

Usability Testing Methodology for the 2017 Economic Census Web Instrument

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FCSM

Disclaimer: Any views expressed are those of the author and not necessarily those of the U.S. Census Bureau.

Outline

- Background of Economic Census
- Centurion Overview
- Methodology
- Metrics
- Conclusion

Economic Census

- Snapshot of the U.S. economy
 - Input to key economic reports such as the GDP
- Conducted every 5 years
- Collected from more than 4 million establishments
- Data collection across a variety of industries
- Collection of establishment level data
 - Employment and payroll
 - Sales, receipts, revenue
 - Shipments
 - Operating expenses

Centurion

- Web-based electronic reporting system that hosts surveys
- Will host the economic census
- Through the Centurion reporting system, respondents fill out and submit the data for their business
- Developed by the Census Bureau's programmers
- Currently in use for all annual surveys that go to a sample of businesses
- Many Economic Census respondents will be seeing it for the first time, introducing them to many new features that even previous respondents will not be familiar with.

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Due Date: June 12, 2018

Step 1 - Report Dashboard

- Update our record of your company's locations by adding locations as needed using the Add Location button at the bottom of the screen. (Note: To see the list of locations of a consolidated report, click "(View All)" under the "Number of Establishments in Survey" column.)
- Begin reporting using one of the following options:

Option 1: Start the survey for each location listed in the table below OR

Option 2: Download, and then Upload a completed spreadsheet template to complete the survey for many locations at once

Download Spreadsheet Template Upload Completed Template

Status	Print / Preview Survey Questions	Errors / Warnings	Number of Establishments in Survey	Survey	Title	CFN	Store / Plant
Resume	Preview Survey	0/0		WH-42311	Motor Vehicles	ADD_500002	
Resume	Preview Survey	0/0		WH-42311	Motor Vehicles	ADD_500001	
Start	Preview Survey	0/0		RT-45231	Warehouse Clubs and...	7609010043	SD1
Start	Preview Survey	0/0		OS-8111X	Repair, Laundry, and O...	7609010042	VA7
Start	Preview Survey	0/0		WH-42311	Motor Vehicles	7609010041	MA1

Print Surveys to PDF Add Location Delete Added Location

Overview

Step 2 - Review

Resume Start

Preview Survey

Print Surveys to PDF

What is usability?

- Usability is defined as “the extent to which a product can be used by specified users to **achieve specified goals**, with **effectiveness, efficiency, and satisfaction** in a specified context of use” (International Organization for Standardization, 1993c)
 - **Efficiency** (*once design is learned, how quickly can they complete the tasks?*)
 - **Errors** (*how many errors are made when attempting a task, are the errors easily amended by user?*)
 - **Satisfaction** (*how pleasant is it to use the design?*)
 - **Utility** (*how functional is the design, does it have all the features it needs?*)
 - **Learnability** (*how easy is it for a novice user to accomplish tasks?*)

Methodology

- Testing duration: May 22nd-June 2nd
 - Local visits (DC, MD, VA)
 - Houston, TX
 - Denver, CO
 - St. Louis, MO
- 38 participants total
 - Recruited from current surveys
 - Multi-Unit establishments (n=29)
 - Single-Unit establishments (n=9)

Participant Characteristics

Education Level	Number of participants (n=38)
< High School	1
High School	1
Some College	5
Associates degree	1
Bachelors	17
Post Bachelors	13

Age range (in years)	Number of participants (n=38)
26-35	8
36-45	10
46-50	6
51+	14

Methodology

- Testing Procedure
 - Protocol
 - Introduction
 - Consent form
 - Demographic and Computer Use/Internet Experience Questionnaire
 - User tasks
 - Think aloud
 - Probes
 - Satisfaction survey
 - Debriefing

Identification of findings

- Usability metrics
 - Efficiency (task completion time)
 - Accuracy (task success)
 - User satisfaction (System Usability Scale)
- Observed behaviors
- Participant commentary

Think Aloud

- Ericsson and Simon's (1993) method of collecting verbal feedback
- Used in this study to capture participants' conscious thoughts, expectations and decisions as they interacted with the site
- R's were prompted to "keep talking," if they fell silent for more than ten seconds
- Highlighted potentially problematic areas of the site
- Allowed researchers to gain an understanding of the participants' underlying cognitive processes.

Tasks

- Tasks were designed to reflect realistic and representative actions that respondents would have to take while reporting to the 2017 Economic Census survey.
- Tasks fell into four main categories:
 - Logging into the survey
 - Reporting Data
 - Reviewing Data
 - Submitting Data

Tasks

Task 1	Log into the survey
Task 2	<p><i>MU ONLY:</i></p> <ul style="list-style-type: none">• Part A: Add 2 new locations• Part B: Remove the locations from the listing• Part C: View/arrange locations by EIN <p><i>SU ONLY:</i></p> <ul style="list-style-type: none">• Part A: Update the company's mailing address to 123 TEST LANE
Task 3	View a copy of the survey questions
Task 4	Begin reporting
Task 5	<p><i>MU ONLY:</i></p> <ul style="list-style-type: none">• Part A: Download and save a full survey spreadsheet to the desktop• Part B: Upload the saved Test spreadsheet to the instrument
Task 6	Review your data <ul style="list-style-type: none">• Part A: Resolve any errors

Metrics: Efficiency

- *Task completion time* is defined as the amount of time (in seconds) it takes the participant to complete a given task using the 2017 Economic Census site
- Start time begins when the participant is done reading the task question aloud and begins to interact with the site
- End time is when the participant states that they have completed the task or that they would like to move on to the next task

Task	Task 1	Task 2a	Task 2b	Task 2c	Task 3	Task 4	Task 5a	Task 5b	Task 6a	Task 6b	Task 7
Average completion time (n=20)	1m27s	1m35s	26s	37s	1m09s	54s	1m47s	55s	34s	36s	1m27s

Metrics: Effectiveness (Accuracy)

- Three categories of effectiveness:
 - **Successfully completed:** The participant was able to navigate through the instrument to complete a given task (via the optimal paths) without assistance from the test administrator
 - **Partial success:** The participant was able to complete part of the task with no assistance from the test administrator
 - **Failure:** The participant failed to complete the task or required assistance

Metrics: User Satisfaction

- Satisfaction ratings were assessed based on subjective satisfaction ratings from the System Usability Scale questionnaire administered at the end of the usability session
- Items were rated on a 5-point Likert Scale
- Item average across participants was calculated

System Usability Scale

Q1	I think that I would like to use the site to complete the Economic Census	3.95
Q2	I found the site to be simple	3.75
Q3	I thought the site was easy to use	3.87
Q4	I think that I could use the site without the support of a technical person	4.18
Q5	I found that the various functions in the site were well put together	3.70
Q6	I thought there was a lot of consistency in the site	3.93
Q7	I would imagine that most people would learn to use the site very quickly	3.84
Q8	I found the site to be very intuitive	3.58
Q9	I felt very confident using the site	3.79
Q10	I could use the site without having to learn anything new	4.22

Future Studies

HeatMap
Draw: 0us
FPS: -2147483648
74.57
counts

USCENSUSBUREAU
Helping You Make Informed Decisions

AMERICAN COMMUNITY SURVEY

Instructions FAQs Save & Logout

- Please make note of the PIN below.
- It will allow you to log back into the survey if the session times out or you need to stop and come back later. The session will time out if left idle for more than 15 minutes. This survey will take approximately 38 minutes to complete.

PIN: 7943

For your security, we will not be able to reset the PIN if lost or forgotten.

Next >>

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HeatMap
Draw: 277083µs
FPS: 3
74.57
counts

AMERICAN COMMUNITY SURVEY

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Next >>

Conclusion

- Multiple quantifiable metrics were used to assess the usability of the Centurion website
 - Efficiency (task completion time)
 - Accuracy (task success)
 - User satisfaction (System Usability Scale)
 - Observed behaviors
 - Participant commentary
- Recommendations for changes to the site were prioritized and implemented by the developers

Progress Following Study

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2017 Economic Census | OMB No.: 0607-0998 | Approval Expires: 05/31/2020 | OMB No.: 0607-0937 | Approval Expires: 05/31/2020 | OMB No.: 0607-0444 | Approval Expires: 05/31/2020

Go to Overview | **Go to Step 1 - Report** | Go to Step 2 - Review | Go to Step 3 - Submit

Step 1 - Report Dashboard

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- Add locations that are missing by selecting the "Add Location" button
- Start reporting data by
 - Individual locations (click "Start" buttons)
 - All locations (click "Download Spreadsheet Template" button)
- To preview or print questions and instructions, click the icon under the "Preview Questions and Instructions" column
 - This document will contain your answers to the survey as you fill it out.
 - You can print this document to have a copy of your responses for your records
- To see the list of locations for a consolidated report, click "(View All)" under the "Num. Estabs. in Survey" column

[+ Add Location](#) | [x Delete Added Location](#) | [Download Spreadsheet Template](#) | [Upload Completed Template](#) | [Summary Data](#)

Status	Preview Questions and Instructions	Errors / Warnings	Num. Estabs. in Survey	Survey	Title	CFN	Store / Plant
Start		0/0		MC-31320	Broadwoven Fabric Mills	ADD_500002	
Start		0/0		MC-31320	Broadwoven Fabric Mills	ADD_500001	

Total Items: 14

Overview | Step 2 - Review

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Overview | Step 2 - Review

Progress Following Study

Preview Questions and Instructions

Print / Preview Survey Questions

Preview Survey

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Print Surveys to PDF Add Location Delete Added Location

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Overview | Step 2 - Review | Overview | Step 2 - Review

Thank you!

Rebecca.Keegan@census.gov

301-763-6003