

STUDY SERIES  
(*Survey Methodology* #2009-15)

**A Usability Evaluation of the Business and Industry Web Site**

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## Executive Summary

During September and October 2008, the Usability Lab tested 12 novice participants in a “one-click” usability study of two different versions of a low-fidelity prototype of the Business and Industry main page. The page was developed by the current Economic Web Site Redesign Team. The page did not have any clickable links, though it did include text that appeared to be links. Participants were given a set of tasks and were asked to click on a link that they felt would best lead them to information that would answer the task question. The link did not take the participant to another page—once the participant had clicked, the task was complete. The study evaluated the success and satisfaction of the participants and whether the link the participants chose would have led them to the answer they were seeking. Testing took place at the U.S. Census Bureau Usability Laboratory in Suitland, Maryland.

Purpose: The primary purpose of the low-fidelity one-click usability testing was to identify elements of the user-interface design that were problematic for participants and led to ineffective, inefficient, and unsatisfying experiences for the participants using the Web site.

Method: The Statistical Research Division (SRD) recruited nine external users from the Usability Lab database and three internal Census Bureau employees. In addition, we ran three dry-run sessions with employees. Participants were diverse and represented the various kinds of novice users of the site. All participants were considered knowledgeable in navigating the Internet and using a computer. Each participant sat in a small room, facing a one-way glass and a wall camera, in front of an LCD monitor equipped with an eye-tracking machine. The test administrator sat beside the participant. The test administrator recorded the audio and video sessions. Each participants' eye movements were recorded with the eye tracking equipment during the sessions.

Participants completed two sets of tasks (task set A and task set B). The tasks were designed to capture the participant's interaction with, and reactions to, the design and functionality of the Business and Industry prototypes. Every participant saw both prototypes and worked on both sets of tasks. Participants were randomly assigned to one of four conditions to offset any learning effects. Participants were encouraged to think aloud and to share what they were thinking about the tasks and the prototypes. If at any time the participant became quiet, the test administrator reminded the participant to think aloud. The participant's narrative allowed the test administrator to gain a greater understanding of how they completed the tasks and to identify issues with the Web site.

After each set of tasks, participants completed a Satisfaction Questionnaire. After completing the second set of tasks and the Satisfaction Questionnaire, participants answered debriefing questions. This was an opportunity for a structured conversational back and forth between the test administrator and participant. Over all, each usability session lasted approximately 60 to 90 minutes.

Results: This report provides complete descriptions of each finding and recommendations for usability issues. The following section highlights issues and recommendations to resolve them.

1. Approximately nine out of 12 users did not use the main section (Select Data by Geography) of the page in either Prototype A or B. This navigation and layout of data was too complex for most users.

**Recommendation:** The layout and navigation must be simplified for novice users. This more complex layout and navigation could work for expert users; however it must be at a deeper level, (at least one or two clicks in) not on the first page that users see: the Business and Industry main page. Use the space on the main entry page into Business and Industry data to give users access to content with topic-based navigation.

2. Users did not see the top-navigation bar or only saw it late in the session. Participants did not use the top-navigation bar as a primary- or secondary-navigation tool.

**Recommendation:** Further research to explore the issues identified with the top-navigation bar is recommended. The coloring scheme needs to be changed. We recommend going to the very obvious blue underlined links and moving these links away from the top banner and into the portion of the screen that users see and work with most.

3. Terminology was confusing to users. Many users were not clear about which link to click on to get the content they wanted.

**Recommendation:** Re-phrase terminology. Use user-derived terminology. Incorporate tool tips for terminology along left-hand column that give clues to the content of each link.

4. The search function was not effective. Users who saw and used the search box tried to search on any terminology or phrase of words, similar to a Google-type search. Some participants never saw or used the search box.

**Recommendation:** Draw more attention to the search box; make it very obvious that the search input box goes with the search field. Reduce the number of words in the search field area by doing the following: Remove the smaller text "Link to all data for a kind of business or industry" and instead have the instruction read in bold "Search for data by industry or business." Remove the words "Industry Search" from the gray button and leave the word "Search" in the gray button. Consider adding directions that would help users enter a successful search query from the beginning, such as "enter only ONE keyword."

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## 1.0 Introduction

The Economic Current Web Site Redesign Team has been planning a new look and feel for the Economic program Web presence on the main Census Bureau Web site (<http://www.census.gov>). The team has asked the Usability Lab at the Census Bureau to participate in the process. This report contains results and recommendations on a recent usability study related to the design process.

During September and October 2008, the Usability Lab tested 12 novice participants in a “one-click” usability study of two different low-fidelity prototypes of the Business and Industry main page. The prototypes were developed by the Economic Current Web Site Redesign Team. The page did not have any working (clickable) links. Participants were given a set of tasks and asked to choose the link that they felt would best lead them to information that would answer the task question. The link did not take the participant to another page—once the participant had clicked, the task was complete. The study evaluated the success and satisfaction of the participants and whether the link the participants chose would have led them to the answer they were seeking. Findings and recommendations are listed below in the Section 3.0 of this report.

### 1.1 Background

The user interface is an important element in the design of any Web site. For a Web site to be successful, the user interface must be able to meet the needs of its users in an efficient, (timely) effective (accurate), and satisfying way. This current test was designed to examine the user interface of the Business and Industry prototype page which is located one click in from the main Census.gov homepage. This is considered the second-level page of the Business and Industry presence on Census.gov.

### 1.2 Purpose

The primary purpose of the low-fidelity one-click usability testing was to identify elements of the user-interface design that were problematic for participants and led to ineffective, inefficient, and unsatisfying experiences with the Web site.

### 1.3 Usability Goals

The usability goals for this study are defined in two categories: user accuracy and satisfaction. We did not set goals for user efficiency, as this was a “one-click” low-fidelity study. Since the links did not actually work, users were not seeking an actual answer to the task questions, but merely making the first step in where to look for the information. As a result, the efficiency rating would be meaningless.

**Goal 1: To achieve a high level of accuracy in completing the given tasks using the Business and Industry Web site prototypes.** The user should be able to make an accurate first click for 70% of the tasks.

**Goal 2: To experience a moderate to high level of satisfaction from experience with the Business and Industry Web site prototypes.** The overall mean of the satisfaction ratings should be well above the midpoint (at 5 or above on a seven-point scale, where 1 is the lowest rating and 7 is the highest rating). The same should be true for the individual satisfaction items.



## **1.4 Scope**

All user interactions with Prototypes A and B were within the scope of the usability evaluation. The links were not functional, and users only saw the first opening page. None of the other pages on the site were functional.

SRD did not test the user interface of the current prototypes for compliance with Section 508<sup>1</sup> accessibility regulations. However, this government Web site must comply with Section 508 regulations for access by people with disabilities before it becomes available (unless a waiver is granted).

## **1.5 Assumptions**

- Participants had at least one year of prior Internet and computer experience
- Participants had prior knowledge of how to navigate a Web site.
- Participants did not have extensive prior experience in using the previous Business and Industry Web site.
- Participants were capable of using a keyboard and mouse.
- Participants had no known disabilities.

## **2.0 Method**

### **2.1 Participants and Observers**

SRD received OMB approval for the study and recruited 12 participants. Nine participants were external users recruited from the Usability Lab database, and three participants were internal Census Bureau employees. In addition, we ran three dry run (pilot) sessions with employees. Participants were diverse and represented the various kinds of novice users of the site.

All participants were considered knowledgeable in navigating the Internet and using a computer. See Table 1 for participants' self-reported computer and Internet experience. Ten participants were unfamiliar with the Business and Industry Web site. One user was a retired Bureau of Labor Statistics (BLS) employee and said she had used the Census Economic Web site in her work. One user was an intern who had recently worked on the Governments area of the Web site and thus had some (though not extensive) familiarity with the Business and Industry site. The participants' age ranges and education levels are displayed in Table 2 below.

Observers from the Economic Current Web Site Redesign Team were invited to watch the usability tests on television screens in a separate room from the participant and test administrator. At the end of each test session, the test administrator and observers discussed the findings from the session.

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<sup>1</sup> <http://www.section508.gov>

**Table 1. Participant's Self-Reported Computer and Internet Experience**

User	Hours per day on the Internet	Scale (1:no experience - 9:very experienced)		Scale (1:not comfortable - 5:comfortable)			Scale (1:never - 5:very often)				
		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	How often working with data on a computer	How often working with complex analyses of data through a computer	How often using the Internet or Web sites to find information	How familiar with Census Web site	How familiar with Business and Industry Web site
1	7+	9	9	5	5	5	5	4	5	1	1
2	4 to 6	7	7	5	5	5	4	3	5	1	1
3	1 to 3	7	7	4	5	5	3	3	5	3	5
4	1 to 3	7	7	4	3	4	3	*N/A	4	1	1
5	4 to 6	7	9	4	5	5	5	3	5	4	4
6	1 to 3	7	8	3	4	5	3	2	3	1	1
7	4 to 6	8	8	5	5	5	5	4	5	1	3
8	1 to 3	4	4	4	3	4	3	1	4	3	3
9	7+	5	7	3	3	4	4	2	4	1	1
10	4 to 6	7	7	5	5	5	5	4	5	5	5
11	1 to 3	6	8	3	5	5	4	4	5	3	1
12	4 to 6	7	7	5	5	5	4	2	5	2	1
Avg across users		<b>6.8</b>	<b>7.3</b>	<b>4.2</b>	<b>4.4</b>	<b>4.8</b>	<b>4.0</b>	<b>2.9</b>	<b>4.6</b>	<b>2.2</b>	<b>2.3</b>

\* N/A = Participant did not answer question.

**Table 2. Participant Demographics**

Gender	Age	Education
Male 5	18-28 1	HS,GED 1
Female 7	29-44 6	Some college 2
	45-64 5	BA/BS 5
		Master's or higher 4
		Currently enrolled in higher education 3

**2.2 Facilities and Equipment**

**2.2.1 Testing Facilities**

The participant sat in a testing room in the usability suite, facing a one-way glass and a wall camera, in front of an LCD monitor placed on a table at standard desktop height. The participant and test administrator were in the same room throughout the entire usability session. The test administrator sat beside the participant.

### **2.2.2 Computing Environment**

The participant's workstation consisted of a Dell OptiPlex GX150 personal computer with a Pentium IV processor and 512 MB of RAM, a standard 101/102 key quiet keyboard, and a PS2 IntelliMouse with a wheel. The operating system was Windows XP.

### **2.2.3 Audio and Video Recording**

Video of the application on the 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. Audio was collected via one desk and one ceiling microphone near the participant. The audio sources were mixed in a Shure audio system, eliminating feedback, and fed to the videocassette recorder.

### **2.2.4 Eye Tracking**

Tracking of the participant's eye movements was recorded during the usability test. Using the ClearView 2.0 software program, the Tobii eye-tracking device monitored the participant's eye movements and recorded eye-gaze data. Data collected from the eye-tracking device included eye-gaze position, timing for each data point, eye position, and areas of interest.

Areas of interest (AOIs) were defined prior to the usability evaluation as areas that are of particular interest to the sponsor. In collaboration with the sponsor, the Usability Lab staff identified the following AOIs for this study:

- (1) Geography links, in middle of screen
- (2) Latest indicators: Prototype A, top right in box; Prototype B, left-hand navigation
- (3) Left-navigation bar, left-hand side of screen
- (4) Program names, links in middle of screen
- (5) Search box, top of screen, below the top navigation bar
- (6) Tab navigation, in middle of screen
- (7) Top-navigation bar, top of screen, above Search box
- (8) "Are You in a Survey?" box, upper left
- (9) Years on the navigation box, in the middle of the screen

# AOIs for Prototypes A and B

U.S. Census Bureau

People | Business | Geography | Howroom | Subjects A to Z | Search: Census

## Business and Industry

[Main](#) [About the Surveys](#) [Get Forms](#) [Historic Data](#) [Schedules](#) [Definitions](#) [FAQs](#)

Are You In A Survey? [Get help with your form](#)

You are here: [Census home](#) > Business and Industry

Search for data by industry Links to all data for a kind of business or industry  
  [Search tips](#)

OR

Select data by ...

Geography

Click on year to go to latest data.

U.S. States Metro Coun- Places ZIP					
areas	ties				codes
<a href="#">Economic Census</a>	2002	2002	2002	2002	2002
<a href="#">Survey of Business Owners</a>	2002	2002	2002	2002	2002
(incl. minorities, women)					
<a href="#">Statistics of U.S. Businesses</a>	2005	2005	2005		
Firms by employment size					
<a href="#">Statistics of U.S. Businesses</a>	2005	2005		2005	
Establishment births, deaths					
<a href="#">County Business Patterns</a>	2006	2006	2006	2006	2006
<a href="#">Nonemployer Statistics</a>	2005	2005	2005	2005	
<a href="#">Local Employment Dynamics</a>					2006
	2007	2007	2007		

Programs with data for geographic areas <sup>1</sup>

- [Economic Census](#)
- [Survey of Business Owners](#) (incl. minorities, women)
- [Statistics of U.S. Businesses](#) Firms by employment size
- [Statistics of U.S. Businesses](#) Establishment births, deaths
- [County Business Patterns](#)
- [Nonemployer Statistics](#)
- [Local Employment Dynamics](#) Qtr Workforce indicators
- [Annual Survey of Manufactures](#)
- [Building Permits](#)
- [Governments](#)
- [Foreign Trade: State Exports](#)

<sup>1</sup> All other business and industry data are published only at the national level

**Latest Indicators**

- Housing Starts**  
-11.0% (month-to-month, Jul 2008)
- Retail & Food Services Sales**  
-0.1% (month-to-month, Jul 2008)
- International Trade Deficit**  
-\$56.8 billion (Jun 2008)
- Manufacturer's New Orders M3**  
+1.7% (month-to-month, Jun 2008)

[Economic Briefing Room](#) · [Indicator Release Schedule](#) · [Historical Time Series](#)

**Find out more about the 2007 Economic Census!**

Figure 1. Business and Industry main page: Prototype A. Area of Interest are highlighted in Blue.

U.S. Census Bureau

People | Business | Geography | Howroom | Subjects A to Z | Search: Census

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Select data by ...

Geography

Click on year to go to latest data.

U.S. States Metro Coun- Places ZIP					
areas	ties				codes
<a href="#">Economic Census</a>	2002	2002	2002	2002	2002
<a href="#">Survey of Business Owners</a>	2002	2002	2002	2002	2002
(incl. minorities, women)					
<a href="#">Statistics of U.S. Businesses</a>	2005	2005	2005		
Firms by employment size					
<a href="#">Statistics of U.S. Businesses</a>	2005	2005	2005	2005	
Establishment births, deaths					
<a href="#">County Business Patterns</a>	2006	2006	2006	2006	2006
<a href="#">Nonemployer Statistics</a>	2005	2005	2005	2005	
<a href="#">Local Employment Dynamics</a>	2007	2007	2007	2007	
<a href="#">Annual Survey of Manufactures</a>	2006	2006		2006	
<a href="#">Building Permits</a>	2007	2007	2007	2007	
<a href="#">Governments</a>	2006	2006	2006	2006	
<a href="#">Foreign Trade: State Exports</a>	2007	2007			

Programs with data for geographic areas <sup>1</sup>

- [Economic Census](#)
- [Survey of Business Owners](#) (incl. minorities, women)
- [Statistics of U.S. Businesses](#) Firms by employment size
- [Statistics of U.S. Businesses](#) Establishment births, deaths
- [County Business Patterns](#)
- [Nonemployer Statistics](#)
- [Local Employment Dynamics](#) Qtr Workforce indicators
- [Annual Survey of Manufactures](#)
- [Building Permits](#)
- [Governments](#)
- [Foreign Trade: State Exports](#)

<sup>1</sup> All other business and industry data are published only at the national level

**Economic Indicators**

- [Briefing Room](#)
- [Indicator Schedule](#)
- [Historic Time Series](#)

**Economic data by sector**

- [Construction](#)
- [Governments](#)
- [Manufacturing](#)
- [Mining](#)
- [Retail trade](#)
- [Services](#)
- [Wholesale trade](#)
- [International trade](#)

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- [Minorities/women](#)
- [NAICS](#)
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Figure 2. Business and Industry main page: Prototype B. Area of Interest are highlighted in Blue.

### **2.2.5 Logging**

The note taker logged notes onto a computer file using the Noldus Observer logging software, then typed a predetermined, two-key code to indicate the observation category and entered a more detailed description of the comment or usability problem. The software added a time code to each observation. Time codes and comments were used in data analysis and in report preparation, as described later. Logging was done after the sessions were complete.

## **2.3 Materials**

Usability testing requires the use of various testing materials. For this study, testing materials included the following items provided in the appendices noted.

### **2.3.1 General Introduction**

The test administrator read some background material and explained several key points about the session. The general introduction read to the participants is provided as Appendix B.

### **2.3.2 Consent Form**

Prior to beginning the usability test, the participants completed a consent form (see Appendix C). The major purpose of the consent form was to obtain the participant's permission for videotaping the session.

### **2.3.3 Questionnaire on Computer Use and Internet Experience**

Prior to the usability test, the participant completed the questionnaire on computer and Internet experience. See Appendix D.

### **2.3.4 Tasks and Randomization Scheme**

Members of the Economic Current Surveys Web Site Redesign Team collaborated with members of SRD's Usability Lab staff to create the tasks and to specify the task-based goals. The tasks were designed to capture the participant's interaction with, and reactions to, the design and functionality of the Business and Industry prototypes. Every participant saw both prototypes and worked on both sets of tasks: Task Set A and Task Set B. There were four conditions that participants were randomly assigned to. We randomized the tasks and prototypes participants saw to counterbalance and offset any order-related differences.

*Task List and Prototype order:*

Condition A: Task List 1, Prototype A → B

Condition B: Task List 1, Prototype B → A

Condition C: Task List 2, Prototype A → B

Condition D: Task List 2, Prototype B → A

See Appendix E for a list of tasks used in the study. See Appendix F for the order in which each task was presented.

### **2.3.5 Satisfaction Questionnaire**

In a usability test at the Census Bureau, the Usability Lab typically uses 10 to 12 satisfaction items tailored to the particular user interface being evaluated. The items are loosely based on the University of Maryland's Questionnaire for User Interaction Satisfaction (Chin, Diehl, and Norman, 1988). In this study, the Satisfaction Questionnaire included 10 items worded for the Business and Industry context. See Appendix G.

### 2.3.6 Debriefing Questions

After completing the tasks, the participants answered debriefing questions about their overall experience using the Business and Industry prototypes pages (see Appendix H).

### 2.3.7 Payment Voucher

Upon completion, the external participants signed and dated a payment voucher. The payment was only for non-federal employees and was considered a stipend to cover the participants travel costs. See Appendix I.

### 2.3.8 Prototypes A and B

Participants saw and worked with both Prototypes A and B during their session. The main difference between the prototypes was that one was a three-column design and the other was a two-column design. Other differences include the location and content of the latest indicators; whether the programs or the years were shown first; the size and wording of the search field; and the size and color of the top navigation bar. See Figure 2 for a screen shot of Prototype A and Figure 3 for a screen shot of Prototype B.

The screenshot shows the U.S. Census Bureau Business and Industry main page. The header includes the U.S. Census Bureau logo and navigation links for People, Business, Geography, Howroom, Subjects A to Z, and Search/Census. The main title is "Business and Industry". Below the title is a navigation bar with links: Main, About the Surveys, Get Forms, Historic Data, Schedules, Definitions, and FAQs. The page is divided into three columns. The left column contains a sidebar with "Are You In A Survey?" and "Economic data by sector" (Construction, Governments, Manufacturing, Mining, Retail trade, Services, Wholesale trade, International trade). The middle column features a search section "Search for data by industry" with a text input field and an "Industry Search" button, and a table of "Programs with data for geographic areas" with columns for Title, Frequency, Form #, and Subjects A to Z. The right column displays "Latest Indicators" such as Housing Starts, Retail & Food Services Sales, International Trade Deficit, and Manufacturer's New Orders M3, along with a "Find out more about the 2007 Economic Census!" call to action.

Geography	Title	Frequency	Form #	Subjects A to Z
Programs with data for geographic areas				
U.S. States Metro Coun- Places ZIP				
areas ties codes				
Economic Census		2002	2002	2002
Survey of Business Owners (incl. minorities, women)		2002	2002	2002
Statistics of U.S. Businesses		2005	2005	2005
Firms by employment size		2005	2005	2005
Establishment births, deaths		2006	2006	2006
County Business Patterns		2006	2006	2006
Nonemployer Statistics		2005	2005	2005
Local Employment Dynamics		2007	2007	2007
Qtr Workforce Indicators		2007	2007	2007

Figure 3. Business and Industry main page: Prototype A with three columns.



Figure 4. Business and Industry main page: Prototype B with two columns.

## 2.4 Procedure

Following security procedures, the participant arrived at the visitor's entrance of the Census Bureau Headquarters in Suitland, MD and was escorted to the Usability Lab (Room 5K512). Upon arriving, the participant was seated in the testing room. The test administrator greeted the participant and read the general introduction, which included instructions for the participants to think aloud. Next, the participant read and signed the consent form. The participant completed the Questionnaire on Computer Use and Internet Experience and the video recording began.

The participant's eyes were then calibrated by the eye tracking software. Calibration lasted 15 to 20 seconds during which time the participant watched a blue dot move across the computer screen. Once calibration was complete, the eye tracker began recording data.

Following calibration, participants completed a practice task where they practiced thinking aloud as they attempted to find information on an apartment using the Craigslist Web site ([www.craigslist.org](http://www.craigslist.org)). After the practice task, the participant began to work on the tasks for the study using the Business and Industry Prototypes. At the start of each task, the participant read the task aloud. The participant looked for where they would click first when attempting to complete the task. The test administrator asked participants to click on the link where they felt they would find the most information even though the links were not live and did not work. This followed the "first-click" method, since lower levels of the site were not functional. After making the click, participants were asked to rate their confidence that they would find the information they were looking for based on the link they had chosen.

While completing the task, the test administrator encouraged participants to think aloud and share what they were thinking about the task. The participant was asked to keep a running commentary, or stream of consciousness verbalization, of that they were thinking. The test administrator listened actively, but gave minimal feedback to the participant's verbal protocol (e.g., "uh-huh," "yes," "mmm-hmm"). Importantly, the test administrator avoided coaching the participant by suggesting where to click. If at any time the participant became quiet, the test

administrator reminded the participant to think aloud by using prompts such as, “What are you thinking?” and “What are your thoughts?” This feedback allowed the Usability Lab staff and observers to gain a greater understanding on how the participant was completing the tasks and to identify issues with the Web site.

During the session, the test administrator noted any signs of confusion or other non-verbal behaviors, including positive or negative body language. After the participant completed all the tasks, the test administrator stopped the eye-tracking device, but the video recording continued. The participant then completed the Satisfaction Questionnaire.

Next, the participant answered debriefing questions. This was an opportunity for a structured yet conversational back-and-forth exchange between the test administrator and the participant; however, during the exchange, the test administrator remained neutral to avoid influencing the participant’s reactions to the site. At the conclusion of the usability evaluation, the test administrator stopped the video recording. Overall, each usability session lasted between 60 to 90 minutes.

## **2.5 Performance Measurement Methods**

Based on user performance, tasks were rated by the test administrator as a success or failure. Participants also gave subjective satisfaction measures of the site as well as a rating on how confident they were that the first click would lead them to the target answer.

### **2.5.1 Accuracy**

After each participant made their first click for the task, the test administrator rated each click as a success or a failure. In the context of 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. Because the site was not fully functional, the success of the tasks was based only on where the user said they would initially click to begin their search for the answers. A failure was recorded when the user said their first click was something other than what the team had decided would be an acceptable first click for each task scenario.

The average accuracy score is presented as two different means:

- (1) Accuracy across the participants
- (2) Accuracy across the tasks.

Prior to the usability study, the sponsor and the Usability Lab staff set an overall accuracy goal of 70 percent across the participants and tasks.

#### **2.5.1.5 Confidence Measure**

In this study, where we were only focusing on the location of the participant’s first click, we added in a new measure to gather user’s confidence in their initial decision (Wolfson, Bailey, Nall, and Koyani, 2008). After each task, the test administrator asked the participant how confident they were that their first click would lead them to the correct answer.

### **2.5.2 Satisfaction**

After completing the usability session, each participant indicated his/her satisfaction with the Web site using the tailored ten-item Satisfaction Questionnaire. Participants were asked to rate their overall reaction to the site by circling a number from 1 to 9, with 1 being the lowest possible rating and 9 being the highest possible rating. From the Satisfaction Questionnaire data, we report ranges and mean scales values for the various rated attributes of the Web site. We also



identify below-mean values, which indicate that problems exist even when the overall mean is acceptable or better.

### **2.5.3 Eye Tracking**

Eye tracking captures exactly where people look as they navigate through a Web site. We can look at an individual's pathway through a site as well as accumulate data and show the common pathways through a Web site. Eye-tracking measures include fixations, gazes, scan paths and hot spots. A fixation is an instant where the eyes are relatively still. Fixations last 218 milliseconds, on average (Poole & Ball, 2005). Although the meaning of differing lengths of fixations is a matter of discussion among experts, there is some evidence for the following interpretations (Poole & Ball, 2005). During an encoding task, such as looking at a Web page, higher fixations indicate an area of interest and/or a complex and difficult to understand area of the screen. During a search task, higher fixations indicate greater uncertainty in identifying the target object and/or the length of fixation indicates processing time. For the purposes of this usability test, the tasks fall into both the encoding and search categories. The analyses of the AOIs were included only when the user fixated on the AOI for at least 218 milliseconds. If the user's eye passed over the AOI without spending 218 milliseconds in the area, we did not count that as fixating on the AOI (Poole & Ball, 2005).

A gaze is the total number of fixations in a given area across all subjects. Gazes indicate which areas are getting the most attention (Poole & Ball, 2005). We were able to see the exact gazes of the individual participants, as well as a mean across all participants. In this study we identify gazes for predetermined AOIs.

A hot spot is an area of the screen where people spend a few moments looking. Hot spots can be examined individually or can be collapsed across participants for a mean that displays the average of all hot spots for all the participants together. Hot spots taken together form a heat map with a range in color from green (short amount of time fixating) to red (long amount of time fixating). In this low-fidelity study where we had one page without any working links, the hotspots did not appear to work. Thus, there are no results for hot spots. We anticipate that we will have hot spot data when we run a future usability study where links are clickable and there are more pages for users to access during the study.

### **2.5.4 Identifying and Prioritizing Usability Problems**

To identify design elements that caused participants problems in completing task objectives, the test administrator recorded detailed notes during the usability sessions. To reinforce these notes, the test administrator used the videotape recordings to refresh memory and to confirm findings. By noting participant behavior and comments, the test administrator, along with other Usability Lab staff members, inferred the likely design elements that caused the participants to experience difficulties. The usability issues were grouped into categories based on priority. The findings and recommendations of these issues are presented below.

The usability team assigned each problem a priority code, based on its effect on performance, as follows:

- *High Priority* – These problems brought the participant to a standstill. He or she was not able to complete the task.
- *Medium Priority* – These problems caused some difficulty or confusion, but the participant was able to complete the task.

- *Low Priority* – These problems caused minor annoyances but did not interfere with the flow of the tasks.

### **3.0 Results and Recommendations Based on Usability Testing**

Results from the usability testing are discussed below. The quantitative data, usability findings, and eye-tracking data are presented. See Appendix J for additional accuracy tables.

#### **3.1 Participant Accuracy**

The overall accuracy score for Prototype A (three columns) was 46% (See Figure 3). The overall accuracy score for Prototype B (two columns) was 47% (See

Figure 4). There was virtually no measurable difference in the accuracy scores for the two different prototypes. For Prototype A, accuracy scores ranged from 21 to 67% across users and from zero to 91% across tasks. For Prototype B, accuracy scores ranged from 37 to 68% across users and from zero to 91% across tasks.

It appears that participants struggled the most with tasks 1a, 6a, 14a, 18a, 5b, 6b, 14b, 16b, 18b, and 19b. When users did better on tasks (e.g., 4a, 8a, 15a, 16a, 17a, 2b, 4b, 8b, 9b, 15b), it was often due to the user matching the word in the task question with a word on the screen, such as in task 8a where the users clicked on the word “NAICS,” on the screen after reading the questions “What is the NAICS code for health insurance companies?” See Table 2 and Table 3 for accuracy data. See Appendix E for complete task questions.

User 6 only used the program name links in the “Select Data by Geography” section of the Web page. If we include this participant in the accuracy rating, the average decreases by about 2 points for both Prototypes A and B. We did not include this participant in the overall accuracy because of the highly unusual performance of ONLY using one small section of the entire Web page.

**Table 3. Prototype A: User accuracy scores for usability testing of the business and industry Web Site (0 = task failure, 1 = task success)**

Tasks																				
Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Overall success rate
1	0	0	1	1	1	0	0	1	0	1	0	1	0	0	1	1	1	0	N/A	47%
2	1	1	0	1	1	0	1	1	0	1	0	1	0	0	1	1	1	0	na	58%
7	0	1	1	1	0	0	0	1	1	0	0	0	1	0	1	0	1	0	0	42%
9	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	1	0	0	37%
10	0	0	1	1	0	1	0	0	0	1	1	1	0	0	1	1	1	0	0	47%
11	0	1	0	1	1	1	1	1	1	0	1	0	0	0	1	1	1	0	0	58%
12	0	0	0	1	0	0	1	1	1	0	0	1	0	0	1	1	1	1	1	53%
3	1	1	1	1	0	0	1	0	1	1	1	1	0	0	1	0	1	1	??	67%
4	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0	0		33%
5	1	1	1	1	0	0	1	1	1	0	0	0	1	0	1	0	0	0	0	47%
8	0	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	21%
Success by task—first click	27%	64%	45%	82%	27%	18%	45%	82%	73%	45%	27%	55%	36%	0%	91%	55%	73%	18%	14%	46%

**Table 4. Prototype B: User Accuracy Scores for Usability Testing of the Business and Industry Web Site (0 = task failure, 1 = task success)**

Tasks																				
Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Overall success rate
3	0	1	1	1	1	0	1	0	1	0	0	0	1	0	1	1	1	0	N/A	53%
4	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	1	0	N/A	37%
5	0	1	0	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	68%
8	0	1	1	1	0	0	0	1	1	0	0	0	1	0	1	1	1	0	0	47%
1	0	1	0	1	0	0	0	1	1	0	0	1	0	0	1	1	1	0	0	42%
2	0	1	0	1	0	0	0	1	1	1	0	1	1	0	1	0	1	0	0	47%
7	0	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	1	0	0	37%
9	1	1	1	1	0	0	0	1	1	1	0	1	1	0	1	0	1	0	1	63%
10	0	0	0	1	0	0	0	1	1	1	1	1	0	0	1	0	1	0	0	42%
11	1	1	0	1	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	37%
12	0	1	0	1	0	0	1	1	1	1	0	0	0	0	1	0	1	1	0	47%
Success by task—first click	18%	91%	27%	100%	18%	0%	36%	91%	91%	36%	27%	45%	64%	0%	100%	36%	91%	9%	22%	47%

### **3.2 Confidence Measure**

Participants rated their confidence (on a scale of 1 to 7 where 7 was highly confident and 1 was not at all confident) that they would find the answer they were looking for, based on the link they had just clicked on. In general, the users were confident that the link they selected would take them to the target answer, even and most importantly, when they were initially headed in the wrong direction (an incorrect first click). The average confidence ratings across users were 5.4 for Prototype A and 5.3 for Prototype B. This highlights the fact that while users were often headed in the wrong direction for the target information, they were unaware of this and actually felt pretty confident that they were headed in the right direction. Based on the confidence measure, users generally seem to feel that what they're doing will lead to success.

### **3.3 Eye Tracking: Area of Interests (AOIs)**

Table 5 reports the time that elapsed before participants looked at each AOI for Prototype A. The average time that elapsed before participants looked at the top-navigation bar was six minutes 41 seconds. For the search bar, it was six minutes and five seconds. The other areas that took an extended time before users first noticed them were the tab navigation at four minutes six seconds and the upper left ("Are you in a Survey?") at nine minutes and 32 seconds. The two areas that users noticed more quickly were the program names (36 seconds) and the left-navigation bar (one minute and six seconds<sup>2</sup>). See Figure 5 for AOIs on Prototype A.

Table 6 reports the time that elapsed before participants looked at each AOI in Prototype B. The average time that elapsed before participants looked at the top-navigation bar was seven minutes 53 seconds. For the tab navigation, it was seven minutes 26 seconds. It took longer for participants to look at the search bar (eight minutes and 12 seconds), and the upper left ("Are you in a Survey?") (16 minutes and 22 seconds) compared to the other AOIs. The areas that users noticed more quickly were the center portion of the screen devoted to Years and Geographies (four minutes and one second), and the left-navigation bar (one minute and 19 seconds<sup>3</sup>). See Figure 6 for AOIs on Prototype B.

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<sup>2</sup> These relative judgments are based on direct comparisons of results, not statistical testing.

<sup>3</sup> These relative judgments are based on direct comparisons of results, not statistical testing.

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Figure 5. Area of interest: Prototype A.

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areas	ties	ties	ties	ties	ties	codes
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<a href="#">County Business Patterns</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>		<a href="#">2006</a>
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<a href="#">Local Employment Dynamics</a> Qtr Workforce Indicators	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>		
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<sup>1</sup> All other business and industry data are published only at the national level

Figure 6. Area of interest: Prototype B.

**Table 5. Time in Minutes (m) and Seconds (s) Elapsed Before Participants First Looked at AOI. Prototype A**

Participant	Geographies	Latest indicators	Left navigation	Program names	Search bar	Tab navigation	Top navigation	Are you in a survey?	Years
1	47 s	7 s	9 s	18s	57 s	33 s	11 s	8 s	2 m 57 s
2	33 s	4 m 43 s	9 s	10 s	5 m 55 s	3 m	17 s	11 m 48 s	39 s
4	<b>14 m 42 s</b>	<b>14 m 53 s</b>	5 s	43 s	2 m 47 s	<b>16 m 04 s</b>	4 m 15 s	<b>did not see</b>	<b>22 m 39 s</b>
5	3 m 42 s	3 m 45 s	34 s	42 s	2 s	1 m 30 s	14 s	23 m 10 s	47 s
7	3 s	4 m 45 s	4 m 10 s	3 s	4 m 44 s	<b>11 m 15 s</b>	<b>did not see</b>	<b>did not see</b>	11 s
8	<b>did not see</b>	3 s	7 s	1 m 45 s	<b>did not see</b>	<b>did not see</b>	50 s	4 m 11 s	<b>did not see</b>
9	15 s	5 m 54 s	3 m 45 s	23 s	3 m 19 s	1 m 43 s	<b>25 m 51 s</b>	<b>21 m</b>	36 s
10	3 s	22 s	26 s	46 s	4 m 42 s	45 s	18 s	19 s	54 s
11	51 s	17 s	6 s	10 s	<b>19 m 35 s</b>	49 s	<b>19 m</b>	16 s	55 s
12	1 m 4 s	3 s	1 m 35 s	1 m 17 s	<b>13 m 13 s</b>	1 m 34 s	<b>9 m 10 s</b>	<b>9 m 3 s</b>	1 m 18 s
<b>Mean time to first look at AOI</b>	2 m 27 s	3 m 25 s	1 m 6 s	36 s	6 m 5 s	4 m 6 s	6 m 41 s	9 m 32 s	3 m 23 s

NOTE: Users 3 and 6 did not calibrate; thus there is no eye-tracking data from them.

**Table 6. Time in Minutes (m) and Seconds (s) Elapsed Before Participants First Looked at AOI. Prototype B**

Participant	Geographies	Latest indicators	Left navigation	Program names	Search bar	Tab navigation	Top navigation	Are you in a survey?	Years
1	41 s	13 s	21 s	31 s	1 m 14 s	1 m 6 s	14 s	1 m 09 s	18 s
2	23 s	2 m 17 s	3 m 50 s	<b>9 m 28 s</b>	8 m 55 s	31 m 9 s	<b>37 m 42 s</b>	<b>64 m 27 s</b>	11 m 17 s
4*	41 s	39 s	40 s	<b>did not see</b>	6 m 42 s	<b>did not see</b>	2 m 49 sec	<b>did not see</b>	58 sec
5	4 m 1 s	7 m 34 s	30 s	42 s	<b>10 m 25 s</b>	35 sec	<b>10 m 34 s</b>	<b>did not see</b>	3 m 1 s
7	6 m 43 s	16 s	1 m 57 s	3 m 10 s	<b>11 m 16 s</b>	4 m 11 s	<b>did not see</b>	<b>did not see</b>	1 m 29 s
8*	54 s	41 s	1 m 1 s	<b>did not see</b>	1 m 19 s	1 m 27 s	1 m 28 s	1 m 32 s	1 m 37 s
9*	<b>13 m 12 s</b>	<b>did not see</b>	1 m 5 s	44 s	<b>13 m 6 s</b>	<b>did not see</b>	<b>did not see</b>	<b>did not see</b>	43 s
10	4 m 17 s	1 m 4 s	1 m 15 s	6 m 51 s	<b>12 m 38 s</b>	3 s	29 s	27 s	2 m 33
11	5 m 18 s	3 m 54 s	6 m 43 s	<b>11 m 21 s</b>	<b>did not see</b>	<b>13 m 36 s</b>	<b>did not see</b>	<b>14 m 14 s</b>	<b>14 m 16 s</b>
<b>Mean time to first look at AOI</b>	4 m 1 s	2 m 4 s	1 m 19 s	4 m 41 s	8 m 12 s	7 m 26 s	7 m 53 s	16 m 22 s	4 m 1 s

\* = User eye tracking somewhat unreliable as there were lots of dropped data when these users leaned back or moved out of the range of the eye tracker

NOTE: Users 3 and 6 did not calibrate, thus there is no eye-tracking data from them. Data from user 12 were not included in the analysis as most of the data were dropped due to technical issues.

Comparing the prototypes, overall, participants noticed the top-navigation bar on Prototype A over a minute faster than they did on Prototype B. While Prototype B uses standard link colors, participants may have not noticed the top-navigation bar as quickly because the top-navigation bar blended in with the banner which could lead to banner blindness, or where users miss important links because of the color, size and location of the links (Bentway, JP 1998). On Prototype A, the top navigation bar is larger and there is white space separating the banner from the top navigation bar. Thirty-three percent of the participants did not notice the top navigation bar on Prototype B, compared to 10 percent when working with Prototype A. However, for both prototypes, the average amount of time elapsed before participants noticed the top navigation bar was over five minutes, suggesting that issues exist with the current layout. For more information on this issue, see Section 3.4 of report.

The largest difference in time elapsed for focusing on a AOI was with Program Names. Participants on average noticed Program Names four minutes faster on Prototype A than they did on Prototype B. This discrepancy in time is most likely due to the placement of the Program Names. On Prototype A, Program Names are listed to the left of Years, which is compatible

with how we read in our culture (i.e., left to right). The non-standard placement of the Program Names on Prototype B likely led to more time in seeing this AOI.<sup>4</sup>

With the exception of the Latest Indicators, participants discovered the AOIs on Prototype A more quickly than they did on Prototype B. The location of the Latest Indicators most likely contributed to the longer elapsed time before the participants focused on the AOI. On commercial Web sites, the right portion of the screen is generally used for advertisements, not displaying information. For more information on this issue, see Section 3.4 of this report.

Participants noticed the search box almost two minutes faster on Prototype A than they did on Prototype B. One explanation for this may be the location of the search box. On Prototype A, the search box and text are closer together than they are on Prototype B.

### **3.3.1 Eye-tracking Gazes**

A gaze is the total number of fixations in a given area across all tasks. Table 7 shows the gazes for each of the nine AOIs in Prototype A. Participants looked at Program Names the most with 3,492 total gazes. The second most looked at AOI was the left navigation bar with 2,640 total gazes. The least often looked at AOI was the upper left link question (e.g., “Are You in a Survey?”), which had 143 total gazes. This was followed by the top navigation bar AOI that had 305 total gazes and then the tab navigation AOI in the middle of the screen with 438 total gazes<sup>5</sup>.

Table 8 shows the gazes for the AOIs in Prototype B. As with Prototype A, participants noticed Program Names most often (2751 gazes). The next most looked at area was the left navigation (2394 gazes). Participants looked at “Are You in a Survey” the least with 109 gazes. The top navigation bar and tab navigation also had a low number of gazes compared to the left navigation. Participants gazed at the left navigation over 2000 times more than the tab navigation (241 gazes) and the top navigation bar (453 gazes).

These observational results demonstrate that participants do not always look at the important AOIs and often miss or overlook the tab and top navigation bar areas. Furthermore, there are inconsistencies across participants, demonstrating that different participants have different ways of approaching a Web site.

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<sup>4</sup> Time differences are based on observation, not on statistical analysis.

<sup>5</sup> This relative ordering is based on direct comparisons of results, not on statistical analysis.



**Table 7. Gazes in AOI: Prototype A: Total Gazes by Participants During Entire Session**

<b>Areas of interest (AOI)</b>				
<b>Participant</b>	<b>Geographies</b>	<b>Latest indicators</b>	<b>Left navigation</b>	<b>Program names</b>
1	30	297	568	528
2	46	31	283	414
4	7	12	288	192
5	72	79	315	791
7*	5	4	32	197
8*	2	61	68	9
9	59	88	38	168
10	72	313	549	593
11	46	5	272	468
12	25	99	227	182
<b>Total gaze by question</b>	<b>364</b>	<b>989</b>	<b>2640</b>	<b>3542</b>

**Table 7 Gazes in AOI: Prototype A: Total Gazes by Participants During Entire Session -continued  
Areas of Interest (AOI)**

<b>Participant</b>	<b>Search bar</b>	<b>Tab navigation</b>	<b>Top navigation</b>	<b>Upper left</b>	<b>Years</b>	<b>Totals</b>
1	55	100	97	15	103	1793
2	34	35	59	21	62	985
4	25	11	37	4	3	579
5	10	24	12	4	188	1495
7*	211	6	1	0	22	478
8*	9	3	5	10	0	167
9	13	10	13	3	99	491
10	20	60	158	50	185	2000
11	5	48	1	1	56	902
12	6	8	55	35	25	662
<b>Total gaze by question</b>	<b>388</b>	<b>305</b>	<b>438</b>	<b>143</b>	<b>743</b>	<b>9552</b>

\* = User eye-tracking data somewhat unreliable as there were lots of dropped data when these users leaned back or moved out of the range of calibration.

NOTE: Users 3 and 6 did not calibrate, thus there is no eye-tracking data from them.

**Table 8. Gazes in AOI: Prototype B: Total Gazes by Participants During Entire Session**

<b>Areas of Interest (AOI)</b>				
<b>Participant</b>	<b>Geographies</b>	<b>Latest indicators</b>	<b>Left navigation</b>	<b>Program names</b>
1	165	92	567	748
2	10	89	252	261
4*	6	15	129	4
5	14	4	102	461
7	9	4	395	584
8*	19	15	39	3
9*	1	1	26	81
10	180	180	561	491
11	66	135	323	118
<b>Total gaze by question</b>	<b>470</b>	<b>535</b>	<b>2394</b>	<b>2751</b>

**Table 8. Gazes in AOI: Prototype B: Total Gazes by Participants During Entire Session -continued**  
**Areas of Interest (AOI)**

<b>Participant</b>	<b>Search bar</b>	<b>Tab navigation</b>	<b>Top navigation</b>	<b>Upper left</b>	<b>Years</b>	<b>Totals</b>
1	69	78	178	21	280	2198
2	61	9	38	4	36	760
4	26	5	37	6	29	257
5	17	21	2	1	45	657
7*	19	8	1	0	165	1185
8*	8	8	19	8	31	130
9	4	2	0	1	8	127
10	18	85	178	66	492	2231
11	0	25	0	2	81	760
<b>Total gaze by question</b>	<b>222</b>	<b>241</b>	<b>453</b>	<b>109</b>	<b>1177</b>	<b>8302</b>

\* = User eye-tracking data somewhat unreliable as there were a lot of dropped data when these users leaned back or moved out of the range of calibration.

NOTE: Users 3 and 6 did not calibrate, thus there is no eye tracking data from them. User 12's data were not included in the analysis because most of the data were dropped due to technical issues.

### **3.4 Participant Satisfaction**

The average satisfaction score was 5.75 for Prototype A and 5.71 for Prototype B. Both scores are above the midpoint, but not *well* above, which was the goal set for the Web site. Although the means were quite high for satisfaction by question, some individual participant mean ratings were quite low (see the gray shaded areas in Table 9 and Table 10 below). Ratings below the midpoint of the scale indicate issues that may affect other users. Users tend to give higher satisfaction ratings than might be expected from their accuracy scores (Andre & Wickins, 1995). Thus, it is not surprising that the satisfaction scores are closer to the set goal than the accuracy scores are. See Appendix G for a complete list of satisfaction questions.

We did not include the results for User 6 in the average satisfaction rating (the accuracy score). Although User 6 only got three tasks correct in Prototype A, and two tasks correct in Prototype

B, her average satisfaction was unusually high at 8.8 (Prototype A) and 8.4 (Prototype B) out of 9. See Appendix G for satisfaction questions.

**Table 9. User Satisfaction Results for the Business and Industry Web Site Prototype A (1 = low, 9 = high)**

QUIS Prototype A (questions 1-9)										
	Satisfaction survey items									
Participant	1	2	3	4	5	6	7	8	9	Mean satisfaction rating by participant
1*	7	8	7	7	7	6	7	7	6	<b>6.9</b>
2*	5	3	3	5	3	5	3	7	5	<b>4.3</b>
3	8	8	8	9	9	9	N/A	5	8	<b>8.0</b>
4	6	5	4	5	5	4	5	5	5	<b>4.9</b>
5*	8	6	6	7	6	7	8	8	6	<b>6.9</b>
7	5	5	5	4	4	5	5	5	6	<b>4.9</b>
8	8	8	8	8	8	7	8	8	6	<b>7.7</b>
9*	3	3	4	4	5	2	3	3	3	<b>3.3</b>
10	4	4	2	4	3	3	3	2	3	<b>3.1</b>
11*	7	7	6	7	8	7	8	8	8	<b>7.3</b>
12	4	6	5	6	8	5	7	6	6	<b>5.9</b>
Mean satisfaction rating by question	<b>5.91</b>	<b>5.73</b>	<b>5.27</b>	<b>6.0</b>	<b>6.0</b>	<b>5.45</b>	<b>5.70</b>	<b>5.82</b>	<b>5.64</b>	<b>5.75</b>

6*	8	9	9	9	9	8	9	9	9	<b>8.8</b>
----	---	---	---	---	---	---	---	---	---	------------

\* = saw the Prototype first, N/A=missing data

**Table 10. User Satisfaction Results for the Business and Industry Web Site Prototype B (1 = low, 9 = high)**

QUIS Prototype B (questions 1-9)										
	Satisfaction survey items									
Participant	1	2	3	4	5	6	7	8	9	Mean satisfaction rating by participant
1	6	5	6	5	5	7	6	7	7	6.00
2	5	7	7	7	7	6	5	9	7	6.67
3*	8	8	8	9	9	9	8	9	9	8.56
4*	6	4	6	5	4	9	6	5	5	5.56
5	7	6	6	7	7	7	7	7	8	6.89
7*	5	5	5	5	4	4	4	4	5	4.56
8*	8	8	9	9	9	9	9	9	9	8.78
9	4	4	3	3	3	4	3	2	4	3.33
10*	6	3	2	3	1	3	2	3	3	2.89
11	6	5	6	7	4	5	4	6	6	5.44
12*	3	3	4	5	4	5	2	7	4	4.11
Mean satisfaction rating by question	5.82	5.27	5.64	5.91	5.18	6.18	5.09	6.18	6.09	5.71

6	7	9	8	9	9	8	9	8	9	8.44
---	---	---	---	---	---	---	---	---	---	------

\* = saw the Prototype first

### Sample of user comments on the final questionnaire:

Not all users wrote comments on the satisfaction questionnaire. For those who did, here is a sample of what the participants added, after rating the site:

- Participant 2 wrote, “I found the page [Prototype A] to be very wordy. To someone who has no experience with the Census Bureau, this would be time consuming and confusing.”
- Participant 7 wrote, “I do not like the year info on the right side [Prototype A]--it is too distracting.”
- Participant 11 wrote of Prototype A, “The ‘research’ category could mean many things. I would consider rewording it. The category ‘special topics’ could have been stated in a more descriptive way.”
- Participant 11 wrote of Prototype B, “The select data by box really bothered me because it is unusually formatted and requires you to figure out why the year is presented, how to read the title, and doesn’t give you much to figure out what the program links are about and like why are they there? A lot of the terms tripped me up.”
- Participant 12 wrote of Prototype B, “What is the ‘briefing room’? What is the ‘indicator schedule’? ‘Research’ is not self explanatory.”

### 3.5 Usability Results

#### Positive Findings

1. Most users saw and said they would click on the various links on the left-hand navigation as well as the program links in the middle of the screen.
2. Users mentioned they liked the color scheme of the page.

#### High-Priority Problems

**Finding 1.** The navigation and layout of data in the main section of the page (Select data by Geography) in both Prototype A and B was too complex for most users. Nine out of 12 users did not use or said they did not understand that section. See Figure 7 and Figure 8 below.

- A few users thought that the years were their zip codes, possibly because the DC area zip codes start with 20. Users often do not pay close attention to displayed information; they tend to scan, not read carefully (Redish, 2007).
- Many users ignored the years and instead clicked on the program name link labels.
- Users did not read the smaller text “to click on year to go to latest data,” nor did they read the footnote. One user commented that there should never be a footnote on an opening Web page.
- Only three of the 12 users consistently understood and used the table to search for year, geography and program type correctly. Of these, two did not understand until almost half-way through the session. And even though these three users understood how to read the table, they were not always accurate on which program would have led them to the correct information.
- Users said they were confused by the program names. Users did not know which program name would take them to the information they were looking for. A few of the program names have a mini-description either below (Prototype A) or to the right of the program name (Prototype B) which most users found helpful. Users commented that they would prefer all program names to have a description so they could know what information was available under the link.

- Some users could not believe that the broad title “Statistics of U.S. Businesses” only contained information on employment size or information on when a company started or ended. Often the users went to this link label for many of the answers because the wording was so broad. This was also true of the program name “Economic Census.”
- Users commented that they read left to right so the program names on the left (Prototype A) worked better for them, but even so they did not necessarily understand how the table worked, just that they could click on the program names more easily.

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Programs with data for geographic areas <sup>1</sup>						
		Click on year to go to latest data.				
		U.S. States	Metro areas	Counties	Places	ZIP codes
	<a href="#">Economic Census</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
	<a href="#">Survey of Business Owners</a> (incl. minorities, women)	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
	<a href="#">Statistics of U.S. Businesses</a> Firms by employment size	<a href="#">2005</a>	<a href="#">2006</a>	<a href="#">2006</a>		
	Establishment births, deaths	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>		
	<a href="#">County Business Patterns</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	
	<a href="#">Nonemployer Statistics</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	
	<a href="#">Local Employment Dynamics</a> Qtr Workforce Indicators	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>		

**Latest Indicators**

- Housing Starts: -11.0% (month-to-month, Jul 2008)
- Retail & Food Services Sales: -0.1% (month-to-month, Jul 2008)
- International Trade Deficit: -\$56.8 billion (Jun 2008)
- Manufacturer's New Orders M3: +1.7% (month-to-month, Jun 2008)

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Figure 7. Business and Industry main page: Prototype A. Users often missed the navigation cues on the page. Many users focused on the left-hand navigation. They missed links along the top and ignored the year/geography relationship.



**Figure 8. Business and Industry main page: Prototype B.** Many users said this prototype was more difficult to use than Prototype A. Users said that because we read left to right, the terminology on the far right was more difficult to read and understand in relation to the other information on the screen.

**Recommendation:** The layout and navigation have to be simplified for the novice users. This more complex layout and navigation could work for expert users; however it must be at a deeper level, (at least one or two clicks in) not the first page that users see: the Business and Industry main page<sup>6</sup>. Instead, use the space on the main entry page into Business and Industry data to give users access to content following a topic-based navigation. Displays must be very simple and clear (Tufte, 2001). Users do not want to puzzle anything out, nor do they have time to do so, they are in a hurry (Nielsen, 2003).

**Finding 2.** The tab navigation did not work for most users. Only a handful of users saw or used the embedded tab navigation. During the debriefing, at the end of the session, users were asked what they thought about the tab navigation. Users often responded that both the layout (they missed seeing the tabs) and terminology (they did not understand what the tab labels meant) caused them not to want to click on the tab navigation. See Figure 9.

- Many users did not click on the tab navigation choices. Only three of 12 participants used the tab to navigate.
- Some users commented that they did not see the tabs, while others said they did not know what the labels meant. Specifically, “Title” and “Frequency” were unclear.
- The tab “Form #” was clicked by one user (User 5) who used it for tasks 18a, 18b and 19a.

<sup>6</sup> The BLS Web site, shown to the team during an earlier meeting, and which uses a similar layout to Prototype A and B, is located deeper in the site, and is likely intended for expert users who can understand the complexities involved in interpreting the information.

- One user (User 12) clicked on the tab “Subjects A to Z” for task 16b. This user said he expected to have a search input box on that page (but he missed the search box in the space above the tab layout entirely).
- One user (User 10) clicked on the tab “Frequency” for question 14a.

U.S. Census Bureau

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Select data by ...

**Geography** | Title | Frequency | Form # | Subjects A to Z

Click on year to go to latest data.

U.S. States	Metro areas	Coun- ties	Places	ZIP codes
<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>		
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>		
<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>		<a href="#">2006</a>
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	
	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	
<a href="#">2006</a>	<a href="#">2006</a>			
<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>
<a href="#">2006</a>	<a href="#">2006</a>			

**Programs with data for geographic areas <sup>1</sup>**

- [Economic Census](#)
- [Survey of Business Owners](#) (incl. minorities, women)
- [Statistics of U.S. Businesses](#) Firms by employment size
- [Statistics of U.S. Businesses](#) Establishment births, deaths
- [County Business Patterns](#)
- [Nonemployer Statistics](#)
- [Local Employment Dynamics](#) Qtr Workforce Indicators
- [Annual Survey of Manufactures](#)
- [Building Permits](#)
- [Governments](#)

Tab navigation did not work for most users. Only three out of 12 users used it.

**Figure 9. Business and Industry main page: Prototype B. Users missed or had difficulty with tabbed areas on the site. Some said they did not see the tabs; others said they did not know what the tab labels meant and so would not click on them.**

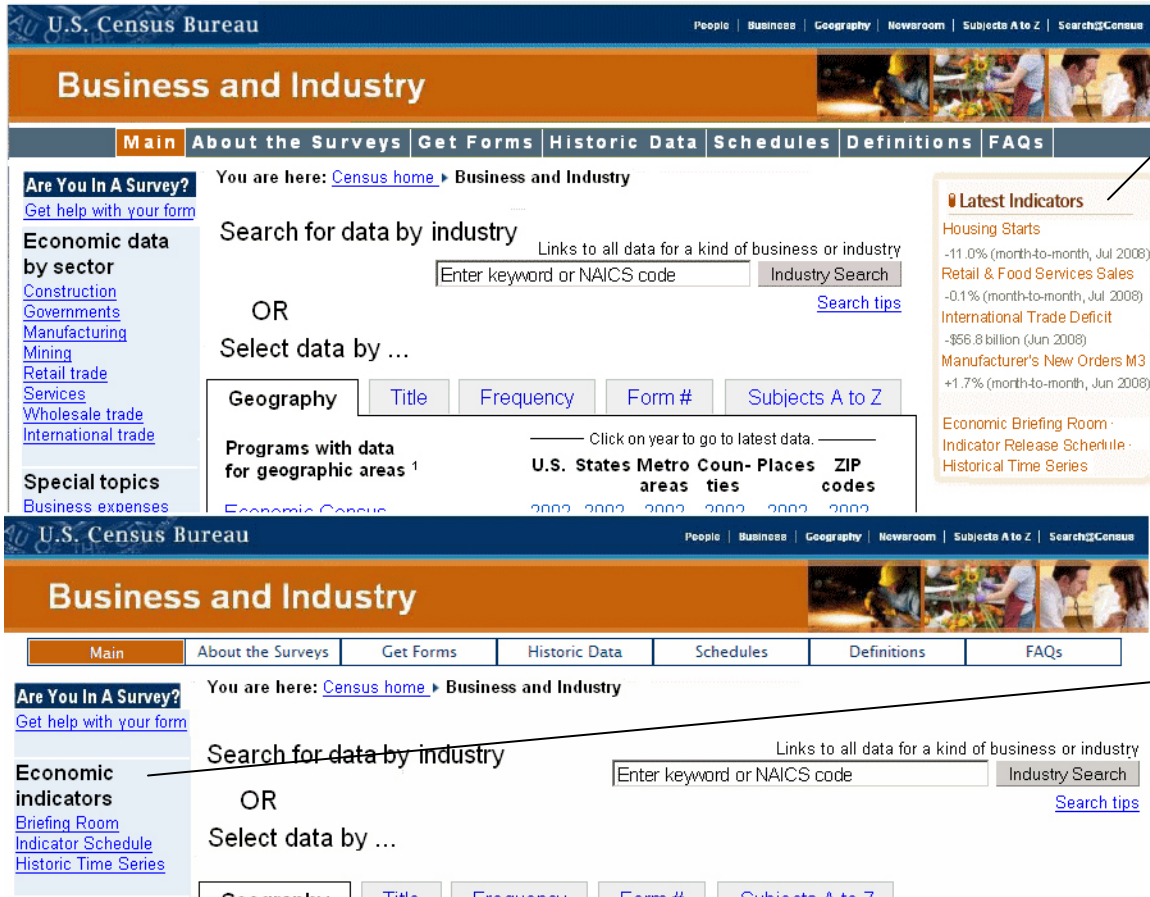
**Recommendation:** As in the recommendation for Finding 1 above, the layout and navigation have to be simplified for the novice user. The embedded-tab navigation should not be the way to get data. Users will not click on a tab (link) unless they are confident about where they will be taken (Head, 1999). Re-design the main page to allow users to navigate into the content from user-derived terminology, which is laid out in a more common format.

**Finding 3.** The Latest Economic Indicator areas did not work effectively for users, though Prototype A with the box on the far right was more effective than Prototype B. Participants gazed at the Latest Indicator box on Prototype A 400 times more than the Economic Indicator section on Prototype B. See Figure 10. These areas were to be an access point into monthly data, and were important since subjects did not notice the "Frequency" tab (see Finding 2). When users missed these areas, they did not know where to go for monthly data.

- On average, participants took 3 minutes and 25 seconds to look at the Latest Indicators (LI) box (Prototype A) on the far right. However, once participants found it, most said it had useful content. Participants commented that they were not sure whether the links in the LI box were actually links, probably because of the orange color and the non-standard format (e.g., not underlined, not blue). A few users commented that they

thought the LI box was an advertisement and said they did not look at or read that area of the screen.

- Many users said they did not know what the links on the far left under the heading Economic Indicators (Prototype B) were or what they meant. Most users did not click on links in this section.



Prototype A with LI box on far right.

Prototype B with LI links on far left navigation panel.

**Figure 10. Business and Industry main page: Prototypes A (top) and B (bottom) with the Latest Economic Indicators (LI) highlighted. More users saw and used the LI box in Prototype A. However, this box could be improved. Links were a non-standard color and the plus and minus signs were not always clear to users. Users said they were unsure where the links would go.**

**Recommendation:** Although the LI box on the right was more effective than the links on the far left, some changes are suggested to make it better. Make the links standard—blue and underlined (as required by IT Standard 15.0.2). Move the box from the far right location on the screen into more of the middle area so that users don't think it is an advertisement.

**Finding 4.** The top-navigation bar was not used effectively. Users did not look at the top navigation bar or only saw it late in the session. See Figure 11.

- Users did not often click on the links in the top-navigation bar.
- A number of users did not look at the word “definition” (or saw it only late in the sessions) when specifically looking for a link that would lead them to a definition of an economic term.



- When using both prototypes, users scrolled down to see the entire page and often missed having the top-navigation bar in view.
- Within the first 90 seconds, most users did not focus on the top navigation bar. See Figure 12 and Figure 13 for eye-tracking screen shots from two users. In contrast, see Figure 14 for an eye-tracking image of where, within the first 90 seconds, a user focused on top navigation bar in Prototype B.
- On average, the amount of time for the participant to notice the top navigation bar on both prototypes was well over five minutes (6 minutes 41 seconds for Prototype A and 7 minutes 53 seconds for Prototype B).
- Of the nine users for whom we have eye-tracking data, three users did not locate the top-navigation bar.

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Select data by ...

Geography						Title	Frequency	Form #	Subjects A to Z
Click on year to go to latest data.						Programs with data for geographic areas <sup>1</sup>			
U.S. States	Metro areas	Coun- ties	Places	ZIP codes					
<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">Economic Census</a>			
<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">Survey of Business Owners</a>	(incl. minorities, women)		
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">Statistics of U.S. Businesses</a>	Firms by employment size		
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">Statistics of U.S. Businesses</a>	Establishment births, deaths		
<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">County Business Patterns</a>			
<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2006</a>	<a href="#">Nonemployer Statistics</a>			
<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">Local Employment Dynamics</a>	Qtr Workforce Indicators		
<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">Annual Survey of Manufactures</a>			
<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">Building Permits</a>			
<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">Governments</a>			
<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">Foreign Trade: State Exports</a>			

<sup>1</sup> All other business and industry data are published only at the national level

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Users missed the top navigation bar because they often scrolled down when working on the tasks and did not scroll back up.

**Figure 11. Business and Industry main page: Prototype B, scrolled down to lower half of screen. Users missed the top navigation bar because they often scrolled down when working on the tasks and did not scroll back up.**

Occasionally, the test administrator scrolled the screen up again, but the participant immediately scrolled back down to get the main part of the screen in view. This implies that there was too much information on the screen, and so much of the content was below the fold that users had to scroll down to see it and thus missed the top navigation bar.



90 seconds into the study, User 11 did not focus on the top navigation bar.

Tracking by Tobii

Figure 12. Scan path data for Business and Industry main page: Prototype A, User 11: approximately 90 seconds into study. Notice user did not focus on the top navigation bar. User did not look at the top navigation bar until 19 minutes into the session.

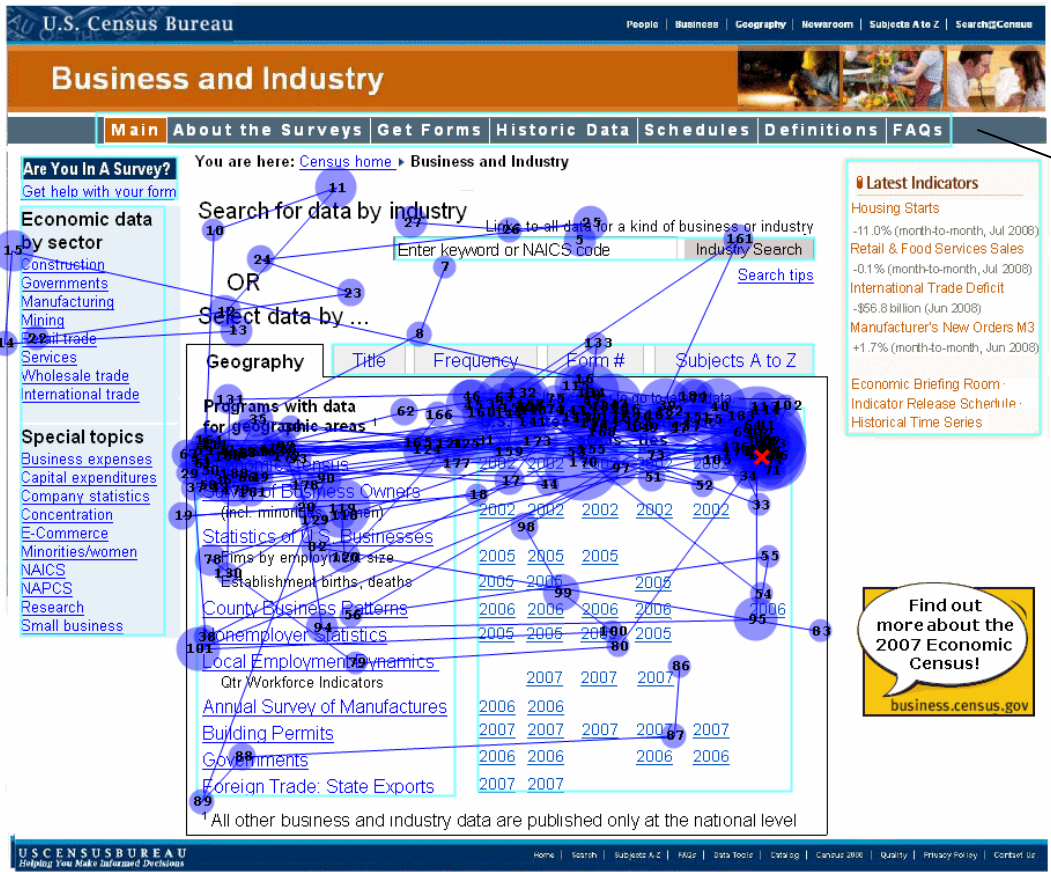
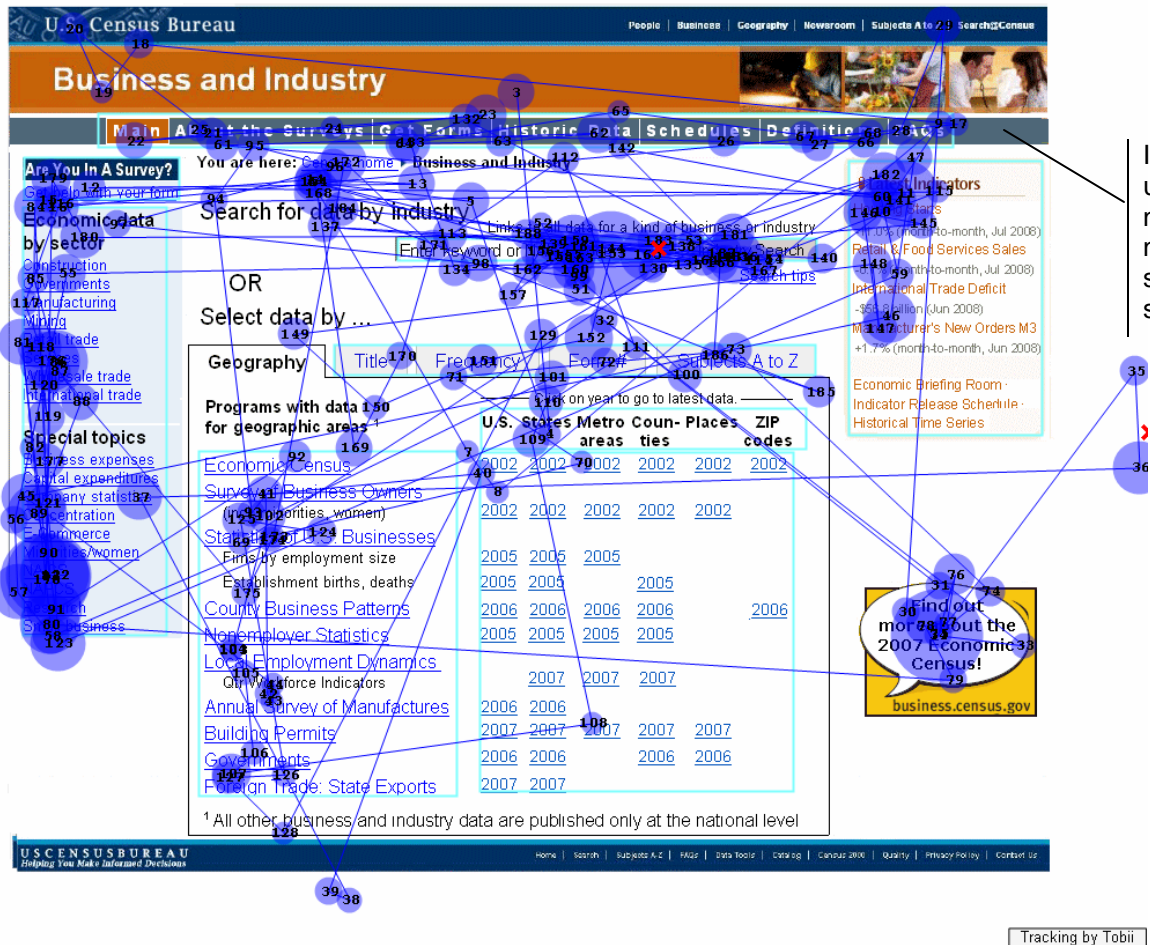


Figure 13. Scan path data for Business and Industry main page: Prototype A, User 9, approximately 90 seconds into study. User did not look at the top navigation bar until 25 minutes and 21 seconds into the session.

Tracking by Tobii



**Figure 14.** Scan path data for Business and Industry main page: Prototype A, User 1, approximately 90 seconds into study. Notice, in contrast to other user eye-tracking data, this user looked at the top navigation bar. User noticed the top navigation bar 18 seconds into the session.

**Recommendation:** The coloring scheme needs to be changed. We recommend going to the very obvious blue underlined links and moving these links away from the top banner (reduce banner blindness) into the portion of the screen that users see and work with. The top navigation bar appears to part of the header/banner. In order for participants to notice the top navigation bar more efficiently, it needs to be separated from the banner. Further research to explore the issues identified with the top navigation bar is recommended.

**Finding 5.** The site had too much Census Economic jargon. Users were confused by terminology on the page. Many users were not clear about what content they could expect to find under a variety of link labels. The following terms caused issues for participants:

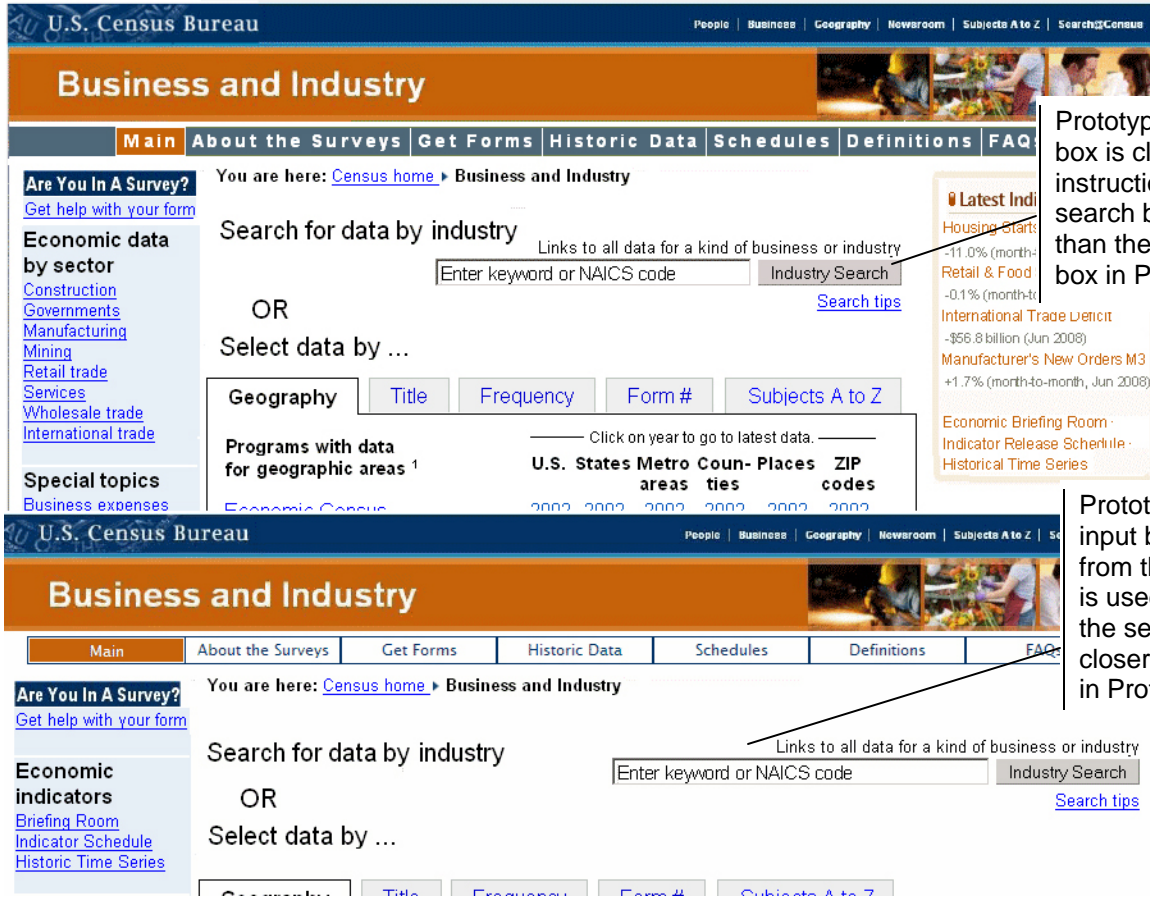
- Company statistics—users thought they could search for specific businesses by name (e.g., Macy’s, Target).
- Concentration—users did not know what would be under this link.
- E-Commerce—only 4 out of 12 users clicked on this for one of the two tasks related to sales over the Internet.

- Research—users clicked on this at different times for different reasons: one user felt it would lead her to definitions and metadata-type information (she missed links at top and the search); a number of users clicked on it thinking they could “research” their topic of interest. In a way, this was a default link rather than the search, when users didn’t know what to try for their “first click.”
- Schedules—one user clicked on this.
- Historic data—two users clicked on this.
- Get help with your form— eight out of 12 users did not click on this section of the screen. Of the four who said they would click on this link, all but User 4 used the links when in Prototype A (three columns), possibly because in Prototype A users did not need to scroll down as far as in Prototype B to see the entire screen. Another possibility is that the heading for this section “Are You In a Survey?” is white text on a blue background, which is not consistent with the other headings (all in bolded black) on the left-hand navigation. For both prototypes, this AOI took the longest time for the participants to look at and received the least amount of fixations (Prototype A: 143 fixations; Prototype B: 109 fixations).

**Recommendation:** Re-phrase terminology. Use user-derived terminology. Incorporate hover or mouse-over buttons for terminology along left-hand column that give clues (i.e., tool tips) to the content underneath each link.

**Finding 6.** Users who saw and used the search box thought they could search on any terminology, similar to a Google-type search. Search was not used effectively by many users. Some never saw or used the search box. See Figure 15.

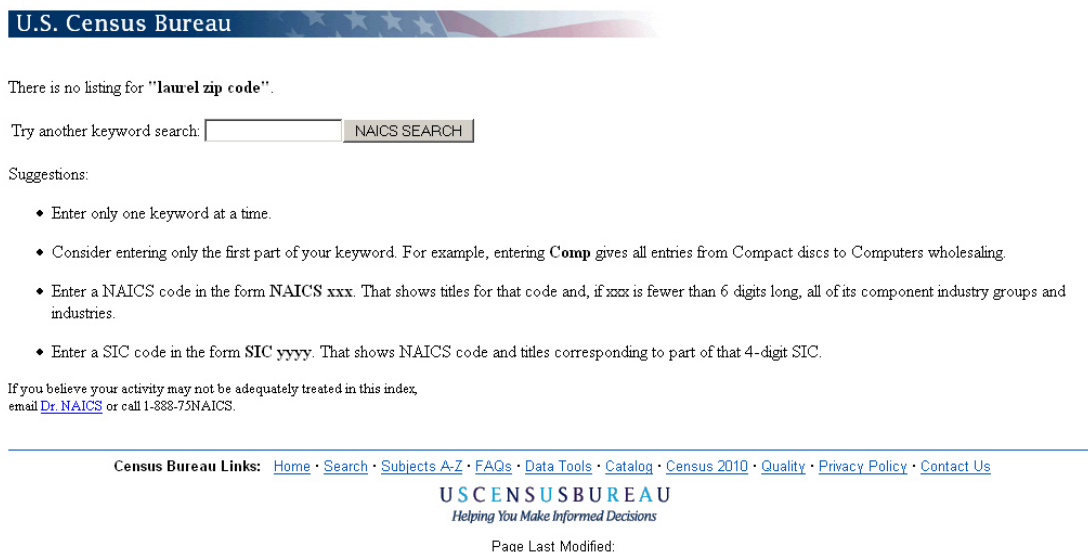
- Examples of some of the phrases users said they would type in are: “data info for restaurants,” “dolls and stuffed animals produced in US in 2002,” “lawyers or attorneys,” “laurel zip code,” and “New Houses, Denver Colorado.”
- Five users out of 12 did not use the search box at all.
- Users were more likely to use the search box in Prototype A with the three columns, where the search field was closer to the instruction to “Search for data by industry.” Of the seven users who used search, three used the search only when it was displayed in Prototype A. The other four used the search box in both prototypes. Participants noticed the search box in Prototype A 2 minutes 7 seconds faster on average when compared to Prototype B.
- At the conclusion of the study, some users mentioned that the top area (where the search box is located) was cluttered with too much information.
- Users did not appear to read all the words related to the search input field.
- When the authors of the report tried typing in the current working NAICS search box, only a handful of the search queries that users actually said they would type in brought back results, all the other search queries returned with the results “there is no listing for...” See Figure 16. This caused the users some amount of frustration as they said they expected the search to return some results.



Prototype A—Search input box is closer to the instruction. Users used this search box more frequently than they used the search box in Prototype B.

Prototype B—Search input box is further away from the instruction, and is used less often than the search box located closer to the instruction in Prototype A.

**Figure 15. Business and Industry main page: Prototypes A (top) and B (bottom).** Users saw and used the search box in Prototype A where the search input field was closer to the instructions to search more often than they used the one in Prototype B. However, five users missed the search box in both prototypes altogether.



**Figure 16. Example of what happens in current NAICS search when users type in phrases that are not recognized by the search engine.**

**Recommendation:** Draw more attention to the search box. Make it very obvious that the search-input box goes with the search field. Consider reducing the number of words in the search-field area by doing the following: Remove the smaller font “Link to all data for a kind of business or industry,” and instead have the instruction read in bold “Search for data by industry or kind of business.” Remove the word “Industry Search” from the gray button and leave the word “Search” in the gray button. Consider adding directions that would help users enter the successful search query from the beginning, such as “enter only ONE keyword.” Most users anticipate being able to do a Google-like search where all phrases are accepted. It is a good idea to adapt a search-query tool similar to Google to meet the user expectations (e.g., entering phrases versus one word).

#### **4.0 Conclusion**

Analysis of testing data identified key issues that led to many incorrect initial first clicks, as well as user frustrations with both Prototypes A and B of the Business and Industry second level page. The team has reconsidered the layout and design of the second level Business and Industry page and has come up with an alternative version, based in large part on the findings and recommendations of the quick report and team meetings. Further improvements to the prototype and working site can improve the user’s success and satisfaction. Participants in this usability study were diverse in age, education, and comfort with Web sites and the Internet. Future usability testing on the site should aim to include a diverse sample of both novices and experts. We also recommend testing with users who have disabilities to determine whether the site works for special-needs users. Technical compliance with federal regulations on accessibility does not guarantee usability for everyone. Upon release of the new design, we recommend conducting further usability testing to evaluate whether the changes to the user interface support users in achieving their goals on the Business and Industry Web site.

## 5.0 References

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## Appendix A: AOs for Prototypes A and B

U.S. Census Bureau

People | Business | Geography | Newsroom | Subjects A to Z | Search2Census

### Business and Industry

Main | About the Surveys | Get Forms | Historic Data | Schedules | Definitions | FAQs

Are You In A Survey? [Get help with your form](#)

You are here: [Census home](#) > Business and Industry

Search for data by industry Links to all data for a kind of business or industry

Enter keyword or NAICS code   [Search tips](#)

OR

Select data by ...

Geography | Title | Frequency | Form # | Subjects A to Z

Click on year to go to latest data.

U.S.	States	Metro areas	Coun- ties	Places	ZIP codes
<a href="#">Economic Census</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">Survey of Business Owners</a> (incl. minorities, women)	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">Statistics of U.S. Businesses</a> Firms by employment size	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>		
<a href="#">Statistics of U.S. Businesses</a> Establishment births, deaths	<a href="#">2005</a>	<a href="#">2005</a>		<a href="#">2005</a>	
<a href="#">County Business Patterns</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>
<a href="#">Nonemployer Statistics</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	
<a href="#">Local Employment Dynamics</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>		

Latest Indicators

- Housing Starts: -11.0% (month-to-month, Jul 2008)
- Retail & Food Services Sales: -0.1% (month-to-month, Jul 2008)
- International Trade Deficit: -\$56.8 billion (Jun 2008)
- Manufacturer's New Orders M3: +1.7% (month-to-month, Jun 2008)

Economic Briefing Room - Indicator Release Schedule - Historical Time Series

Find out more about the 2007 Economic Census!

Figure 17. Business and Industry main page: Prototype A. Area of Interest are highlighted in Blue.

U.S. Census Bureau

People | Business | Geography | Newsroom | Subjects A to Z | Search2Census

### Business and Industry

Main | About the Surveys | Get Forms | Historic Data | Schedules | Definitions | FAQs

Are You In A Survey? [Get help with your form](#)

You are here: [Census home](#) > Business and Industry

Search for data by industry Links to all data for a kind of business or industry

Enter keyword or NAICS code   [Search tips](#)

OR

Select data by ...

Geography | Title | Frequency | Form # | Subjects A to Z

Click on year to go to latest data.

U.S.	States	Metro areas	Coun- ties	Places	ZIP codes
<a href="#">Economic Census</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">Survey of Business Owners</a> (incl. minorities, women)	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>	<a href="#">2002</a>
<a href="#">Statistics of U.S. Businesses</a> Firms by employment size	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>		
<a href="#">Statistics of U.S. Businesses</a> Establishment births, deaths	<a href="#">2005</a>	<a href="#">2005</a>		<a href="#">2005</a>	
<a href="#">County Business Patterns</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>
<a href="#">Nonemployer Statistics</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	<a href="#">2005</a>	
<a href="#">Local Employment Dynamics</a> Qtr Workforce indicators	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>		
<a href="#">Annual Survey of Manufactures</a>	<a href="#">2006</a>	<a href="#">2006</a>			
<a href="#">Building Permits</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	<a href="#">2007</a>	
<a href="#">Governments</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	<a href="#">2006</a>	
<a href="#">Foreign Trade: State Exports</a>	<a href="#">2007</a>	<a href="#">2007</a>			

1 All other business and industry data are published only at the national level

Figure 18. Business and Industry main page: Prototype B. Area of Interest are highlighted in Blue.

## **Appendix B: General Introduction**

Thank you for your time today. My name is Erica/Kathy/Jenna and I will be working with you today. We will be evaluating a new design of the Business and Industry Web site prototypes by having you work on several tasks. Your experience with the site is an essential part of our work. We are going to use your comments to give feedback to the developers of the site. Your comments and thoughts will help the developers make changes to improve the site. I did not create the site, so please do not feel like you have to hold back on your thoughts to be polite. Please share both your positive and negative reactions to the site. We are not evaluating you or your skills, but rather you are helping us see how the site works, where we can improve it, and make it better.

First, I would like to ask you to read and sign this consent form. It explains the purpose of the session and informs you that we would like to videotape the session, with your permission. Only those of us connected with the project will review the tape. We will use it mainly as a memory aid. We may also use quotations from the tape to illustrate key points about the design of the Web pages.

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

***[Start the tape when the participant signs the form.]***

So today, you will be helping us test the usability of the Business and Industry Web site prototypes. Your feedback is valuable, and we appreciate your help. We are going to do some eye-tracking as well as have you work on some task scenarios that I will give you.

Before we get started, please take a moment to complete this computer usage and internet experience questionnaire. Do you have any questions?

***[Hand computer experience form, and go into control room.]***

Now I am going to calibrate your eyes for the eye tracking. I am going to have you position yourself in front of the screen so that you can see your nose in the reflection at the bottom of the monitor. To calibrate your eyes, please follow the blue dot across the screen with your eyes.

***[Do Calibration]***

Now that we have your eyes calibrated, we are ready to begin. For the next 60 minutes, I will ask you to read each task and then tell me with all the link choices on the screen—which one would you click on to get your best choice? I would like you to tell me your impressions and thoughts about the Web site as you think about where you would click and why you choose a link to click on. Even though the links we will be looking at today are not active or working links, please click on the link that you think would be the correct one as if it were active. Talk about why you clicked on a link or where you expected the link to take you.

After you clicked on each link I am going to ask you on a scale of 1 to 7 where 1 is low and 7 is high “how confident are you that you would be able to find the information you were looking for based on your selection?”

Now we'll do a brief practice on making one click and thinking aloud right now.

[Do Practice on Thinking Aloud—use website <http://craigslisdc.org> as most participants will come from that list]

Great that's what I want you to do. Be sure to actually make the click on what you think is the link (even though the links will not work) because that way we will have a record of which link you think will best lead you down towards the answer.

[Note to TAs if user forgets to click or does not click remind them to click on the “link” because that way we will have a record with the eye tracking tool]

Finally, during the session, I will remind you to think aloud if you get quiet. Please focus on verbalizing what you are thinking and expecting to happen. We are interested in the reasoning behind your actions, not just in what you are doing.

I ask that each time you start a task, please read the task out loud, and once you have found the link you think will work click on it—even though it is not currently a working link. Then I'll ask you to give me your rating of confidence based on the 1 to 7 scale.

Please remember to begin each task by reading the task question aloud. Also, as you work, please remember to think aloud.

**Appendix C: Consent Form**  
**Usability of Economic Surveys Web Site Prototypes**

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 site and online surveys, in order to obtain the best information possible and to provide satisfying experiences to users of our products.

You have volunteered to take part in a study to improve the usability of the Economic Surveys Web site. 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. Staff directly involved in the usable design 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 D: Pre Questionnaire

### Questionnaire on Computer Use and Internet Experience

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

(Check all that apply.)

Home

Work

Somewhere else, such as school, library, etc.

2. If you have a computer at home,

a. What kind of modem 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.

Internet Explorer

Firefox

Netscape

Other \_\_\_\_\_

Don't know \_\_\_\_\_

c. What operating system does your browser run in?

MAC OS

Windows 95

Windows 2000

Windows XP

Windows Vista

Other \_\_\_\_\_

Don't know \_\_\_\_\_

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

0

1-3

4-6

7+

3b. On average, how many hours do you use the Internet per week?

0

1-3

4-6

7+

4. For how many years have you been using the Internet?

5. What do you use the Internet for more, 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. Please rate your overall experience with the following:

		no experience					very experienced			
Computers		1	2	3	4	5	6	7	8	9
Internet		1	2	3	4	5	6	7	8	9

8. What computer applications do you use?

Mark (X) 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	
	1	2	3	4	5
9. How <i>comfortable</i> are you in learning software applications that are new to you?					
10. Computer windows can be minimized, resized, and scrolled through. How <i>comfortable</i> are you in manipulating a window?					
11. How <i>comfortable</i> are you using and navigating through the Internet?					
12. How <i>often</i> do you work with any type of data through a computer?					
13. How <i>often</i> do you perform complex analyses of data through a computer?					
14. How <i>often</i> do you use the Internet or Web sites to find information? (e.g., printed reports, news articles, data tables, blogs, etc.)					
15. How <i>familiar</i> are you with the Census Web site (location, tools, data, etc)?					
16. How <i>familiar</i> are you with the Business and Industry area of the Census (terms, data, etc.)					

17. How old are you?

- a)  18-28
- b)  29-44
- c)  45-64
- d)  65+

18. What is the highest grade of school you have completed, or the highest degree you have received?

- a)  Completed ninth grade or below
- b)  Some high school, but no diploma
- c)  Completed high school with diploma or received a GED
- d)  Vocational training beyond high school
- e)  Some college credit
- f)  Associates degree (AA/AS)
- g)  Bachelor's Degree (BA/BS)
- h)  Master's, Professional, or Doctoral degree

19. Are you currently enrolled in school?

Yes

No

## **Appendix E: Tasks A and B**

### **Task Set A:**

- 1a Are monthly data available for restaurants?
- 2a What are the latest changes in retail sales for July?
- 3a What is the latest deficit in US trade with other countries?
- 4a How many new homes did builders begin constructing in August? Is it more or less than were started in July?
- 5a How much money do commercial bakeries make in Michigan?
- 6a How many dry cleaning establishments are located in Fairfax County, VA?
- 7a What is the value of dolls and stuffed animals produced in the U.S. in 2002?
- 8a What is the NAICS code for health insurance companies?
- 9a How many people work for firms (businesses) with 500 employees or more in Maryland?
- 10a How many new houses were authorized to be built in Denver, CO, in the latest month?
- 11a Where would you find the most recent information for your zip code?
- 12a What is the difference between a firm and an establishment?
- 13a When will data from the 2007 Economic Census be released?
- 14a Can I get a list of all antique stores, in Miami, FL?
- 15a How many Black-owned businesses are there in the U.S.?
- 16a What fraction of retail sales is accounted for by the Internet?
- 17a Does the Census Bureau define small business?
- 18a You have only 30 employees in your small family run business and are wondering if you have to fill out the Census Form that just came in the mail?



- 19a Your business received a Small Business Owner SBO-1 form in the mail, and would like to make sure this is a valid Census Bureau survey. Where would you look to find this information?

**Task Set B**

- 1b Are monthly data available for new car dealers?
- 2b What are the latest changes in wholesale trade for July?
- 3b When was the last year the United States had a trade surplus?
- 4b What was the dollar value for new orders for manufactured goods in July? How does this differ for the dollar value of new orders placed in June?
- 5b How much money do flower shops make in Iowa?
- 6b How many lawyers' offices are located in Montgomery, MD?
- 7b What is the value of toothpaste produced by the U.S. in 2002?
- 8b What is the NAICS code for day care facilities?
- 9b How many firms (businesses) in Virginia have fewer than 20 employees?
- 10b How many apartment buildings for 5 or more families were authorized by building permits in Fairfax County, VA?
- 11b What is the most recent data you can get for metropolitan areas?
- 12b What is the difference between a business and an industry?
- 13b When will data from the 2007 Annual Wholesale Trade Survey be available?
- 14b Can I get a list of businesses in Ocean City, MD?
- 15b How many women-owned businesses are there in the U.S.?
- 16b What fraction of electronic repair (such as iPods) are attributed to the Internet?
- 17b What constitutes a self-employed status?
- 18b You have 800 employees at your firm and are wondering which Census form must you fill out?

## Appendix F: Order of tasks

Task order was randomized to control for learning.

Order of Tasks for List 1

11  
3  
8  
2  
1  
14  
21  
10  
18  
6  
16  
12  
20  
4  
19  
7  
17  
9  
13  
15  
5

Order of Tasks for List 2

21  
13  
10  
16  
17  
15  
3  
4  
19  
11  
9  
7  
14  
20  
6  
5  
2  
12  
8  
1  
18

## Appendix G: Satisfaction Questionnaire

Please circle the numbers that most appropriately reflect your impressions about using this Web-based instrument.

- |   |            |   |   |   |   |   |   |           |   |  |  |  |                |
|---|------------|---|---|---|---|---|---|-----------|---|--|--|--|----------------|
| 1. Overall reaction to the Web pages:                 | terrible   |   |   |   |   |   |   | wonderful |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 2. Screen layouts:                                    | confusing  |   |   |   |   |   |   | clear     |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 3. Use of terminology:                                | confusing  |   |   |   |   |   |   | clear     |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 4. Information displayed on the screens:              | inadequate |   |   |   |   |   |   | adequate  |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 5. Arrangement of information on the screen:          | illogical  |   |   |   |   |   |   | logical   |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 6. Tasks can be started in a straight-forward manner: | never      |   |   |   |   |   |   | always    |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 7. Organization of information on the site:           | confusing  |   |   |   |   |   |   | clear     |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 8. It is clear where to click for forward navigation: | confusing  |   |   |   |   |   |   | clear     |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 9. Overall experience of finding information:         | difficult  |   |   |   |   |   |   | easy      |   |  |  |  | not applicable |
|   | 1          | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 |  |  |  |                |
| 10. Additional Comments:                              |            |   |   |   |   |   |   |           |   |  |  |  |                |

## Appendix H: Debriefing Questions

1. Can you walk me through your thinking on why you marked (a particular item) especially low/high? (Do this for several low/high ratings).
2. 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?
3. What do you think of the navigational methods?
  - a. Menu bar across the top?
  - b. Links in center of the page (tabs in center of page)?
  - c. Links on the sides of the pages?
  - d. Other?
4. What did you like best about the page?
5. What did you like least about the page?
6. What is something that you feel should be changed?
7. What is something that you feel should stay the same?
8. How easy or difficult do you feel it was to make the choice on where you would first click
9. Is there anything you'd like to mention that we haven't talked about?
- 10 (after they have worked on both versions) Do you prefer one of the prototypes over the other?
11. If you were to contact the Census Bureau about a data question-would you prefer to have a person's name and phone or email? (*Q from Nick*)
11. Additional Comments:

### Appendix I: Payment Voucher

Standard Form 1034 September 1973 Treasury FRM 2000	<b>PUBLIC VOUCHER FOR PURCHASES AND SERVICES OTHER THAN PERSONAL</b>				VOUCHER NO.	
U.S. DEPARTMENT, BUREAU OR ESTABLISHMENT AND LOCATION  <b>U.S. Department of Commerce          Bureau of the Census          Washington, DC 20233-9100</b>			DATE VOUCHER PREPARED		SCHEDULE NO.	
			CONTRACT NUMBER AND DATE		PAID BY	
			REQ. NUMBER AND DATE			
<b>PLEASE PRINT NAME &amp; ADDRESS BELOW:</b>					DATE INVOICE RECEIVED	
PAYEE'S NAME AND ADDRESS					DISCOUNT TERMS	
SHIPPED FROM TO WEIGHT					PAYEE'S ACCOUNT NUMBER	
GOVERNMENT B/L NUMBER						
NUMBER AND DATE OF ORDER	DATE OF DELIVERY OR SERVICE	ARTICLES OR SERVICES <i>(Enter description, item number of contract or Federal supply schedule, and other information deemed necessary)</i>	QUAN-TITY	UNIT PRICE		AMOUNT
				COST	PER	
		For participating in a usability test as part of Business and Industry Web site at the Usability Laboratory Center for Survey Methods Research Statistical Research Division  Received by: _____  Date: _____				\$40.00
(Use continuation sheet(s) if necessary) (Payee must NOT use the space below)						
<b>TOTAL</b>						
PAYMENT: <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL <input type="checkbox"/> PROGRESS <input type="checkbox"/> ADVANCE	APPROVED FOR \$40.00		EXCHANGE RATE = \$1.00		DIFFERENCES	
	BY:					
	TITLE:				Amount verified correct for \$40.00	
	(Signature or initials)					
Pursuant to authority vested in me, I certify that this voucher is correct and proper for payment						

_____		_____		<u>Social Science Analyst</u>	
(Date)		(Authorized Certifying Officer)		(Title)	
ACCOUNTING CLASSIFICATION					
Project/Task: 5907054-000; Organizational Code: 11-29-0091-50-50-00-00; Obj. Class: 25-20-04-00					
CHECK NUMBER	ON TREASURER OF THE UNITED STATES			CHECK NUMBER	ON (Name of Bank)
CASH	DATE			PAYEE	
PER				TITLE	

## Appendix J: Additional tables—Accuracy

**User accuracy scores for Task set A--Usability Testing of the Business and Industry Web Site**

Participant	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a
1*	0	0	1	1	1	0	0	1	0	1
2*	1	1	0	1	1	0	1	1	0	1
3*	0	1	1	1	1	0	1	0	1	0
4*	0	1	0	1	0	0	0	1	1	0
5	0	1	0	1	1	0	1	1	1	0
7	0	1	1	1	0	0	0	1	1	0
8*	0	1	1	1	0	0	0	1	1	0
9*	0	0	0	0	0	0	0	1	1	1
10	0	0	1	1	0	1	0	0	0	1
11*	0	1	0	1	1	1	1	1	1	0
12	0	0	0	1	0	0	1	1	1	0
Average	0.09	0.64	0.45	0.91	0.45	0.18	0.45	0.82	0.73	0.36

**User accuracy scores for Task set A--Usability Testing of the Business and Industry Web Site—table continued**

Participant	11a	12a	13a	14a	15a	16a	17a	18a	19a	Average
1*	0	1	0	0	1	1	1	0	na	0.47
2*	0	1	0	0	1	1	1	0	na	0.58
3*	0	0	1	0	1	1	1	0	na	0.53
4*	0	0	1	0	1	0	1	0	na	0.37
5	1	1	1	0	1	1	1	0	1	0.68
7	0	0	1	0	1	0	1	0	0	0.42
8*	0	0	1	0	1	1	1	0	0	0.47
9*	0	1	0	0	1	1	1	0	0	0.37
10	1	1	0	0	1	1	1	0	0	0.47
11*	1	0	0	0	1	1	1	0	0	0.58
12	0	1	0	0	1	1	1	1	1	0.53
Average	0.27	0.55	0.45	0.00	1.00	0.82	1.00	0.09	0.29	0.50 <sup>7</sup>

<sup>7</sup> A task was considered a success when a user clicked on one of the acceptable links specific to the task question, as determined by the team. If this round of testing had been of a live, working Web site, some users may have completed tasks successfully once computer feedback was/was not received.

**User Accuracy Scores for Task set B--Usability Testing of the Business and Industry Web Site**

Participant	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b
1	0	1	0	1	0	0	0	1	1	0
2	0	1	0	1	0	0	0	1	1	1
3	1	1	1	1	0	0	1	0	1	1
4	0	1	0	1	0	0	0	1	1	0
5*	1	1	1	1	0	0	1	1	1	0
7*	0	1	0	1	0	0	0	1	1	0
8	0	1	0	0	0	0	0	1	1	0
9	1	1	1	1	0	0	0	1	1	1
10*	0	0	0	1	0	0	0	1	1	1
11	1	1	0	1	0	0	1	1	0	0
12*	0	1	0	1	0	0	1	1	1	1
Avg	0.36	0.91	0.27	0.91	0.00	0.00	0.36	0.91	0.91	0.45

**User Accuracy Scores for Task set B--Usability Testing of the Business and Industry Web Site—table continued**

Participant	11b	12b	13b	14b	15b	16b	17b	18b	19b	Average
1	0	1	0	0	1	1	1	0	0	0.42
2	0	1	1	0	1	0	1	0	0	0.47
3	1	1	0	0	1	0	1	1		0.67
4	0	0	1	0	1	0	0	0		0.33
5*	0	0	1	0	1	0	0	0	0	0.47
7*	0	0	1	0	1	0	1	0	0	0.37
8	0	0	1	0	0	0	0	0	0	0.21
9	0	1	1	0	1	0	1	0	1	0.63
10*	1	1	0	0	1	0	1	0	0	0.42
11	1	0	0	0	1	0	0	0	0	0.37
12*	0	0	0	0	1	0	1	1	0	0.47
Avg	0.27	0.45	0.55	0.00	0.91	0.09	0.64	0.18	0.11	0.44