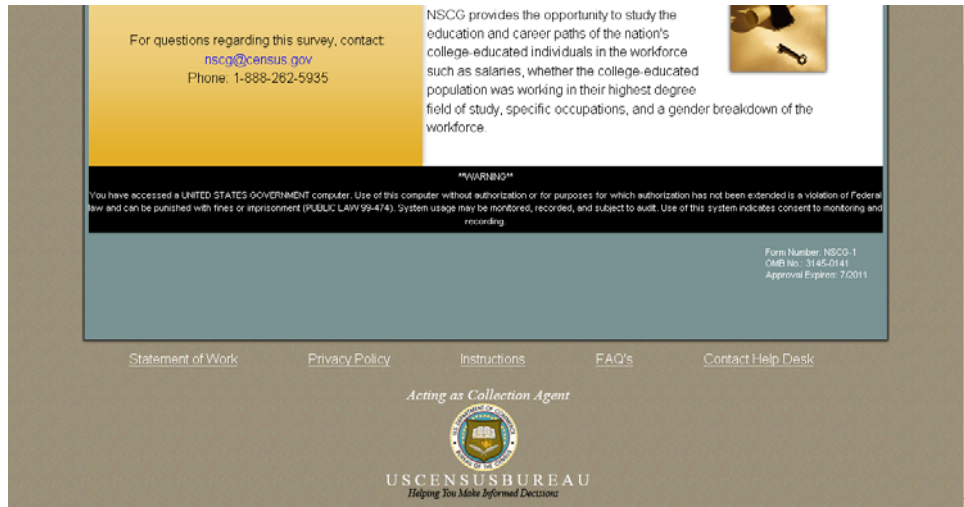


Figure 6. Links are presented outside the box encapsulating the main content of the page.

4.0 Conclusions and Future Directions

Overall, users were able to successfully use the NSCG by completing 100% of the answers on the survey. Minor usability issues have been identified, and the Special Survey Branch team has made plans to modify the survey. These changes should alleviate many of the important issues.

Participants in this usability study were diverse in age, education, and comfort with using Web sites and the Internet. It is probable that individuals who were more comfortable with the Internet and who had higher levels of education were likely to understand the online survey better than those who were at a more novice level, but we did not statistically test for this. Future testing should include usability testing on a diverse sample of novices and experts as well as accessibility testing for those with disabilities. It is required for government Web sites to be compliant with Section 508 of the Disabilities act so that users with disabilities can access public information.

Future research should include another round of usability testing to evaluate whether the changes to the user interface supports users in completing the NSCG online survey. Iterative testing is ideal, in that we test the changes that have been made to see if they lead to improvements in usability and, equally important, if they introduce new issues (Bailey, 1993; Nielsen, 1993). In addition, future research should include eye tracking¹. With eye tracking, we can examine what people look at, when they look at something, and how often they look at something, as well as if they *never* look at something. With eye tracking, we can identify areas that attract and do not attract users' attention, which is often unintentional (Lew, 2009; Wedel, Pieters, & Liechty, 2008), areas they miss, and areas that are of interest or that are confusing (Poole & Ball, 2005).

¹ We aimed to conduct eye tracking with this round of testing, but the Usability Lab's eye tracker was in the midst of being upgraded. We continued forth with a small number of participants, with the intention of conducting another round in the near future. We recommend waiting to conduct the next round until the eye tracker is functioning.

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6.0 Acknowledgements

The authors thank Matt Jans and Beth Nichols for their helpful comments on an earlier version of this report. We also thank our participants.

Appendix A. Research Script for Usability Session

Thank you for your time today. My name is (Test Administrator). I work here in the U.S. Census Bureau Usability Lab, and I will be working with you today. In this lab, we evaluate how easy or difficult Census products are to use. We bring in people like you who are potential users of our products to try them out while there is still time to make changes to them. What works well, we keep. When potential users such as you have difficulty with something, we have an opportunity to fix it.

Today, we will be evaluating the National Survey of College Graduates by having you work on the survey. There are two parts to our session. First, you will complete the Web survey. Then, at the end of the session, you will fill out a questionnaire about your experience during the session. The entire session should last about an hour.

Before we start, there is a form I would like you to read and sign. It explains the purpose of today's session and your rights as a participant. It also informs you that we would like to videotape the session to get an accurate record of your feedback. Only those of us connected with the project will review the tape and it will be used solely for research purposes. Your name will not be associated with the tape or any of the other data collected during the session.

[Hand consent form; give time to read and sign; sign own name and date.]

Thank you.

Before we start, I want to tell you that you can't make a mistake or do anything wrong here. Difficulties you may run into reflect the design of the survey, not your skills or abilities. This product is intended for people like you. Where it works well, that's great. If you have a problem using parts of it, that is also great, because you will help us to identify these places. We are going to use your comments and data as well as comments and data from the other participants to give feedback to the developers of the Web survey. Your comments and thoughts will help the developers make changes to improve the survey. I did not create the survey, so please do not feel like you have to hold back on your thoughts to be polite. We are not evaluating you or your skills, but rather you are helping us see how well the Web survey works. Please share both your positive and negative reactions to the survey.

Your comments are very important to us. I'd like you to tell me your impressions and thoughts as you work through the survey. So give me your open impressions, both good and bad of what you see and what you experience.

While you are working, I would like you to think aloud. In other words, I'd like you to tell me what you are thinking, describe the steps you are taking, what you are expecting to see, why you are doing what you are doing, what you are going to do, and why. Tell me why you clicked on a link or where you expect the link to take you. Tell me if you are looking for something and what it is and whether you can find it or not.

Do you have any questions about the "think-aloud" process?

Tell Participant about interruption that will take place during the survey.

Tell Participant about the letter that they would receive in the mail- when you ask them to, they are to read it and proceed with the survey as they would if they got the letter in the mail.

Ok, now we are ready to begin. I am going to go around to the other room and do a sound check. I will instruct you when to read the instructions on this paper and when to begin. Also, here is the questionnaire you will complete at the very end. I will tell you when to complete this.

[Hand computer experience form. Set the task questions and questionnaire by participant.]

I am going to leave, but we will still be able to communicate through a series of microphones and speakers. Do you have any questions?

[Go to control room. Do sound check. Start video recording.]

Now we are ready to begin. Please begin by reading the instructions out loud. As you work, remember to talk to me about what you are thinking and feeling.

Appendix B. Consent Form



**Consent Form
For Individual Participants
Usability Testing of the NSCG Web Survey**

Each year the Census Bureau conducts many different usability evaluations. For example, the Census Bureau routinely tests the wording, layout and behavior of products, such as Web sites and online surveys and questionnaires in order to obtain the best information possible.

You have volunteered to take part in a study to improve the usability of the NSCG Web Survey. In order to have a complete record of your comments, your usability session will be videotaped. We plan to use the tapes to improve the design of the product. Only staff directly involved in the research project will have access to the tapes. Your participation is voluntary and your answers will remain strictly confidential.

This usability study is being conducted under the authority of Title 13 USC. The OMB control number for this study is 0607-0725. This valid approval number legally certifies this information collection.

I have volunteered to participate in this Census Bureau usability study, and I give permission for my tapes to be used for the purposes stated above.

Researcher's Name: _____

Researcher's Signature: _____

Date: _____

Participant's Name: _____

Participant's Signature: _____

Date: _____

Appendix C. Log-In Letter

Dear Respondent,

As a college graduate in a science or engineering field, you have been selected to participate in the National Survey of College Graduates. The National Science Foundation, together with the US Census Bureau, is pleased to offer a new and convenient way to respond. Responding by Web saves you time and is easy to use.

To complete the survey online, follow the three easy steps listed below:

1. Go to **<http://idc4.ssd.census.gov:4321/nscg>** (This is a secure site).
2. On the opening screen, enter the following Username and Password.

Username: NSCG6745

Password: \$eaFPq93YjDr

The screenshot shows a web browser window displaying the login page for the National Survey of College Graduates. The page has a yellow and blue color scheme. At the top, it says 'National Science Foundation WHERE DISCOVERIES BEGIN' and 'NATIONAL SURVEY OF COLLEGE GRADUATES'. Below this is a login section with the heading 'Please enter your username and password:'. There are two input fields: 'Username' and 'Password', followed by a 'Login' button. To the right of the login form is a text block that reads: 'The National Survey of College Graduates (NSCG) is a longitudinal survey, designed to provide data on the number and characteristics of experienced individuals with education and/or employment in science and engineering (S&E), or S&E related fields in the United States. The NSCG provides the opportunity to study the education and career paths of the nation's college-educated individuals in the workforce such as salaries, whether the college-educated population was working in their highest degree field of study, specific occupations, and a gender breakdown of the workforce.' Below the login form, there is contact information: 'For questions regarding this survey, contact: nscg@census.gov Phone: 1-888-262-5935'. At the bottom of the page, there are links for 'Statement of Work' and 'Privacy Policy', and the USCENSUSBUREAU logo.

3. Once you log in, follow the instructions on the screen to complete the questionnaire.

If you have any questions about the study, please contact the Census Bureau between 9 a.m. and 5 p.m. EST at 301-763-3856 or send an e-mail to nscg@census.gov.

Your participation in this important research effort is greatly appreciated.

Thank you.

Appendix D. Questionnaire on Computer and Internet Experience and Demographics

Check (X) for all that apply.

1. Do you use a computer at home or at work or both?

- Home
- Work
- Somewhere else, such as school, library, etc.

2. If you have a computer at home,

a. What type of internet connection do you use at home?

- Dial up
- Cable
- DSL
- Wireless (Wi-Fi)
- Other _____
- Don't know

b. Which browser do you typically use at home? Please indicate the version if you can recall it.

- Firefox _____
- Internet Explorer _____
- Netscape _____
- Google Chrome
- Safari
- Other _____
- Don't know

c. What operating system does the home computer you typically use run in?

- MAC OS
- Windows 95
- Windows 2000
- Windows XP
- Windows Vista
- Windows 7
- Other _____
- Don't know

3. On average, about how many hours do you spend on the Internet per day **total**?

0 hours 1-3 hours 4-6 hours 7 or more hours

4. On average, about how many hours do you use the Internet per week **total**?

0 hours 1-3 hours 4-6 hours 7 or more hours

5. Which of the following activities do you use the Internet for **more often**?

Searching / Surfing the web **or** Answering / Sending e-mail

6. Have you ever filled out a survey on the Internet?

Yes No

a. If yes, about how many surveys do you think you have filled out on the Internet? _____

b. If yes, have you filled out a survey on the Internet in the last two months?

Yes No

7. How often do you use different media (i.e., photos, audio, video streams) on the Internet?

8. Please rate your overall experience with the following:

Circle one number.

	No experience					Very experienced				
Computers	1	2	3	4	5	6	7	8	9	
Internet	1	2	4	5	5	6	7	8	9	

9. What computer applications do you use?

Check (X) for all that apply.

- E-mail
- Internet
- Word processing (MS-Word, WordPerfect, etc.)
- Spreadsheets (Excel, Lotus, Quattro, etc.)
- Databases (MS-Access, etc.)
- Accounting or tax software
- Engineering, scientific, or statistical software
- Other applications, please specify _____

Please circle one number for each question below.

	Not at all Comfortable			Very Comfortable	
10. How <i>comfortable</i> are you in learning to navigate new Web sites?	1	2	3	4	5
11. Computer windows can be minimized, resized, and scrolled through. How <i>comfortable</i> are you in manipulating a window?	1	2	3	4	5
12. How <i>comfortable</i> are you using and navigating through the Internet?	1	2	3	4	5
13. How <i>comfortable</i> are you in providing personal information through the Internet?	1	2	3	4	5
	Never			Very Often	
14. How <i>often</i> do you work with any type of data using a computer?	1	2	3	4	5
15. How <i>often</i> do you perform complex analyses of data through a computer?	1	2	3	4	5
16. How <i>often</i> do you use the Internet or Web sites to find information? (printed reports, news articles, data tables, blogs, etc.)	1	2	3	4	5
17. How <i>often</i> do you use the Internet for personal reasons (e.g. Facebook, blog, etc.)?	1	2	3	4	5
18. How <i>often</i> do you use the Internet for business (e.g. online banking, etc.)?	1	2	3	4	5
	Not at all Familiar			Very Familiar	
19. How <i>familiar</i> are you with the Census Web site (location, tools, terms, data, etc.)?	1	2	3	4	5

Appendix E. Satisfaction Questionnaire

Please circle the numbers that most appropriately reflect your impressions about using this Web survey.

- | | | | |
|---|-----------------------------------|---------------------------------|----------------|
| 1. Overall reaction to the Web site: | terrible
1 2 3 4 5 6 7 8 9 | wonderful
1 2 3 4 5 6 7 8 9 | not applicable |
| 2. Screen layouts: | confusing
1 2 3 4 5 6 7 8 9 | clear
1 2 3 4 5 6 7 8 9 | not applicable |
| 3. Use of terminology throughout the Web survey: | inconsistent
1 2 3 4 5 6 7 8 9 | consistent
1 2 3 4 5 6 7 8 9 | not applicable |
| 4. Instructions displayed on the screens: | inadequate
1 2 3 4 5 6 7 8 9 | adequate
1 2 3 4 5 6 7 8 9 | not applicable |
| 5. Questions displayed on the screens: | inadequate
1 2 3 4 5 6 7 8 9 | adequate
1 2 3 4 5 6 7 8 9 | not applicable |
| 6. Arrangement of necessary information (FAQ, Help, etc.) on the screen: | illogical
1 2 3 4 5 6 7 8 9 | logical
1 2 3 4 5 6 7 8 9 | not applicable |
| 7. Questions can be answered in a straight-forward manner: | never
1 2 3 4 5 6 7 8 9 | always
1 2 3 4 5 6 7 8 9 | not applicable |
| 8. Organization of question, instruction and response categories in the survey: | confusing
1 2 3 4 5 6 7 8 9 | clear
1 2 3 4 5 6 7 8 9 | not applicable |
| 9. Forward navigation: | impossible
1 2 3 4 5 6 7 8 9 | easy
1 2 3 4 5 6 7 8 9 | not applicable |
| 10. Suspending and resuming the survey: | impossible
1 2 3 4 5 6 7 8 9 | easy
1 2 3 4 5 6 7 8 9 | not applicable |
| 11. Overall experience of completing the survey: | difficult
1 2 3 4 5 6 7 8 9 | easy
1 2 3 4 5 6 7 8 9 | not applicable |

Additional Comments

Appendix F. Debriefing Questionnaire

1. Can you walk me through your thinking on why you marked (a particular QUIS item) especially low/high? (Do this for several low/high QUIS ratings).
2. What was your first impression of the Web survey Web site?
3. What was your overall experience from logging into the Web survey to the first survey question?
4. What do you think of the basic screen layout?
 - a. Overall?
 - b. Colors?
 - c. Links and information around the center pane?
 - d. Context of the information on the homepage?
 - e. Other?
5. What do you think of the navigational methods?
 - a. Previous and Next buttons?
 - b. Saving and Exit button?
6. What was your experience of logging back in after suspending the survey?
7. What do you think of the questions asking you to select a job category?
 - a. Was it easy for you to find and select the appropriate category?
 - b. Do you feel confident that you selected the best category?
 - c. Would you prefer the answers to be displayed in 2 columns or 1 column?
8. What do you think of the questions asking you to select an education category?
 - a. Was it easy for you to find and select the appropriate category?
 - b. Do you feel confident that you selected the best category?
9. How easy or difficult was it to complete the survey in general?
10. What did you think of the follow-up questions that prompt you for an answer when you did not provide an answer the first time? (if necessary)
11. *If participant clicked on any of the links in the footer, ask: Why did you click on X link?*
If participant did not click on any of the links in the footer, ask: What do you think of these links?
12. What did you like best about the Web survey?
13. What did you like least about the Web survey?
14. Is there anything that you feel should be changed?
15. Is there anything that you feel should stay the same?
16. How easy/difficult do you feel it was to complete the questions? What made a question easy/difficult?
17. Was there any information you needed that you could not find or was not provided on the screen?
18. Is there anything you would like to mention that we haven't talked about?

Appendix G. Participants' Computer and Internet Experience

Table 4. Participants' Self-Reported Computer and Internet Experience

Participant	Hours per day online, Filled out online survey, Number of online surveys taken			Scale: 1 (no experience) – 9 (very experienced)		Scale: 1 (not comfortable) – 5 (comfortable)				Scale: 1 (never) – 5 (very often)			Scale: 1 (not familiar at all) – 5 (very familiar)	
				Overall experience with computers	Overall experience with Internet	Comfort in learning to navigate new Web sites	Comfort in manipulating a window	Comfort in using and navigating the Internet	Comfort in providing personal info online	How often working with data on a computer	How often working with complex analyses of data with a computer	How often using the Internet or Web sites to find info	How familiar with the Census Web site (location, tools, data, etc.)	How familiar with NSRCG, NSRCG, or SDR
1	1-3	Yes	50+	9	9	5	4	5	3	3	2	4	2	1
2	7+	Yes	30	6	7	4	5	5	4	4	3	5	4	1
3	4-6	Yes	100	9	9	5	5	5	3	3	5	5	5	5
4	4-6	Yes	100	6	8	4	5	5	2	3	2	5	3	2
5	7+	Yes	1	6	9	5	5	5	2	3	3	5	2	1
6	7+	Yes	100	9	9	5	5	5	3	5	5	5	5	5
7	1-3	No	0	9	9	4	5	5	3	4	3	5	3	2
8	7+	Yes	20	7	7	4	5	5	3	5	5	4	3	1
Average across all participants				7.63	8.38	4.50	4.88	5.00	2.25	3.75	3.50	4.75	3.38	2.25
Median across all participants				8.00	9.00	4.50	5.00	5.00	3.00	3.50	3.00	5.00	3.00	1.50