

## MEMORANDUM

Date: March 11, 2016

To: Shelly Wilkie Martinez, Desk Officer  
Office of Management and Budget

From: John Gawalt, Director  
National Center for Science and Engineering Statistics

Via: Suzanne Plimpton, Clearance Officer  
National Science Foundation (NSF)

Subject: Notification of data collection under generic clearance (Revised)

The purpose of this memorandum is to inform you of NSF's plan to conduct usability testing under the generic clearance for survey improvement projects (OMB #3145-0174). This study is part of a larger set of activities assessing how well our current dissemination tools and data products meet the needs of our users. We have completed a user analysis and will follow this proposed study with a formal user needs analysis. This request describes our plan to conduct usability tests on NCSES data tools and products by observing users as they interact with these components.

### **Background**

The National Science Foundation's (NSF) National Center for Science and Engineering Statistics (NCSES) is the principal source of analytical and statistical reports, data, and related information that describe and provide insight into the nation's science and engineering resources. All of the Center's data are released in electronic format on NSF's centrally administered web server (<http://www.nsf.gov/statistics/>). NCSES also manages additional external and internal servers that supplement the central server's content.

To support the analysis, dissemination and archiving of the Center's survey data, NCSES maintains a data system, comprised of several major components. The major components of the data system include: the *SESTAT database* and *SESTAT Data Tool*, custom-built web-based data tabulation and information applications which respectively store and provide access to both restricted use and public use microdata for the SESTAT surveys (<http://www.nsf.gov/statistics/sestat/>); the *data repository*, an Oracle database with a SAS software application layer for increased user access, analytical capabilities and data dissemination activities; the *WebCASPAR data system*, an on-line data tool application maintained by a separate contract vehicle (<https://ncesdata.nsf.gov/webcaspar/>); and a newly-developed data table product, called *eTables*, that is currently generated and publicly disseminated on the web using SAS stored processes (<http://ncesdata.nsf.gov/gradpostdoc/2013/>).

With increasing technological advancements and the changing needs and preferences of its stakeholders, NCSES strives to make improvements to its data dissemination activities by identifying those processes, products and tools that may require reassessment and refinement. NCSES faces the same challenges that other federal statistical agencies experience in understanding and meeting the needs of its data users. We participate in and benefit from knowledge and experiences shared during discussions among members of the Federal Interagency Dissemination Group, which brings together the data dissemination leaders within the federal statistical system. The group is charged with identifying the ongoing challenges in dissemination and sharing of best practices, including usability testing, to help support the missions of their respective agencies.

The goal of this project is to develop insight into the functionality of NCSES web-based tools, applications and data products, including SESTAT, WebCASPAR, eTables, the data repository, and other web-based data products currently generated from the NCSES data system. The information gathered will establish a baseline understanding of NCSES's current data products and how they facilitate or inhibit access to, and analysis of, data collected by NCSES. The results of the usability testing will guide NCSES in prioritizing resources for refining these data tools and products. Results also will inform NCSES decisions on the future development of new products that better the needs of NCSES's target audience.

## **Recruitment**

NCSES plans to conduct a series of tests to evaluate the usability of these components by a sample of data users. The sampling method for the interviews is nonprobabilistic, purposive, and heterogeneous. Potential participants will be selected to be broadly representative of a participant group and to have knowledge and/or interest in science and engineering statistics to represent the current user or potential user base, as opposed to the general population. We plan to recruit participants from the U.S. through targeted email and telephone messages without any regard to geography. (See Attachment B for contact scripts.) To maximize response rates as well as reduce the burden of filtering out potential participants that do not have an interest in science and engineering statistics, participants will be targeted based on their past interactions with information on the science and engineering enterprise. Sources for recruitment include individuals who have contacted an NSF survey manager for assistance, signed up for the National Center for Science and Engineering RSS feed, or published papers or reports that incorporate data on the science and engineering enterprise. We expect testing to start in spring of 2016 and continue for 12 weeks.

## Project Description

Usability testing will be conducted in order to observe users while they use the tools and systems displayed in the following table.

Product	Detail
WebCASPAR	The WebCASPAR Data System <sup>1</sup> is a custom NCSES data tool that provides access to a number of data sources. WebCASPAR is primarily focused on providing institutional data.
SESTAT	The SESTAT Data Tables and Metadata Explorer <sup>2</sup> is a custom NCSES data tool that reports anonymous data about individual survey respondents.
SED Tabulation Engine	Survey of Earned Doctorates (SED) Tabulation Engine(s) <sup>3</sup> is a custom NCSES data tool that provides alternate access to a subset of the data available in WebCASPAR.
Public Use Files	GSS, HERD, and FFRDC Public Use Files <sup>4</sup> provide access to NCSES data as raw data that may be opened in Excel or other statistical tools.
Academic Institutional Profiles	Academic Institutional Profiles <sup>5</sup> show selected NCSES information for U.S. academic institutions.
State Profiles	Science and Engineering State Profiles <sup>6</sup> is an interactive tool that presents STEM workforce and R&D data for U.S. states.
eTables	The NCSES eTables <sup>7</sup> present preformatted information rather than the user-generated tables that appear in data tools like WebCASPAR, SESTAT, and the SED Tabulation Engine.

The testing is designed to generate data on how these tools perform during usage, what features and capabilities work well for people, and where the tools may create challenges for users. As outlined in Attachment A (Usability Testing Draft Testing Plan/Script), we will ask participants to perform a set of tasks with NCSES data tool(s) and ask them to explain what they are doing while performing the task. With regard to identifying tasks to be tested, we inventoried all of the functionalities present in each of the data tools (e.g.

<sup>1</sup> WebCASPAR: <https://ncesdata.nsf.gov/webcaspar/>

<sup>2</sup> SESTAT: <http://www.nsf.gov/statistics/sestat/>

<sup>3</sup> SED Tabulation Engine: <https://nces.norc.org/NSFTabEngine/>

<sup>4</sup> Public Use Files: GSS [http://www.nsf.gov/statistics/srvygradpostdoc/pub\\_data.cfm](http://www.nsf.gov/statistics/srvygradpostdoc/pub_data.cfm), HERD [http://www.nsf.gov/statistics/herd/pub\\_data.cfm](http://www.nsf.gov/statistics/herd/pub_data.cfm), FFRDC [http://www.nsf.gov/statistics/ffrdc/pub\\_data.cfm](http://www.nsf.gov/statistics/ffrdc/pub_data.cfm)

<sup>5</sup> Academic Institution Profiles: <http://ncesdata.nsf.gov/profiles/>

<sup>6</sup> Science and Engineering State Profiles: <http://www.nsf.gov/statistics/states/>

<sup>7</sup> eTables: HERD <http://ncesdata.nsf.gov/herd/2012/>, SDR <http://ncesdata.nsf.gov/doctoratework/2010/> and <http://ncesdata.nsf.gov/doctoratework/2013/>, NSRCG <http://ncesdata.nsf.gov/recentgrads/2010/>, GSS <http://ncesdata.nsf.gov/gradpostdoc/2012/> and <http://ncesdata.nsf.gov/gradpostdoc/2013/>, FFRDC <http://ncesdata.nsf.gov/ffrdc/2013/>

sorting, filtering, linking, downloading), and then identified tasks that would test an individual’s ability to effectively use one or more of those functionalities. Through direct observation and test subject answers, each test will provide insight into the user experience for each tool, and simultaneously elicit direct feedback on each tool.

Participants will initially be assigned to one of the following participant groups based on their affiliation:

- Policy Analysts
- Media
- Academia
- Industry
- Nonprofit Organizations
- Casual Information Seekers

The next table displays the mapping of how participants in the study will be directed to different products according to their participant group. At the beginning of the test, participants will be asked about their general job responsibilities, their skill level with data analysis, and their knowledge of NCSES tools. Specific tasks (displayed in Attachment A) will be assigned based on the user skill level reported at the beginning of the interview or the functionality the facilitator is seeking to test to assure good coverage on all tools. In the table, “primary” indicates that this is the primary tool that will be tested with the indicated participant group, while the tools labeled as secondary will be tested as time allows in that participant group’s test sessions.

Product Selections by Participant Group						
	Analysts	Media	Academia	Industry	Nonprofit Organizations	Casual Information Seekers
Academic Institutional Profiles	Secondary	Primary	Primary	Primary	Primary	Primary
State Profiles	Secondary	Primary	Secondary	Primary	Primary	Primary
WebCASPAR	Primary		Secondary			
SESTAT	Primary		Secondary			
SED Tabulation Engine	Primary		Secondary	Secondary	Secondary	
eTables	Secondary	Secondary	Secondary			Secondary
Public Use Files	Primary		Secondary			

Test sessions will be conducted virtually over the Internet using the GoToMeeting collaboration service. Each participant will be asked to give consent for participation and to be recorded for note-taking purposes. (The consent form is contained in Attachment C.) Each test session will be 45 to 60 minutes in length. Individuals joining the test session will be asked to share their screen using the GoToMeeting software and perform common tasks using the data products and tools, while “talking us through” what they are doing at the time. Sessions will be recorded through the GoToMeeting tool. While the test subject is narrating his or her actions, we expect to have an informative dialog with that user regarding specific tasks, goals, anticipated outcomes, and areas for improvement.

While observing the users and probing them about their experiences, the following topics will be examined:

- Methods of navigation and problems encountered (e.g., do users make use of the instructions or do they proceed directly to the tool or survey page; do they go backwards to look at previous screens; and do they express frustration in not being able to go where they want)
- Types of errors made (any error message generated or problems that prevent completion of the task—i.e., critical errors and non-critical errors). An error is designated as “critical” when the user is unable to complete the task successfully or encounters a system-level error message.
- Frequency of and response to error messages (e.g., do users frequently make such errors; do they read through and understand the error messages; do they understand the process for correcting an error; and do they attempt to correct their errors or give up?)
- Use of help screens and other features (e.g., how much do they make use of the special features versus proceeding directly through the tool or NCSES websites)
- Problems or issues with specific features and capabilities of the tool
- User perceptions of the strengths and weaknesses of the web design (e.g., are there any features that they found particularly useful or frustrating, and for what reasons)

### **Burden Information**

We expect to invite up to 100 participants with the goal of obtaining participation from 10 to 20 people. We expect the public burden of the recruiting process to take an average of five minutes per person, resulting in approximately 8.3 hours of burden (100 experts x 5 minutes = 500 minutes  $\approx$  8.3 hours). The estimated time for the testing is 1 hour. At the maximum 20 people will participate; therefore, the total maximum burden for the survey activity would be 20 hours (20 responses x 1 hour = 20 hours). Thus, we estimate a total burden of 28.3 hours for this research.

## **Incentive Payments**

There are no incentive payments.

## **Contact Information**

The contact person for questions regarding this data collection is:

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National Science Foundation  
(703) 292-4977  
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### Attachments

- A – Test plan
- B – Draft contact scripts
- C – Consent form

cc: Joydip Kundu  
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