# Usability Evaluation of Data Dissemination for Official Statistics

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## Background

Official statistics refer to the statistical data produced by the government through survey or other methods. Official statistics are an important source of evidence for policy making. The U.S. Census Bureau serves as the leading source of official statistical data about the nation's people and economy, and has the responsibility to empower citizens to effectively and efficiently use the data.

## Challenges

***1. Siloed data sources***

Multiple independent systems (data portals, applications, websites, application programming interfaces, etc) make it difficult for a user to find the right point of entry to data.

***2. Poor user interfaces***

**Different systems have different user interface designs**. Users found it difficult to interact with those interfaces.

## Solution

Develop a **platform** that makes it **easier to find, access, and use the data** on any device, anywhere, and anytime. This knowledge-based data dissemination platform is to be user-driven, extensible, and integrated across all the censuses and surveys conducted by the Census Bureau.

## Human-Centered Approach

1. Minimize potential usability problems during application design phase
2. Identify and address usability problems during application development phase
3. Assess application's usability upon the completion of development
4. Establish user performance benchmarks for the application

**Phase 1:** Usability review of the high-level information architecture

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**Phase 2:** Rapid wireframe usability testing at the completion of each design

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**Phase 3:** Comprehensive formative testing at each release

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**Phase 4:** Summative testing at the application release

## Case Study: IMPROVING DATA SEARCH

### Initial Search Design Assessment

1. ***User interface design:***

Three areas - Left, middle, and right panels (Figure 1).
Middle panel - a list of search fields, derived from the Census Bureau's internal data structure, was presented vertically from the top all the way down through the screen. There were various search field formats: some with write-in areas, some others in dropdown format, etc.
Left panel - showed "filters" that had been applied during a search.
Right panel - displayed instructions on how to perform a search.

2. ***Usability testing Objectives:***

(1) Identify existing usability issues.

3. ***Usability testing findings:***

(1) Ambiguous search parameters requirement.
(2) Preference to search in natural language.

4. ***Design improvement:***

Single search field (Figure 2).

### Round 2 Search Design Assessment

1. ***User interface design:***

Single search field (Figure 2).

2. ***Usability testing Objectives:***

(1) Assess if the new design address the previous usability problems.
(2) Identify additional usability issues.

3. ***Usability testing Findings:***

(1) Improved user performance – Able to conduct search in natural language.
(2) New functional issue – The system was unable to handle query in complex natural language.

4. ***Design improvement:***

Enhanced back-end with re-designed front-end (Figure 3).

### Round 3 Search Design Assessment

1. ***User interface design:***

Enhanced back-end with re-designed front-end (Figure 3).

2. ***Usability testing Objectives:***

(1) Assess if the dissemination tool can work on devises with various screen sizes (laptop computer (large screen) and smartphone (small screen)).
(2) Identify additional issues.

3. ***Usability testing Findings:***

(1) On a smartphone, the carousel-motion display of pre-populated text in the search field was confusing.

4. ***Design improvement:***

Eliminating the pre-populated text.

### Round 4 Search Design Assessment

1. ***User interface design:***

No pre-populated text. Adding "Advanced Search" and "Search my location" links (Figure 4).

2. ***Usability testing Objectives:***

(1) Compare the search performance between novice users and expert users.
(2) Identify additional issues.

3. ***Usability testing Findings:***

(1) Both novice and expert users could do well with simple searches.
(2) The experts found it difficult to use advanced search.

4. ***Design improvement:***

Improving advanced search function.

## Conclusions

We incorporated **iterative usability testing** into an agile development life cycle, using the methodology of **human-centered design** in a government operational setting. This study demonstrates the importance of involving **usability evaluation in the earlier stage of design phase and throughout the development lifecycle**. It has a significant implication on **quality and efficiency of statistical data presentation and visualization**.



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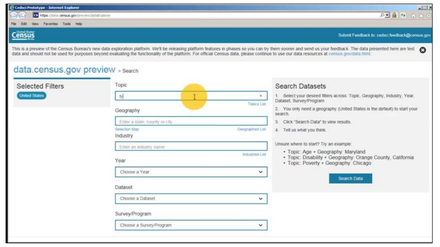


Figure 1

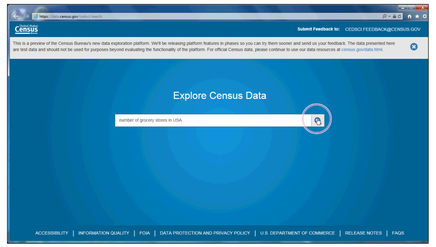


Figure 2

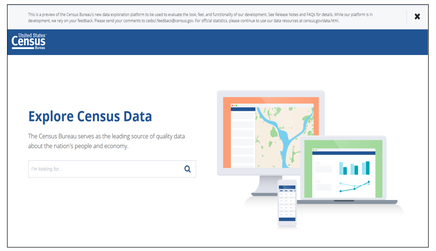


Figure 3

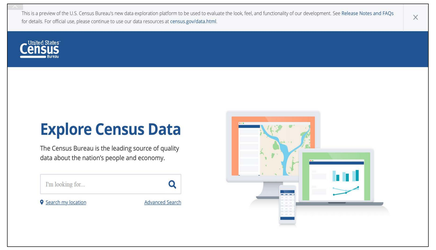


Figure 4