**A High-Fidelity Usability Evaluation
of Iteration 3 of the New American
FactFinder Web Site: Increased Functionality**

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Abstract:
In March of 2010, the U.S. Census Bureau's Center for Survey Measurement (CSM) conducted a usability evaluation of Iteration 3.0 of the newly designed American FactFinder (AFF) Web site. The usability testing evaluated the success (accuracy and efficiency) and satisfaction of participants with the increasingly higher fidelity site. As the site was still in production, not all the data were loaded into the system. However, all screens and links were working.

Tasks were developed to gain an understanding of whether users understood the Web site's search and navigation capabilities as well as some table and map functions. Usability testing revealed several major findings, including confusion about how the geography overlay worked and lack of understanding of how the different components of the faceted search all worked together. This report provides a complete summary of this usability evaluation, including methods, findings and team decisions based on our findings. Future changes to the AFF site should be evaluated for usability to maintain the iterative approach towards improvement that has been adopted.

Executive Summary

In March of 2010, the Center for Survey Measurement (CSM) conducted usability evaluations of increasingly higher-fidelity screens (i.e., only a few select data files were loaded into the system) of the new American FactFinder (AFF) Web site. These evaluations were the fourth in a series of planned, iterative tests in the redesign process. The testing evaluated the success (accuracy and efficiency) and satisfaction of users with the new Web site. Testing took place at the U.S. Census Bureau's Usability Laboratory in Suitland, MD.

Purpose: The purpose of this test was to discover whether users understood the new AFF search and navigation capabilities and some table and map functions, and thus to improve the AFF user interface.

Method: Seven novices and one expert were recruited to participate in the usability study of Iteration 3.0. Each participant sat in a small room, facing one-way glass and a wall camera, in front of a computer monitor. After finishing the tasks, participants completed a satisfaction questionnaire and answered debriefing questions that were administered by the test administrator. Members from the AFF Design Team, composed of members from the Data Access and Dissemination Systems Office (DADSO) and IBM, observed several sessions from a television screen and monitor in a separate room.

Results: This report documents the usability findings, including high, medium and low-priority issues. Some of the high-priority findings include the following:
- A lack of understanding of how the faceted search interface worked
- Difficulties with the geography overlay
- Confusion with the connection between the topics users had selected and what was displayed on the screen
- Search boxes were expected to function similar to a "Googlesque" search in that any query entered would return useful results
- When viewing an actual data table, users experienced some confusion over how to map, modify and view their data.

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1.0 Introduction

The user-interface (UI) is an important element to the design of a Web site. A successful UI should allow an efficient, effective, and satisfying interaction between the user and the system. This means that the UI should provide cues and affordances for users to get started quickly and find information easily. The American FactFinder (AFF), which is the major dissemination site of the Census' population and economic data, has been undergoing a complete redesign, transitioning from the legacy Web site to the new AFF Web site. The development team asked the Census Bureau's Center for Survey Measurement (CSM) Human Factors and Usability Research Group (hereafter referred to as the Usability Team) to participate in the redesign effort.

This report specifies the methods used to evaluate the fourth round of testing of the new AFF Web site. This report documents the usability results, recommendations and the responses from the AFF development team.

The main goal of this study was to determine whether the higher-functioning AFF site (still in development at the time of testing) allowed participants to easily locate information and use the new mapping and table manipulation features. Results are intended to assist the Design Team in future development of the user interface. Findings and recommendations include user accuracy, efficiency, satisfaction, and behavioral data from usability testing on the site.

This version of the prototype had some functionality, and tasks were designed to enable participants to use the available functions. Findings and recommendations will inform the sponsor and the designer(s) on areas of satisfaction as well as areas where the participants struggled while completing tasks on the AFF Web site prototype.

1.1 Background on the New American FactFinder Web site

Prior to this study, we conducted three rounds of iterative testing on the developing Web site. The first round of testing was on the conceptual design and was conducted on paper (Romano, Olmsted-Hawala & Murphy, 2009). The second and third rounds were conducted on medium-fidelity working prototypes that were not fully functioning (Romano, Chen, Olmsted-Hawala & Murphy, 2010).

This fourth round of testing was conducted on a higher-fidelity prototype than the prior rounds of testing. All the links were working, and the functionality of the site was more complete, but not all Census data sets had been loaded into the system. Thirteen tasks were repeated from earlier iterations (i.e., usability tests of the emerging design) and one new task was created to test the new functionality of the emerging design. Testing took place from March 2 to 17, 2010. The primary purpose of the fourth usability test was to assess whether participants understood how to use some of the Web site's geography selection functions.

1.2 Purpose

The primary purpose of Web site usability testing is to identify elements of the user-interface design that are problematic and lead to ineffective, inefficient, and unsatisfying experiences for

people using the Web site. When working with the fourth iteration of the AFF prototype, the focus was on whether the new functionality was working as intended, i.e., "does the organization of the interface lead users in the right direction so they can accomplish their goals?"

1.3 Usability Goals

Together with the sponsor, we defined the usability goals for the study in three categories: accuracy, efficiency and satisfaction.

Goal 1: To achieve a high level of accuracy in completing the given tasks using the AFF Web site prototypes. The user should be able to successfully complete 80% of the given tasks.

Goal 2: To successfully complete tasks in an efficient manner. The user should be able to complete search and navigation tasks in 2.5 minutes or less; and tasks involving manipulating tables and maps in 3 minutes or less.

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

2.0 Methods

Upon arriving at the lab, each participant was seated in the testing room. The test administrator (TA) greeted the participant and read the general introduction (see Appendix B). Next, the participant read and signed the informed consent form (see Appendix C). After signing the consent form and doing a practice task (from www.craigslist.org), the TA placed the task questions (see Appendix D) and the Satisfaction Questionnaire (Appendix E) on the desk beside the participant. The TA then went to the control room for a sound check. During this time, the participant completed the Questionnaire on Computer-and-Internet Experience and Demographics (see Appendix F). Upon the participant's completion of the questionnaire, the TA began video recording and the participant commenced working on the tasks.

As some tasks followed the successful completion of others, if participants did not successfully complete certain tasks, they could not attempt others. Thus, the participants in this study completed seven to 14 tasks. At the start of each task, the participant read the task aloud. While completing the tasks, the TA encouraged participants to think aloud and share their thoughts about executing the task. The think-aloud technique (Ericsson & Simon, 1980; Olmsted-Hawala, Murphy, Hawala & Ashenfelter, 2010) was used to understand the participant's cognitive processes as they interacted with the interface. If at any time the participant became quiet, the TA encouraged the participant to continue to think aloud, by using prompts such as "What are you thinking?" and "Tell me your thoughts." This method was used to maintain a running verbal commentary of the participants' thoughts as they interacted with the interface. Participants completed tasks designed specifically for this AFF higher fidelity Web

site usability study. Participants were instructed to think and interact with the Web pages on the computer screen as if the pages were fully-functioning on a Web site[1].

After completing all tasks, the TA asked the participant to complete the Satisfaction Questionnaire. Members of the Usability Team created the Satisfaction Questionnaire, which is loosely based on the Questionnaire for User Interaction Satisfaction (QUIS, Chin, Diehl, and Norman, 1988). In typical usability tests at the Census Bureau, we use 10 to 12 satisfaction items that are tailored to the particular user interface we are evaluating. In this study, the Satisfaction Questionnaire included 11 items tailored to the AFF Web site prototype. See Appendix E for the Satisfaction Questionnaire used in this study.

After completing the Satisfaction Questionnaire, the TA asked the participant debriefing questions about their overall experience with the prototypes (see Appendix G). Debriefing provided an opportunity for a conversational exchange about the Web site. The TA also asked questions based on the specific issues each participant had during the session and questions that the observers had (although the participant did not know that some questions came from the observers). At the conclusion of the debriefing, the TA stopped the video recording. Overall, each session lasted approximately 60 minutes. Non-federal employees were paid $40 each for participation.

2.1 Participants and Observers

Seven novices and one expert, with a mean age of 43.5 (range 26 – 69) participated.   Five people were recruited externally through a database maintained by the Usability Lab, two were internal Census Bureau employees, and one was an "expert user" who was at the Census Bureau for training and was recruited by a DADSO team member. See Table 1 for complete demographics and Appendix A for participants' self-reported computer and Internet experience.

Table 1. Participant Demographics

Gender		Age Range		Education		Race	
Male	5	$\leq$ 30	2	HS, GED	0	African American	2
Female	3	31-45	2	Some college, AA	2	Asian	2
		46-60	3	Bachelor's	3	White	4
		61+	1	Master's +	3		
Mean across all participants		**43.50 years***					

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

2.2. Performance Measurement Methods

2.2.1. Accuracy

After each participant completed a task, the TA rated the task as a success (1), partial success (0.5), or a failure (0). In usability testing, successful completion of a task means that the design

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[1] The only difference with this version of the site and the fully functioning site was that not all data sets were loaded into the system.

supported the user in reaching a goal. Failure means that the design did not support task completion. A successful task completion involved the participant successfully using the user interface to identify the correct piece of information on the Web site, based on the task objective. If the participant struggled to find the information but eventually arrived at the correct response, it was still considered a success. A failure was recorded when the participant was unable to identify the correct piece of information. A partial success was given to tasks that required more than one step, such that if participants completed the first step but not the second, they were given a partial success for that task. The Usability Team calculated the average accuracy score across all participants for each task and across all tasks for each participant.

2.2.2 Efficiency

Efficiency was measured by calculating the time it took participants to finish each task question. The TA noted the start and stop time for each task. After all usability tests were complete, the Usability Team calculated the average time taken to complete each task. Average times were calculated across all participants for each task and across all tasks for each participant.

2.2.3 Satisfaction

At the end of the session, each participant indicated his/her satisfaction with the prototypes using the tailored 10-item Satisfaction Questionnaire. For example, participants were asked to rate their overall reaction to the site by circling a number from 1 to 9, with 1 meaning "terrible" and 9 meaning "wonderful." The Usability Team calculated ranges and means for the various rated attributes of the Web site.

2.3. Identifying and Prioritizing Usability Problems
To identify design elements that caused participants problems in completing the tasks, the Usability Team recorded detailed notes during the usability sessions. To bolster these notes, the team used the videotape recordings from each session to confirm or disconfirm findings. By noting participant behavior and comments, we inferred the design element(s) that likely caused participants to experience difficulties. We then grouped the usability issues into categories based on priority. We assigned each problem a priority code, based on the severity of its effect on performance. The codes are as follows:
- **High Priority –** These problems brought most participants to a standstill. They were not able to complete the task.
- **Medium Priority –** These problems caused some difficulty or confusion, but most participants were 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, Recommendations and Team Responses

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

3.1 Important Report Terminology

1. Beneath. In this report, "beneath" refers to items that could not be seen on a screen because of an overlay that covered them, and thus, the items were behind the overlay.

2. Below. "Below" refers to items that were on the screen but could only be seen if people scrolled. For example, people could scroll down to see items below the fold of the page.

3.2 Participant Accuracy

The overall accuracy score was 52% across all participants. Accuracy scores ranged from 7% to 96% across users and from 20% to 86% across tasks[2]. This is a drop in the accuracy score from iteration 2 and 2.5 (See Romano et al., 2010). Typically in iterative testing the goal is to incrementally improve, however this did not happen and is a cause of concern on the current state of the usability of the new system. It appears that participants struggled the most with tasks 3a and 4a. These tasks are typical tasks that participants come to the site to do: find information on a specific geographic area (e.g., Maryland and Virginia), a topic (e.g., women in poverty), and time frame (e.g., 2005). The user-interface must be tweaked in order to accommodate these and similar common user searches. See Appendix H for user accuracy scores and Appendix D for the complete tasks.

3.3 Participant Efficiency

The average time to *successfully* complete Search & Navigation tasks was tasks was 6 minutes 48 seconds, which is longer than the goal of 2.5 minutes. The amount of time that participants had to spend to simply get started on their path to the target table or piece of information is longer than is realistic to expect users to take. Spending effort improving the initial search and navigation features of the user-interface should help improve the efficiency score. The average time to *successfully* complete Manipulating Tables tasks was 3 minutes and 26 seconds, which is slightly longer than the 3 minute goal. The average time to *successfully* complete Manipulating Maps tasks was 2 minutes and 7 seconds, which is faster than the goal of 3 minutes. See Appendix I for detailed participant efficiency scores and Appendix D for the complete set of tasks.

3.4 Participant Satisfaction

There were two types of items/scales on the satisfaction questionnaire. In the first section, participants responded about various attributes of the Web site (such as organization of the site, use of terminology, arrangement of information on screen, etc.) on a 9-point scale. In the second section, participants responded about their overall reaction to the Web site on a 7-point scale. The average satisfaction score across all participants on the first section was 5.20 out of 9 (1 = low and 9 = high), and the average score for the second section was 3.71 out of 7 (1 = low and 7 = high). None of the satisfaction question means achieved a score higher than 6.43, and one participant had an average satisfaction score of 2.70. This suggests that participants were not satisfied with the prototype. See Table 2 and Appendix J for more details and Appendix E for the complete satisfaction questionnaire.

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[2] This average does not include the five tasks that only one participant attempted and successfully completed, for which a 100% accuracy score would be uninformative.

As shown in Table 2, the lowest rated items were:
- #2: "Screen layouts: confusing – clear"
- #4: "Information displayed on the screens: inadequate – adequate"
- #6: "Tasks can be performed in a straight-forward manner: never – always"
- #9: "Overall experience of finding information: difficult – easy"

These satisfaction ratings are discussed further in the usability issues below.

Table 2. Mean Satisfaction Questionnaire Scores Across Participants

	Satisfaction questionnaire items (Scale: 1-9)										Overall reaction to the Web site (Scale: 1-7)		
	1	2	3	4	5	6	7	8	9	10	11	12	13
Mean	5.00	3.88	5.25	4.88	5.88	4.88	5.25	6.43	4.88	5.71	4.14	3.71	3.29
Overall mean	5.20										3.71		

3.5 Positive Findings
- Overall, people understood how to manipulate the maps. Tasks 4f, 4g, and 4h, the map manipulation tasks, had the highest accuracy of all the tasks.
- 86% of the participants (6 of 7) understood how to zoom in to a state on the map (task 4g). Most participants used the + magnifying glass icon, which is easily recognized by users.
- 86% of the participants (6 of 7) correctly used the Find a Location tab to find Roanoke, VA in Task 4h. This terminology is ideal in that it precisely describes what the user action will be when they click on the tab.

3.6 Usability Problems
Explanations for the performance deficits are discussed in the list of usability violations that follows. We prioritized them from high- to low-priority based on their effects on participant performance.

The usability issues deal primarily with the users' difficulties using the geography overlay and the lack of understanding in how the "Your Selections" area, including adding topics and geographies to that area was connected to their search results.

3.6.1 High-Priority Usability Problems

Testing identified a number of high-priority usability issues that we report at this time. High-priority issues have the potential to interfere with user success by bringing the user to a standstill from which they are unable to recover.

1. Users experienced many different issues with the geography portion of the user interface.
        1a. Using the geography overlay to add geographies was confusing for users.
Participants often experienced difficulties adding geographies. For example, most participants did not know that once they clicked on the state they had in fact added it to the "Your Selections" box. The lack of feedback caused participants to click on the state numerous times, but still they did not notice that the state had been added to their selections. One participant said, "I'm clicking on California and nothing is happening…I am expecting that California would

come and all the subheadings…but I have to get into California first. If I can't get into it, I can't do anything."

One participant clicked on the link to California and thought that nothing happened and then tried to figure out which region would have data on California. He said that California is on the west coast so he would click on the "West Region," but he did not notice that a change had occurred. He said, "I can't tell if anything changed."

Another participant said, "After I clicked California, I expected a table to come out. I don't see anything come out." The screen provided feedback that something was loading by displaying a small loading image; however when that closed, the page did not look like anything changed. See Figure 1. This image does not provide enough feedback to alert the user that the geography they just clicked on has been added to their selections.

Figure 1. The "Loading" feedback that participants saw after clicking on a state.

Participants did not seem to understand that they needed to add geography filters to the "Your Selections" box, and instead some tried to add in a geography using the geography overlay. Some participants typed the state name into the search field on the Name tab and then clicked "Go." See Figure 2. These participants said they expected this action to load their geography. They expressed confusion about the outcome. Participants who had seen the "Your Selections" box were confused why their state did not pop up in that area. One participant said, "Why didn't it appear in my selections?"
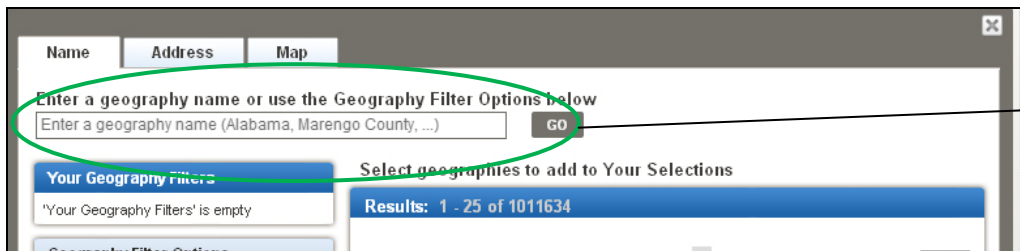
Participants used the search box in the geography overlay to select geographies, but when doing so, the geographies never appeared in "Your Selections."

Figure 2. Geography overlay search box.

1b. Users do not see the search results that load beneath the geography overlay.
The geography overlay that appears when users click on the Geographies tab on the main page is very large and obscures the search results that are beneath it. When participants added a topic using the geography overlay, they often missed that the results, which were beneath the overlay, had been updated based on their action. Most participants did not close the overlay, and thus were prevented from navigating forward. They did not use the "x" in the upper-right corner of the overlay that would close the overlay and allow them to see results. See Figure 2.

When participants used the geography overlay, they selected items to narrow their search. When they did this, the geography search results (in the overlay) changed. Since participants could not immediately see the results and did not quickly realize that the geography overlay

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could be closed, they often said that they thought the results shown within the geography overlay were the (main) search results. For these participants, when no results were shown in the geography overlay, they concluded that there were no search results. See Figure 3. Other times, participants noticed search results that were visible below the geography overlay. Participants believed that those were the only search results available to them and looked only through those results. See Figure 4. One participant said, "Somehow this page covers the information. I'm trying to see the… I can only see a few tables… but it's not relevant." Here, the participant noticed that there were data beneath the geography overlay but he did not know how to bring it to the forefront. The participant also believed that the content was not relevant to his search because he only saw the links that were exposed below the geography overlay rather than the ones at the top of the list which might have been more relevant to his search.

Participants could not see the results that were beneath the geography overlay.

Upon selecting geographies, the geography search results changed, and participants thought these were the main search results.
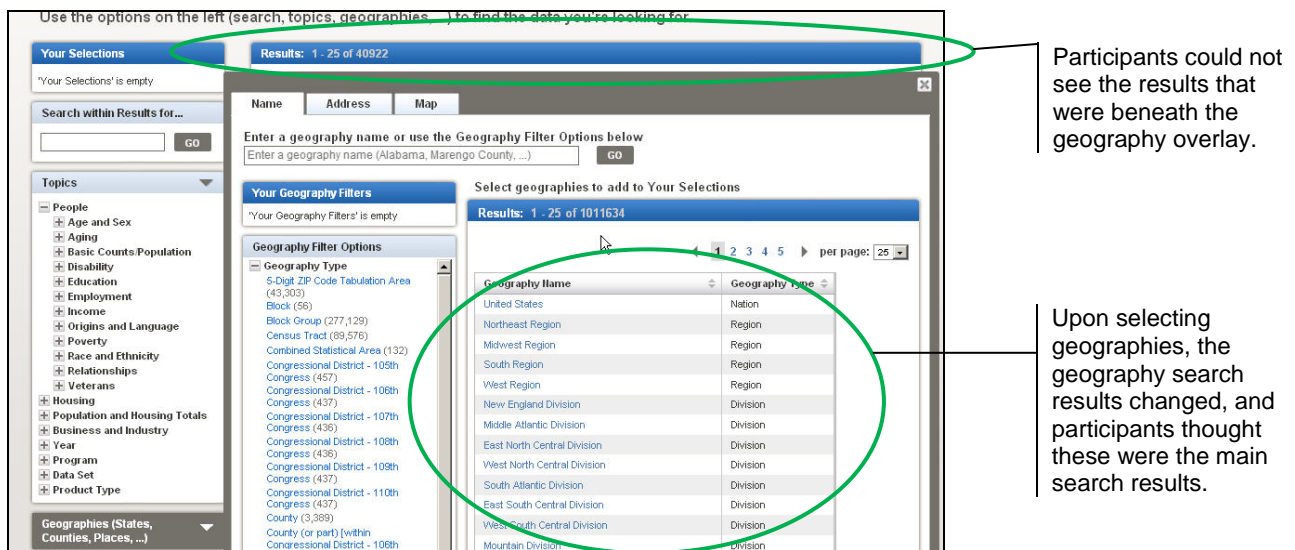
Figure 3. Geography overlay covers the results, and users cannot see that the results are updated/changed.

When participants noticed the results below the geography overlay, they thought these were the *only* results.
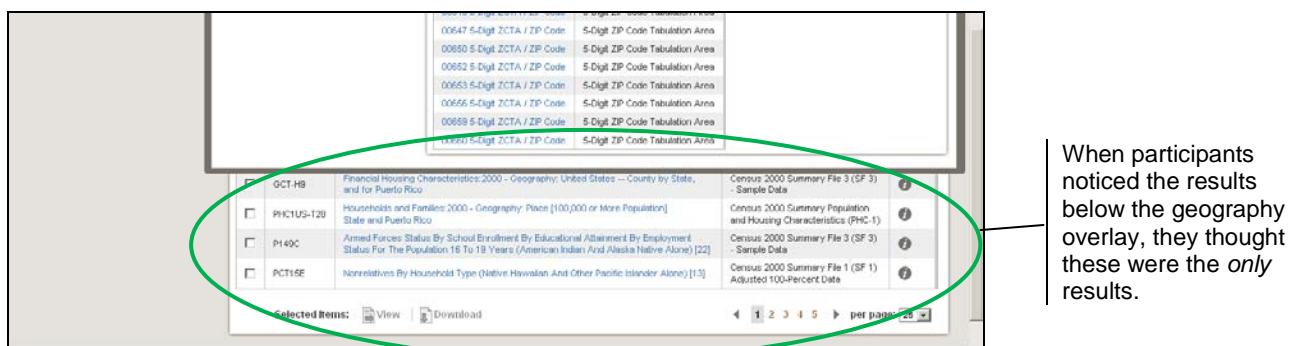
Figure 4. Sometimes participants noticed the results below the overlay and thought these were all of the results.

In contrast, one participant figured out pretty quickly that the geography feature was an overlay. He said, "I see the results in the background. Will I be able to access this [geography filter] later on? I'm pretty sure. I'll have to try to 'x' it." The participant then closed the overlay and was able to see the data. Even this participant, who was very comfortable with the interface, wondered initially if he would be able to get the screen back up. Another participant figured out that he had to close the overlay but not upon initial interaction with the site.

1c. Users do not know they can choose multiple geographies. Initially not all participants understood that they could select more than one geography at a time. Some participants started by selecting only one geography (i.e., adding only CA or TX rather than adding in both CA and TX at the same time). Eventually some participants figured out that they could add multiple geographies. For example, one participant said, "I wonder if I can do CA and TX?" This confusion is likely due to the fact that only one geography can be entered into the search on the front page and because the geography overlay was confusing for participants. This is problematic considering users need more than one geography to create a map, so this issue will likely lead to frustration and confusion in later steps.

Recommendation: Make the geography overlay smaller, either by making it narrower or pushing it lower on the page. Consider creating an "intermediate" state for the geography overlay between open and closed or automatically minimizing the geography overlay once a filter has been selected. In addition, consider changing the way the other filters work, such that they *all* open to the right of the tabs on the main page. Users expect consistency within a Web site, and right now, the geography filter does not work the same way that the others do. This is confusing and frustrating for users.

Team Response:
- For each overlay there is now a caption at the top left that tells what it is.
- The overlay was moved down a bit so users may see the first search result.
- The overlay was made a little more transparent so users may see that there is information beneath the overlay.
- Once users click on another item in the far left-hand column, the overlay is automatically closed.
- When users select (by clicking) a geography, there will be an animation moving it from where it was clicked over to the "Your Selections" area of the screen.
- The most often selected geographies will be at the top of the overlay.
- There is a checkbox in front of each geography that the user wants to load (this may indicate to users that they can select more than one).
- There will be a tutorial on how to use the geography overlay.

2. "Your Selections" is not intuitive for users. Participants did not seem to understand how "Your Selections" connected to the other parts of the site. Adding filters to "Your Selections" was confusing for participants. For example, when a subject from Topics was added to the "Your Selections" box, participants were confused when that subject area disappeared from the Topics list. Participants also did not seem to understand when geographies were added to the "Your Selections" box. One possibility for confusion is that two separate but similar boxes are used: a geography filter in the geography overlay and the "Your Selections" box. The connection between these two tools does not seem to be well understood by participants.

Another issue is that the "Your Selections" box did not behave ideally when participants used the back button in the browser. For example, newly added filters disappeared from the "Your Selections" box when the participant hit the back button, and filters that were supposed to be removed were no longer removed when the participant hit the back button.

One participant mentioned that he did not understood what the "x" icon stood for (shown on the upper left side of Figure 5).

Recommendation: Consider using a hover tool tip that says "remove" when the user hovers his/her mouse over the "x" icon or replacing the icon with a link labeled "remove."

Consider having the "Your Selections" box move with the screen so users will always see it on the screen, no matter where they are. This feature is on other sites where something "floats" on the screen, even when the user scrolls down the page.

Team Response:
- Items that are being added into the "Your Selections" box are having animation added to them so that each time a user clicks a topic, whatever topic they have clicked will move to the "Your Selections" box. The Design Team demonstrated this to the Usability Team, and it appears to be an effective way to show users what is happening.
- The "Your Selections" Box will only work if users navigate back to it from deeper in the site with the "Back to Search" results. The Design Team made this link like a breadcrumb and it is more noticeable, but they cannot do anything about the use of the browser's back button.

3. Users experience many usability issues with the different search interfaces.

3a. Users want to search for a specific address with the main Search box. Most participants used the "Start Here" search navigation box in the middle of the main page to search for information about a specific address, thus failing the task and missing the address search feature on the far right-hand side of the screen. See Figure 5. One participant noticed and used the "Address Search," but she did so after she had moved on to a different task and had failed Task 2, which asks for information on a specific address.

In the geography overlay, not all participants noticed the address search tab. Some participants tried to search for the address when still in the default "Name" tab. For example, one participant typed the address into the search on the geography overlay "Name" tab, rather than on the "Address" tab. Another participant did the same thing, but eventually, after nine minutes of working on the task, he noticed the "Address" tab in the geography overlay. Of the participants who noticed the "Address" tab, most did not immediately use it to answer Task 2, and some never used it at all.

Participants were more likely to enter the address by using the Start Here box than to use the Address Search on the main page.
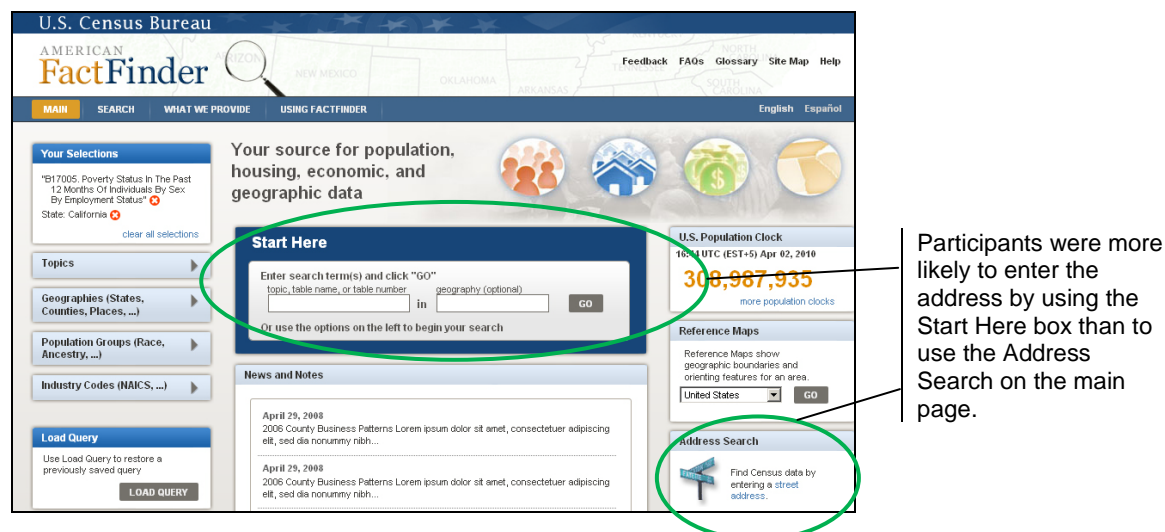
Figure 5. Main page of the AFF prototype.

3b. The "search within" tool was not intuitive for users. When the geography overlay did not work, participants used the "Search within results for…" to try to get to their geography. The results were often less robust when participants used this feature. Some did not seem to realize that it was a tool to search *within* results instead of a general search tool. Participants seemed to treat it in the same way as the search tool on the main page.

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Participants saw the search interface and immediately tried to conduct a search typical to a Google search.

Recommendation: Consider adding an address search function to the main Start Here box or allowing addresses to be searchable within the current search framework. Consider moving the "search within" tool closer to the results list so that the association between the two is clearer. Allow the search fields to accept Google-like searches.

Team Response
- At this time the search on the Main page is not able to be matched with the Address search—due to issues on the back end (indices).
- There was no change planned for the tabs on the overlays; the Design Team plans to see if this is still an issue in the next iteration of testing.
- The Design Team is considering moving the "search within" tool to the right where the overlay results are so users associate the search with the correct content.

4. There were usability issues with the "Topics" area of the interface.

4a. The "Topics" section did not match users' expectations. When a participant double-clicked on a topic in this prototype, it moved from the topic list up to the "Your Selections" box. Not all the participants in this study noticed this change on the screen. Some participants were surprised that the selected topic seemingly had disappeared, which led some to believe that they could not choose it. For example, after clicking on the "income household and families" topic, one participant said, "Where did it go?" The topic had been loaded into the "Your Selections" box, but the participant did not notice, and he was confused why the topic he had just clicked was gone. Another participant said, "I don't know what just happened." After he clicked on the "education" topic, it moved up to the "Your Selections" box and disappeared from the Topics list.

One participant said, "I clicked on 'education' and it says 683. I don't think… nothing new came up. I don't see anything on education that came up." The participant, at this point, gave up on education and California and said, "Maybe I should try Texas." This participant had the geography overlay open and saw neither the "Your Selections" box nor the results beneath the overlay.

In addition, participants were confused when the entire topic list disappeared. This occurred when a participant added a topic to their selections. For example, when a participant double clicked on "earnings" or "age and sex" and "aging," the entire "Topics" list disappeared. See Figure 6. One participant said, "I clicked on 'income' and all that info [the topics section] went away." He was confused and continued, "There was stuff here… the categories… I'm trying to see if I minimized them or something."

Some participants were also confused about the number in gray parentheses immediately following topic names. It was not immediately obvious that it referred to the number of data tables related to the specific topic.
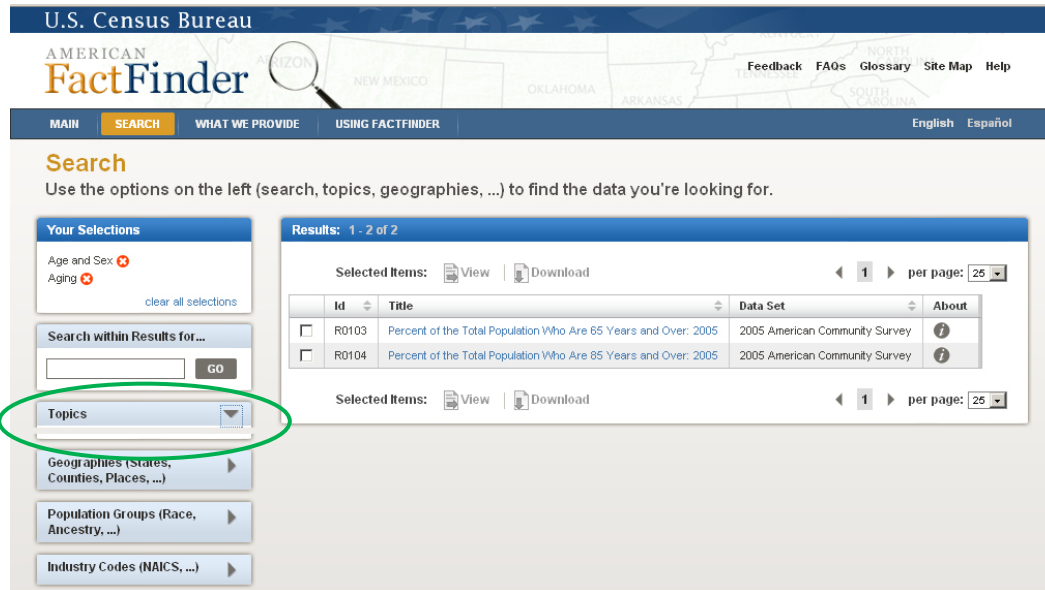
Figure 6. Screen shot of the main page with "Age and Sex" and "Aging" selected from the topic list. All the topic options have disappeared.

4b. Users experience confusion with the results list after adding different topics to the "Your Selection" area. When a participant added the topic 'poverty' to his results, the initial list of tables was not relevant. The first table was a PUMS and the next eight tables all said "imputation of poverty status…" This confused the participant who said he did not know why the imputation tables came out and he said that "most people who do a search on poverty are interested in knowing the number of people below poverty." Basically, the results list did not appear to highlight the most relevant or most common tables.

Recommendation: Consider adding an icon (e.g., a checkmark) next to the selected topics so that users can see which topics have already been selected rather than having items disappear when they are added to the "Your Selections" box. Make the most common data tables for each topic appear at the top of the list. Rank the plethora of "imputation tables" lower so that they don't appear so readily.

Team Response
- The previously mentioned animation of moving the item that was clicked in the topics section up to the "Your Selections" should aid users to know where their topic is going.
- It is possible that if users could see the search results being refined and updated with their selections that the gray numbers in parenthesis may be understood, as well as the connection between the topics and the results list.
- During testing, the table lists were not sorted by relevancy. The Design Team is currently working on the "relevancy rules." It is possible that the tagging (e.g., metadata) of the tables needs to be re-evaluated.

5. Users experience a number of issues with the Maps section of the site.
5a. Participants were confused about the default hand icon on the Map View page. The default icon on the map view page is the hand icon which, for this prototype, functioned as an "identify" icon. However, users are familiar with Google Maps, Google Earth and other similar programs, which also have a hand icon, but with a different function. In Google Maps, for example, once a map loads, the user can use the hand icon to immediately move the map to

their area of interest. Having the identify feature as the initial default is not what users expect.
See Figure 7.
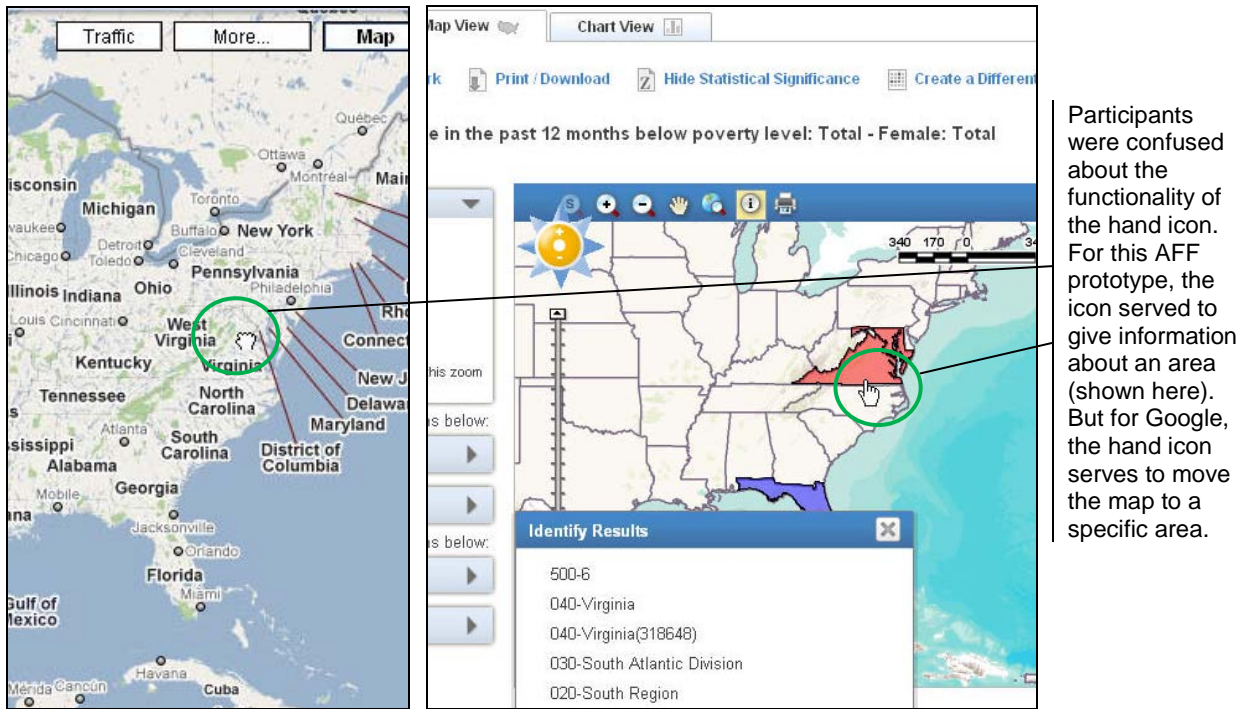
Figure 7. Screen shots of Google Map (left panel) and AFF map (right panel).

Team Response

- This was a bug in the higher-fidelity prototype and will be corrected before the final release.

5b. Participants wanted to map one geography, but the system did not allow it.
Frequently, participants wanted to map one geography, but they got an error message that told them, "Single geo cannot be mapped." See Figure 8. This message does not make sense to users who assume they should be able to obtain maps of one geography. The error message also does not show users what to do to fix the problem to create a map. This leaves them feeling frustrated and believing that the site cannot create maps. Finally the word "geo" is not a word that people know as it is internal jargon.
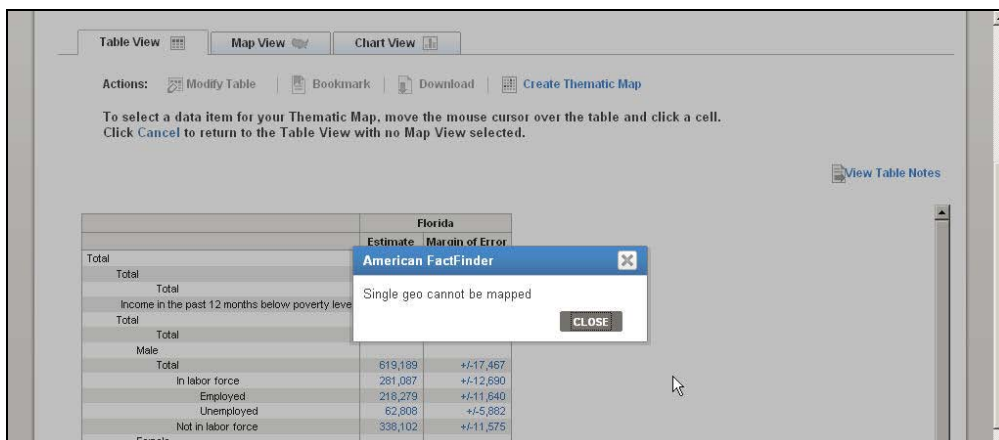
Team Response
- The system *only* allows two or more geographies to be mapped at this time.
- The Design Team felt it was possible the task question needed to be reworded. They thought the task was giving the impression that one geography *could* be mapped.
- The error message will be reworded to:
  a) Give instructions on what the user needs to do (e.g., how the user needs to have more than one geography on the page).
  b) The internal word "geo" will be spelled out.

5c. Users do not know when the map is loading something. Participants frequently made a selection over and over again because they believed nothing was happening. In actuality, the map was just taking a long time to load. However, since the map's "working" indicator (to show that a map is being loaded) is not prominent enough, participants did not receive that feedback. See Figure 9.
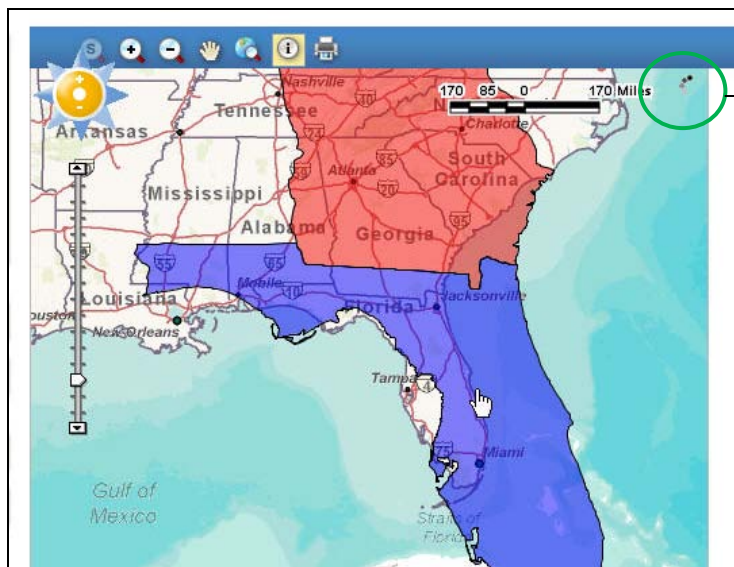
Participants did not see the indicator that something was loading.

Figure 9. Screen shot of an AFF map. The participant clicked on the map and the information is loading.

Recommendation: Instead of being hidden in the top-right corner of the map, the loading indicator should be in the center of the map, and more clearly indicating loading.

Team Response
- The icon will be replaced with the standard loading icon that is used in other places throughout the site.

5d. The instructions on how to create a map are not clear. Most participants first clicked on the "Map View" tab to create a map. Once the TA informed them that that tab would not be available in the final product (as agreed to, under the assumption by all team members that this was a temporary bug in the system), many participants said they would click on the "Create a Thematic Map" button. One participant questioned the meaning of "thematic."

Once the "Create a Thematic Map" function was activated, participants often did not know how to click on a data cell to map it.

Often, participants thought the page had not changed after they clicked on "Create a Thematic Map" button. They clicked the button multiple times, thinking that the page had not responded. If they eventually figured it out, many did not know how cancel that function. They clicked on the "Create a Thematic Map" button again and again. Some finally read the statement that instructs them to click "Cancel," but some did not. See Figure 10.
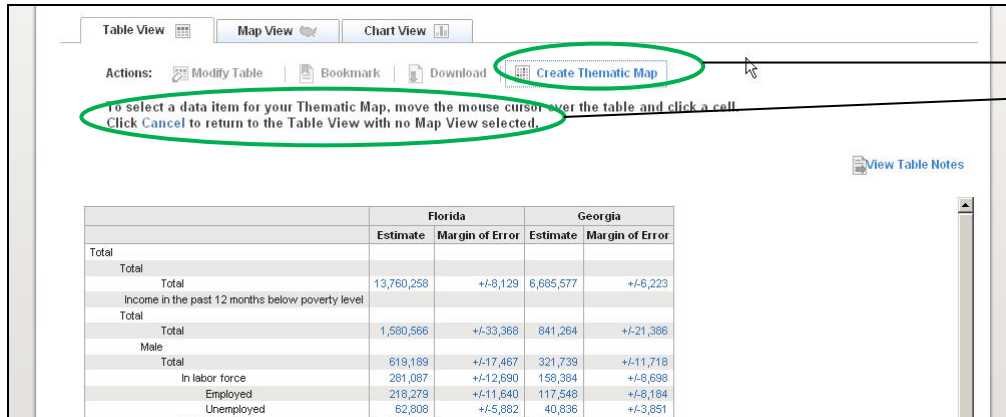
Participants clicked on Create a Thematic Map to cancel function before reading the instructions.

Figure 10. Screen shot of the Table View page.

Recommendation: Surround the directions for selecting a data cell to map with a call-out bubble like the one used for the Modify Table function.

Team Response
- The connection between the "Create Map" button and the instructions will follow what is done on the Modify Table function.
- The word "thematic" will not be used, not even in the instruction.
- The instructions will be more clear and succinct—not in sentence form but rather in bulleted format.
    e.g.:
    To select a data item:
    1. Move the mouse cursor over the table
    2. Click a cell
    3. Click Cancel to return to Table view.

6. Participants frequently used the Browser's back button. Many users frequently used the browser's back button to navigate. When users' did this, they lost the items that they had searched on, which means that all the time they spent looking through the faceted search and choosing carefully their search queries was lost. Users expected that the application would continue to have their search queries when navigating back using either the interface back button or the browser's back button

Recommendation: Allow the user to be able to use the browsers back button without losing their search items.

Team Response
- The Design Team said they cannot do anything about the use of the browser's back button.
- As was mentioned in Team Response 2 above: The "Your Selections" Box will only work if users navigate back to it from deeper in the site with the "Back to Search" results. The

Design Team made this link like a breadcrumb and it is more noticeable, but they cannot do anything about the use of the browser's back button.

3.6.2 Medium-Priority Usability Issues

7. Headers disappear when users scroll to view data in tables. When viewing a data table, users must use the table scroll bar to scroll down to see data on the lower parts of the table. When participants did this in testing, the table column headers disappeared. The scrolling is problematic for a couple of reasons. First, there is so much information at the top – scrolling pushes all the content down. Second, there are two different scroll bars, and it makes it difficult to look at the actual data in the table. See Figure 11.

Figure 11. Screen shot of the table view page. The participant has scrolled down to see the bottom of the table, but the table headers disappear. Notice the page scroll bar, in addition to the table scroll bar.

Recommendation: Freeze the table headers so they don't disappear when the user scrolls.

Team Response
- This was a bug in the testing and will not be in the next release.

8. Icons on the Modify Table view are unclear. The "+" and "-" icons on the Table View page when "Modify Table" is selected were unclear to participants. These icons are intended to allow users to manipulate which data appear on the table, but participants were confused, even after some looked at the legend. See Figure 12.

Figure 12. Screen shot of table view page when "Modify Table" function is active.

	Florida		Maryland		Virginia	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total						
Total						
Total	13,760,258	+/-8,129	4,201,577	+/-4,916	5,646,636	+/-7,241
Income in the past 12 months below poverty level						
Total						
Total	1,580,566	+/-33,368	314,079	+/-16,162	512,866	+/-15,566
Male						
Total	619,189	+/-17,467	117,303	+/-8,022	194,238	+/-8,289
In labor force	281,087	+/-12,690	57,747	+/-5,536	86,801	+/-5,605
Employed	218,279	+/-11,640	42,086	+/-4,272	66,425	+/-5,431
Unemployed	62,808	+/-5,882	15,661	+/-3,169	20,376	+/-2,437
Not in labor force	338,102	+/-11,575	59,556	+/-5,227	107,437	+/-6,108
Female						
Total	961,377	+/-20,929	196,776	+/-10,655	318,648	+/-10,151
In labor force	351,344	+/-11,557	82,055	+/-6,921	125,336	+/-6,413
Employed	267,947	+/-10,491	60,081	+/-4,988	94,166	+/-5,282
Unemployed	83,397	+/-5,654	21,974	+/-3,884	31,170	+/-3,464
Not in labor force	610,033	+/-17,754	114,721	+/-6,913	193,312	+/-8,055
Income in the past 12 months at or above poverty level						
Total						
Total	12,179,692	+/-34,664	3,887,498	+/-16,417	5,133,750	+/-16,230
Male						
Total	5,981,180	+/-19,727	1,863,948	+/-8,401	2,500,827	+/-10,731
In labor force	4,224,918	+/-24,195	1,447,792	+/-11,195	1,931,032	+/-12,467
Employed	4,029,299	+/-24,987	1,378,179	+/-10,792	1,856,104	+/-12,769
Unemployed	195,619	+/-7,509	69,613	+/-4,523	74,928	+/-4,529

Source: U.S. Census Bureau, 2005-2007 American Community Survey

Participants were confused about the functionality of the "+" and "-" icons.

Team Response:
- The Design Team decided to add hover tool tips to the icons to clarify what each is and does.

9. Topic Links looked clickable. In the left-hand navigation buttons, participants tried to click on the link labels before they tried clicking on the arrows. One participant said, "I tried to click on the name but I guess I have to click on the arrow."

Recommendation: In the left-hand navigation buttons, instead of just having the arrows clickable, make the link labels clickable (e.g., topics, geographies, population groups, etc.).

Team Response:
- This has been done.

10. Topic labels confused participants on what content was available. At least two participants thought they could find gender information (male/female) by searching in the population groups tab.

Recommendation: Consider adding in examples that highlight what types of content is encompassed within the label, as is done on the legacy site.

Team Response:
- This is on the list of things to do.

3.6.3 Low-Priority Usability Issues

11. The bookmark label did not function as participants expected. Most participants did not use the load query function; most chose 'download' instead of 'bookmark.' It was not intuitive that 'bookmark' would load the query.

Team Response
- The Usability Team needs to check the task question to make sure we were asking for a bookmark or a download.
- The Design Team suggests this issue might have been a problem with the task wording.
- The bookmarking will now work on the data table; it wasn't functioning previously.

12. The "Data Classes" section, on the legend, was confusing for participants. The numbered information does not have commas, and it is hard to know what the numbers are actually representing on the map. One user wondered, "What does the number 846727-846727 mean?" In addition, the red and the blue colors are the default colors for the legend, and this might hold political implications for some users when the Census Bureau is not implying that at all. See Figure 13.

Figure 13. On the Legend, the "data classes" section can be confusing because there is no context for what the numbers represent, and there are no commas within the numbers.

Recommendation: Indicate, near the legend, what the numbers represent. This will remind users what cell they just clicked on.

Team Response:
- Commas have been added.
- The label that tells what the data classes is appears just below the word Data Classes in regular (not bolded) font.
- The default color is in the green family, not red and blue.

4.0 Discussion

There is some amount of learning that has to take place for users to be able to use the Web site. For the more Web-savvy users, by approximately the third task, they were able to add and take away topics of interest and were more willing to try to work with the table and map features. The less Web-savvy users needed more guidance and were slower to explore some of the different features of the site, if they did at all. Many of the participants never really understood how the geography overlay worked, how the geography they had chosen was then moved to the "Your Selections" area of the screen, as well as how the results updated beneath the geography overlay. This confusion on the basic functioning of the faceted search functionality of the site led to higher task failures than had been seen in earlier iterations (See Romano et al., 2010).

Usability testing of the higher-fidelity version of the new AFF Web site identified numerous high-priority issues that impeded users from completing tasks and several medium- and low-priority issues that interfered with user performance. The Design Team's responses to the different findings highlights that the team recognizes these issues are important to fix. Attempts to address these issues will be made before the next round of testing is planned. Further iterative

testing is recommended to verify whether these new fixes increase user performance or lead to additional decrements.

During Iteration 3 testing, the challenges many participants faced (with the geography overlay and not connecting how the faceted search works) were so great that changes made after Iteration 2.5 testing could not be evaluated, due to lack of data (i.e., users did not progress far enough into the system). For example, after Iteration 2.5 and the challenges users had in adding new geographies and data to their table, the Design Team agreed to make modifications to draw the users' attention to the "Back to Search" area, since this was the only way that users would be able to modify their table to include new data or new geographies. In Iteration 3 testing, we did not collect enough information to see if the tweaks made after Iteration 2.5 testing had in fact solved the problem. Thus, in order to evaluate whether the recommended fixes in this report and those identifies in earlier reports were successful, additional iterative testing must be done. Furthermore, as new designs emerge, the Usability Team recommends continuing iterative usability testing to refine the design and to minimize user obstacles when finding and understanding Census data. With future rounds of testing planned on the emerging design, the team members strive to incrementally improve the usability of new version of the AFF.

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Appendix A. Participants' Self-Reported Computer-and-Internet Experience and Demographics

Participant	Hours per day online	Scale: 1 (no experience) – 9 (very experienced)		Scale: 1 (not comfortable) – 5 (comfortable)				Scale: 1 (never) – 5 (very often)					Scale: 1 (not familiar at all) – 5 (very familiar)	
		Overall experience with computers	Overall experience with Internet	Comfort in learning to navigate new Web sites	Comfort in manipulating a window	Comfort in using and navigating the Internet	Comfort in providing personal info online	How often working with data on a computer	How often working with complex analyses of data with a computer	How often use Internet to find information	How often use Internet for personal reasons	How often use Internet for business	How familiar with the Census Web site (location, tools, data, etc.)	How familiar with AFF Web site?
1	1-3	7	7	4	4	5	3	5	4	5	3	4	5	5
2	4-6	7	9	5	5	5	4	4	4	5	5	5	1	1
3	1-3	4	4	5	4	3	2	5	5	4	2	3	2	1
4	4-6	6	4	3	4	3	2	3	1	5	5	4	1	1
5	1-3	6	5	4	4	3	5	4	2	4	4	2	1	1
6	1-3	9	9	5	5	5	5	5	3	5	5	5	2	3
7	1-3	8	8	5	5	5	4	3	2	4	4	2	1	1
8	4-6	8	8	5	5	5	4	5	5	5	5	4	2	1
Average across all participants		6.88	6.75	4.50	4.50	4.25	3.63	4.25	3.25	4.63	4.13	3.63	1.88	1.75

Appendix B. General Introduction

Thank you for your time today. My name is ----, and I will be working with you today. We will be evaluating a new design of the American FactFinder Web site 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 well the site works.

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 American FactFinder Web site prototype. 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. As you work through the tasks today I am going to be in the other room, but we will still be able to communicate through the microphones and speakers. This is your microphone. 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 hour, I will ask you to work on 4 tasks. I would like you to tell me your impressions and thoughts about the Web site as you work through the tasks. I would like you to "think aloud" and talk to me about your decisions. So if you expect something to happen, tell me what you expect. If you expect to see some piece of information, tell me about what you expect. This means that as you work on a task, talk to me about what you are doing, what you are going to do, and why. Since this is an early prototype, only some of the links and buttons work. Tell me what you would do and expect to happen even if the link or button doesn't work. You may not be able to find a solution to every task, and during some tasks, I will stop the task you are working on and move you onto the next task. Remember, you cannot make a mistake. The tasks are not intended to grade you or access your knowledge. Rather the tasks are intended to evaluate the Web site. Where the site works for you great, and where it doesn't work for you great. Do you have any questions? We'll do a brief practice on thinking aloud right now.

[Do Practice on Thinking Aloud]

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 information you are looking for please state your answer aloud. For example, say, "My answer is ---" or "This is my final answer." After each task, I will return you to the homepage where you can begin the next task.

Please remember to begin each task by reading the task question aloud as well as stating your final answer. Also, as you work, please remember to think aloud.

Appendix C. Consent Form

Consent Form
For Individual Participants
Usability Testing of the American FactFinder Web Site

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

You have volunteered to take part in a study to improve the usability of the American FactFinder 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. Only staff directly involved in the research project will have access to the tapes. Your participation is voluntary and your answers will remain strictly confidential.

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

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

Participant's Name: _____

Participant's Signature: _____   Date: _____

Researcher's Name: _____

Researcher's Signature: _____   Date: _____

Appendix D. Tasks and Ideal Actions

Note: I1=Iteration 1; I2=Iteration 2; I2.5=Iteration 2.5

1a. (modified from I1) Your friend recommended this American FactFinder site to you. Here is the Main page. Look for as much information as possible in California and Texas, including education, income, children, families, language, poverty, and elderly.

1b. You decide that there is just too much information here. Narrow your results to just California. (Tell P to view results.)

1c. Now, continue to narrow your results to just poverty and education in CA.

Ideal Action(s): Topics tab and Geographies tab

2. (repeated from I1 and I2) You are interested in finding information about a neighborhood that your sister used to live in. You want to get as much information as you can about the area where she lived in 2005. At that time, she lived at 4237 Peapod Lane, Norfolk City, VA, 23501. How would you find all the available information about that neighborhood?

Ideal Action(s): Geographies tab→ Address tab → Type address → Go OR Address Search on lower right side of the main page   *The address search will not work because the address is not loaded… a success is just getting to the address search function*
Note: Searching on main page will NOT work and is incorrect.

3a. (modified from I1, I2, and I2.5) You are doing a report on education in the United States and want to know how many men in California and Texas were White and college educated in 2005.

3b. Is there a way to visualize this information?

Ideal Action(s): Topics tab OR Geographies tab OR Population tab OR use Start Here search
Note: This task can be performed to the end to the table and the map.

4a. (modified from I1 and I2) For a project you are working on, find information on women in poverty in Maryland and Virginia in 2005.

Ideal Action(s): Topics tab (to select poverty and sex/and or age with woman) and Geographies tab (to select states MD and VA) and Year (to select 2005)
Note: Can be performed to the end. For the rest of the tasks, B17005 is needed.

4b. (modified from I2.5) Now you decide that you are interested in the same information for Washington DC and Florida. How would you add this information to your table?

Ideal Action(s): Back to search →Geographies tab

4c. (repeated from I2; modified from I2.5) Now you don't want to see the information for males. What would you do to simplify these results?

Ideal Action(s): Modify Table → Uncheck checkboxes for male rows

4d, *if 4c is a success.* (repeated from I2) Now you decide that males are important for your project. How would you get that information back on the screen?

Ideal Action(s): Show Hidden Rows/Columns → check the boxes → Hide Table Tools

4e. (modified from I2) Now you would like to see a map of the number of females in poverty. How would you make a map with your results?

Ideal Action(s): Create a Thematic Map; Select top cell (not M/F)

4f, *if 4e is a success.* (modified from I2.5) You are currently looking at a map of females in poverty. How would you view a map of the same information but for males?

Ideal Action: Create a Different Thematic Map or Table View → Create a Thematic Map

4g. (repeated from I2) How would you zoom in to include only Washington DC on your map?

Ideal Action(s): Use the zoom in magnifying glass icon OR zoom in using the map slider AND clicking and dragging the map using the hand tool OR Find a Location

4h, *they did not use Find a Location in 4g.* (repeated from I2) You want to see a map of Roanoke, VA, but you don't know where it is. How would you see where it is on the map?

Ideal Action(s): Select Find a Location → Enter Roanoke, VA in the search box

4i. Now you decide that it is late and you want to go home. But you plan to come back tomorrow and know you will want to access the same exact search results. What would you do?

Ideal Action(s): Download OR Bookmark OR Bookmark → Save Query (only from Table page, NOT Map page)

4j. (If Participant chooses Save Query) Now you'd like to retrieve your information.

Ideal Action(s): On main page: Retrieve Query

Appendix E. Satisfaction Questionnaire

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

1. Overall reaction to the Web site:

    terrible   wonderful
    1 2 3 4 5 6 7 8 9 not applicable

2. Screen layouts:

    confusing   clear
    1 2 3 4 5 6 7 8 9 not applicable

3. Use of terminology throughout the Web site:

    inconsistent   consistent
    1 2 3 4 5 6 7 8 9 not applicable

4. Information displayed on the screens:

    inadequate   adequate
    1 2 3 4 5 6 7 8 9 not applicable

5. Arrangement of information on the screen:

    illogical   logical
    1 2 3 4 5 6 7 8 9 not applicable

6. Tasks can be performed in a straight-forward manner:

    never   always
    1 2 3 4 5 6 7 8 9 not applicable

7. Organization of information on the site:

    confusing   clear
    1 2 3 4 5 6 7 8 9 not applicable

8. Forward navigation:

    impossible   easy
    1 2 3 4 5 6 7 8 9 not applicable

9. Overall experience of finding information:

    difficult   easy
    1 2 3 4 5 6 7 8 9 not applicable

10. Census Bureau-specific terminology:

    too frequent   appropriate
    1 2 3 4 5 6 7 8 9 not applicable

11. Overall reaction to the Web Site

    Terrible   Wonderful
    1 2 3 4 5 6 7

    Frustrating   Satisfying
    1 2 3 4 5 6 7

    Difficult   Easy
    1 2 3 4 5 6 7

Additional Comments:

Appendix F. Questionnaire on Computer Use, Internet Use and Demographics

Check (X) for all that apply.

1. Do you use a computer at home or at work or both?
    >   ___ Home
    >   ___ Work
    >   ___ Somewhere else, such as school, library, etc.

2. If you have a computer at home,
    >   a. What type of internet connection do you use at home?
    >   >   ___ Dial up
    >   >   ___ Cable
    >   >   ___ DSL
    >   >   ___ Wireless (Wi-Fi)
    >   >   ___ Other _____
    >   >   ___ Don't know
    >
    >   b. Which browser do you typically use at home? Please indicate the version if you can recall it.
    >   >   ___ Firefox _____
    >   >   ___ Internet Explorer _____
    >   >   ___ Netscape _____
    >   >   ___ Google Chrome
    >   >   ___ Safari
    >   >   ___ Other _____
    >   >   ___ Don't know
    >
    >   c. What operating system does the home computer you typically use run in?
    >   >   ___ MAC OS
    >   >   ___ Windows 95
    >   >   ___ Windows 2000
    >   >   ___ Windows XP
    >   >   ___ Windows Vista
    >   >   ___ Windows 7
    >   >   ___ Other _____
    >   >   ___ Don't know

3. On average, about how many hours do you spend on the Internet per day **total**?
    ___ 0 hours   ___ 1-3 hours   ___ 4-6 hours   ___ 7or more hours

4. On average, about how many hours do you use the Internet per week **total**?
    ___ 0 hours   ___ 1-3 hours   ___ 4-6 hours   ___ 7or more hours

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

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

6. Have you ever filled out a survey on the Internet?
    >   ☐ Yes   ☐ No

a. If yes, about how many surveys do you think you have filled out on the Internet?_____
b. If yes, have you filled out a survey on the Internet in the last two months?
    >   ☐ Yes   ☐ No

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

_____

8. Please rate your overall experience with the following:
   Circle one number.

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

9. What computer applications do you use?
   Check (X) for all that apply.
   ___ E-mail
   ___ Internet
   ___ Word processing (MS-Word, WordPerfect, etc.)
   ___ Spreadsheets (Excel, Lotus, Quattro, etc.)
   ___ Databases (MS-Access, etc.)
   ___ Accounting or tax software
   ___ Engineering, scientific, or statistical software
   ___ Other applications, please specify_____

Please circle one number for each question below.	**Not at all Comfortable**				**Very Comfortable**
10. How *comfortable* are you in learning to navigate new Web sites?	1	2	3	4	5
11. Computer windows can be minimized, resized, and scrolled through. How *comfortable* are you in manipulating a window?	1	2	3	4	5
12. How *comfortable* are you using and navigating through the Internet?	1	2	3	4	5
13. How *comfortable* are you in providing personal information through the Internet?	1	2	3	4	5

	Never				**Very Often**
14. How *often* do you work with any type of data using a computer?	1	2	3	4	5
15. How *often* do you perform complex analyses of data through a computer?	1	2	3	4	5
16. How *often* do you use the Internet or Web sites to find information? (printed reports, news articles, data tables, blogs, etc.)	1	2	3	4	5
17. How *often* do you use the Internet for personal reasons (e.g. Facebook, blog, etc.)?	1	2	3	4	5
18. How *often* do you use the Internet for business (e.g. online banking, etc.)?	1	2	3	4	5

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	Not at all Familiar				Very Familiar
19. How *familiar* are you with the Census Web site (location, tools, terms, data, etc)?	1	2	3	4	5
20. How *familiar* are you with the American FactFinder Web site?	1	2	3	4	5

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21. What is your date of birth? _____

                                            month   year

22. 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 degree (MA/MS)
        i) [ ] Professional degree
        j) [ ] Doctoral degree

        For options D through J above, indicate area of study: _____

23. What is your gender?

_____ Male   _____ Female

24. Do you consider yourself to be of Hispanic, Latino, or Spanish origin?
(Optional. We ask this question to ensure a diverse sample of people is in each study.)

_____ Yes   _____ No

25. What is your race? Choose **one or more** races.
 (Optional. We ask this question to ensure a diverse sample of people is in each study.)

_____ White
_____ Black or African American
_____ Asian
_____ Native Hawaiian or Other Pacific Islander
_____ American Indian or Alaska Native

_____ Other (please specify) _____

Appendix G. Debriefing Questions
Part A:
Ask about items on the Satisfaction Questionnaire which the participant has rated the Web site to be particularly high or low.

Part B:
1. What did you like best about the site / prototype?

2. What did you like least about the site / prototype?

3. Is there anything that you feel should be changed?

4. Is there anything you would like to mention that we have not talked about?

Appendix H. User Accuracy by Task

Tasks

Participant	Search and navigation							Manipulating tables			Create map	Manipulating maps			Save and upload query		Mean by participant
	1a	1b	1c	2	3a	3b	4a	4b	4c	4d	4e	4f	4g	4h	4i	4j	
1	0.5	skip	skip	0	skip	skip	0	0	0	skip	1	0	1	1	0	skip	35%
2	0.5	skip	skip	0	0	skip	0	0.5	0	skip	0.5	skip	1	1	0	skip	35%
3	1	*	*	1	1	1	1	1	0.5	skip	1	1	1	1	1	skip	96%
4	0	skip	skip	1	0	skip	0	0.5	0.5	skip	1	1	1	1	skip	skip	60%
5	0	skip	skip	1	skip	skip	0	1	0	skip	1	0	0	0	0	skip	30%
6	0	skip	skip	0	0	skip	0	0.5	0	skip	0	skip	skip	skip	skip	skip	7%
7	0	skip	skip	1	0	skip	0	0	0.5	skip	0.5	skip	1	1	0	skip	40%
8	0.5	skip	skip	0	skip	skip	1	1	1	1	1	1	1	1	1	1	88%
Mean by task	**31%**			**50%**	**20%**		**25%**	**56%**	**31%**		**75%**	**60%**	**86%**	**86%**	**33%**		**52%**

*Participant did not actually attempt tasks 1b and 1c, but while working on task 1a, he fiddled around with the system and narrowed results.

Appendix I. User Efficiency by Task

| | Tasks | | | | | | | | | | | | | | | | Mean by participant |
| | Search & Navigation | | | | | | Manipulating Tables | | | | | Manipulating Maps | | | | | |
Participant	1a	1b	1c	2	3a	3b	4a	4b	4c	4d	4e	4f	4g	4h	4i	4j	
SDC 1	**11:07**	skip	skip	3:36	skip	skip	5:59	4:00	2:21	skip	**5:09**	1:42	**0:40**	**1:09**		skip	**3:58**
1	**17:05**	skip	skip	1:35	7:30	skip	13:22	**5:41**	1:36	skip	**5:00**	skip	**0:39**	**1:19**	1:18	skip	**5:30**
2	**9:45**	*	*	**9:43**	**9:55**	**1:59**	**4:32**	**2:07**	**1:43**	skip	**0:57**	**4:38**	**0:13**	**0:28**	**1:15**	skip	**3:56**
4	6:10	skip	skip	**7:44**	9:12	skip	4:51	**4:13**	**3:01**	skip	**5:11**	**1:53**	0:55	0:23	skip	skip	**4:21**
5	12:17	skip	skip	**7:26**	skip	skip	8:11	**3:52**	3:20	skip	**4:40**	2:00	1:05	0:58	3:33	skip	**4:44**
6	7:09	skip	skip	5:40	11:53	skip	10:12	**7:50**	5:10	skip	6:20	skip	skip	skip	skip	skip	**7:44**
7	7:32	skip	skip	**1:46**	5:07	skip	6:43	3:25	**3:11**	skip	2:40	skip	**1:32**	**1:19**	3:10	skip	**3:38**
8	**5:07**	skip	skip	0:57	skip	skip	**4:57**	**1:02**	**1:37**	**3:50**	**1:55**	**0:35**	**0:56**	**0:07**	**2:00**	**3:30**	**2:12**
Mean by task	**9:31**			**4:48**	**8:43**		**7:20**	**4:01**	**2:44**		**3:59**	**2:09**	**0:51**	**0:49**	**2:15**		
Correct only	**10:46**			**6:39**	**9:55**	**1:59**	**4:44**	**4:07**	**2:23**	**3:50**	**3:38**	**2:22**	**0:49**	**0:47**	**1:37**	**3:30**	

Note: Bolding indicates task success or partial success.
*P2 did not actually attempt tasks 1b and 1c, but while working on task 1a, he fiddled around with the system and narrowed results.

Appendix J. Participants' Satisfaction Scores

	Satisfaction Questionnaire Items (Scale: 1-9)										
	1	2	3	4	5	6	7	8	9	10	
	Terrible	Confusing	Inconsistent	Inadequate	Illogical	Never	Confusing	Impossible	Difficult	Too frequent	**Mean by**
Participant	-wonderful	-clear	-consistent	-adequate	-logical	-always	-clear	-easy	-easy	-appropriate	**participant**
1	4	6	6	7	7	6	6	7	6	5	**6.00**
2	6	4	7	7	7	4	4	6	6	6	**5.70**
3	8	5	6	7	8	6	7	8	7	7	**6.90**
4	3	2	3	3	2	3	3	3	2	3	**2.70**
5	6	4	5	5	6	4	4	*	4	5	**4.78**
6	3	2	2	3	6	7	8	9	7	N/A	**5.22**
7	3	4	7	3	7	2	6	4	2	7	**4.50**
8	7	4	6	4	4	7	4	8	5	7	**5.60**
Mean by item	**5.00**	**3.88**	**5.25**	**4.88**	**5.88**	**4.88**	**5.25**	**6.43**	**4.88**	**5.71**	**5.18**

	Overall reaction to Web site (Scale: 1-7)			
	11	12	13	
	Terrible	Frustrating	Difficult	Mean by
Participant	-wonderful	-satisfying	-easy	participant
1	4	5	4	**4.33**
2	4	3	3	**3.33**
3	7	6	5	**6.00**
4	2	1	1	**1.33**
5	4	4	4	**4.00**
6	N/A	N/A	N/A	**N/A**
7	3	2	2	**2.33**
8	5	5	4	**4.67**
Mean by item	**4.14**	**3.71**	**3.29**	**3.71**