

From Overviews to Previews to Answers: Integrated Interfaces for Federal Statistics

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Executive Summary

Federal statistics have long been important to economic, health, and other professionals, but the WWW promises to make this data easily accessible to the general population as they make decisions about where to live, what to buy, and how to secure their future. Fedstats (www.fedstats.gov) directs people to the bulk of statistics collected and disseminated by 70 federal government agencies through 196 primary websites that each contain many different subsites and webpages. This service has opened new possibilities for citizen access and use in the face of severe conceptual and technical constraints. Effective use of this service, as with other electronic services, depends on user interfaces that are powerful yet easy to use by people with diverse needs and experiences. This work is a follow on to the design and testing of a graphical user interface tool called the Relation Browser that was designed as a supplement to the Fedstats website, a portal to all U.S. government statistical data. The Relation Browser has three primary goals:

- Help users acquire an overview of what data is and is not available at federal agencies and hence gain a better understanding of federal statistics;
- Help users explore in more detail what is available by attributes such as data types, regional coverage, and temporal coverage at specific federal websites; and
- Provide users with interface control mechanisms to look ahead to what is in a site before committing to loading it, hence saving time and minimizing disorientation.

Based upon usability testing of the prototype Relation Browser, the tool was revised and a field test was conducted over a six-month period from November 1999 through April 2000. The Relation Browser was accessed from almost 8000 unique IP addresses over this period and 74 people completed an online questionnaire (less than one percent response rate). The responses ran the full range from high praise to strong criticism, however many respondents said that the tool helped them to gain an overview of federal statistics and would save them time and effort. Half the respondents strongly agreed that the tool should be permanently added to the Fedstats site. Based upon the field test, a revised version was developed that provided a help button and gave a table of data attributes for each website in the results window—a preview of each website. A usability test with nine subjects was conducted in the BLS Cognitive Laboratory. Results demonstrate the viability of the Relation Browser in achieving its main goals although users must become familiar with its capabilities and uses. A database backend was developed to demonstrate the technical feasibility of collecting and maintaining the data from the almost 200 federal websites characterized by the Relation Browser. Recommendations are made to add the Relation Browser as an added-value tool that will provide new capabilities as well as an alternative entry point to the Fedstats collection. Finally, some recommendations for adding “look ahead” cues to the existing BLS website are made.

From Overviews to Previews to Answers: Integrated Interfaces for Federal Statistics

Context and Problem Statement

For the past four years, a team of information specialists has been working with the Bureau of Labor Statistics to improve outreach to constituent groups by means of the World Wide Web (WWW). One goal of this work is to design and test user interface tools that help citizens understand what federal statistics are available, access the statistics that are most pertinent to their needs, and use these data to answer questions and make decisions. The interface design vision is guided by the belief that people benefit from multiple views of information resources and dynamic mechanisms for manipulating these views (e.g., Greene et al., 1999; Marchionini, et al., in press; Shneiderman, 1998). Furthermore, such designs must be informed by understanding people's needs and behaviors, and by rich organization and indexing in the underlying information.

In our preliminary work (1996-97), we conducted investigations of user needs and tasks and completed transaction log analyses of user behavior at the BLS website, resulting in a user task-type taxonomy (<http://ils.unc.edu/~march/blsreport/mainbls.html>). In the second year (1997-98), additional user needs analyses were done, transaction log analyses were replicated, an interface prototype that aimed to provide alternative entry points to the BLS website for different user needs and types was built and tested, and recommendations for short and long term design strategies were made (Hert & Marchionini, 1998); (http://ils.unc.edu/~march/blsreport98/final_report.html). In the third year (1998-99), the interface work extended these efforts to the Fedstats website that includes the bulk of statistics collected and disseminated by 70 U.S. government agencies. Fedstats is a portal service (also called a locator service or a metasite) meant to serve as a gateway to all federal government statistics (www.fedstats.gov). A prototype tool (Relation Browser) was built that aims to give people an overview of the range of federal statistics and an alternative entry to them through "look ahead" interface mechanisms. This prototype was tested with users and recommendations for revisions made (Marchionini et al., in press) (<http://ils.unc.edu/~march/blsreport99/final.pdf>).

In the 1999-2000 project reported here, the Relation Browser was revised based upon the previous year's usability tests, two types of assessment were made, and a final revision was prepared. This report describes the Relation Browser tool evolution and testing, and makes suggestions for long-term implementation. This work has been reported at national conferences (e.g., National Conference on Health Statistics, July 1999, International Conference on Establishment Surveys, June 2000, and papers are in press for others (see Marchionini, 2000 for a briefing that summarizes the interface design work of the four years; Marchionini et al., for American Society for Information Science Annual Meeting, November 2000; and Marchionini et al., for ACM Conference on Universal Usability, November, 2000).

This work took place from September 1999 to June 2000 and had three primary objectives:

- a) Continue development of the Relation Browser to improve the transition between overview of federal statistics and data previews and identification in specific webpages.
- b) Test next iterations of the Relation Browser to determine how the new levels of interaction it

supports influences information seeking.

- c) Explore how the Relation Browser techniques can be easily adapted for specific statistical sites such as the BLS website.

Background

Federal statistics have long been important to economic, health, and other professionals, but the WWW promises to make this data easily accessible to the general population as they make decisions about where to live, what to buy, and how to secure their future. Fedstats (www.fedstats.gov) directs people to the bulk of statistics collected and disseminated by 70 federal government agencies through 196 primary websites that each contain many different subsites and webpages. This service has opened new possibilities for citizen access and use in the face of severe conceptual and technical constraints. Effective use of this service, as with other electronic services, depends on user interfaces that are powerful yet easy to use by people with diverse needs and experiences.

Interfaces to large WWW spaces offer doubly-vexing challenges to designers. First, the large number of sites and pages relevant to even moderately general topics threatens to overload users whether they use analytical search strategies or informal selection strategies. Second, broad-based availability demands that user-centered approaches support very wide ranges of user capabilities and experiences. These challenges are especially problematic in federal government portals and websites that disseminate large volumes of information and aim to serve the entire citizenry from school children to world-class specialists. Federal statistical websites face these general challenges as well as the special challenges associated with statistical information. First, statistics are more compact and precise than text and thus require context (e.g., units, sources, notes, and associated interpretive reports). As such, statistics are like electronic multimedia, incorporating text and non-textual information, but less direct and natural than video or audio information since both the numeric and textual objects are abstractions. Second, the general population exhibits a very low level of basic statistical literacy, making access and use more problematic. Thus, federal statistics websites face significant challenges in making information broadly accessible to the public via the WWW.

Before personal computers were widely available, there were three main ways that people accessed federal statistical data. By far the most common is through summaries and reports created by the federal agencies themselves. Agencies responsible for the data analyze, summarize, and interpret the data and create periodic or special reports that are released to the public. Important examples The Statistical Abstracts of the USA, Vital Statistics of the US, and Science and Engineering Indicators; as well as periodic economic reports containing summary indexes such as the consumer price index (CPI), unemployment rate, and Gross Domestic Product. These reports are in turn used by the media, corporations, and individuals as the basis for discussion and decision making. This enterprise is enormously important to citizens and involves thousands of statisticians, economists, sociologists, analysts, and technicians who create reliable, official summaries and interpretations of statistical data. This process provides the primary point of access to statistical data for citizens.

A second way that government statistical data flows to the public is for organizations to obtain raw data (with identifying information expunged) from government agencies and make it available in turn to portions of the population. These organizations may be non-profit (e.g., university centers/consortia such as the Inter-university Consortium for Political and Social Research) or for-profit companies and they may simply make the data accessible or add value through specialized search interfaces or by creating specialized summaries, reports or interpretations. The primary users of these services are researchers, students, and journalists who investigate highly specialized questions not addressed in the official reports or who aim to challenge or verify official reports.

A third way that citizens may gain access to federal statistical data is to make formal, individual requests via letter or telephone (and more recently via email). Analysts in government agencies respond to these requests on an ad hoc basis depending on agency. Requests for data sets are handled by policy (e.g., refer to public releases) and requests for specific data or general interpretations may be referred to published reports. Clearly, only a small portion of the population in the past could or should take advantage of this personalized service.

Widespread access to personal computers and the Internet have dramatically changed the relationship of citizens to government when it comes to information in general and statistical information in particular. Federal agencies have recognized that information technologies provide a mass dissemination conduit for reaching larger portions of the population, thus advancing the service mission. Agencies are also beginning to recognize that this is a two-way conduit in that IT provides the possibilities to better respond to individual requests as well as. This second realization has long-term implications for the entire statistical data access enterprise as more federal resources are directed to personalized response to citizen requests rather than depending primarily on official reports and summaries. Clearly, beyond the economies of scale official releases and reports serve, they are crucial to insuring standardized and validated interpretations of data as well. It is inevitable that the considerable investments in producing official releases and summaries will continue to be needed while adding additional resources to serving the personalized needs of citizens empowered by information technologies. One hope for solving the economics of this dual challenge is to develop sophisticated user interfaces for WWW sites that help citizens help themselves. That good interfaces are crucial to this solution is illustrated by the costs and reactions to automated phone menu systems for managing phone calls from the public. Good interfaces for federal websites are even more crucial as larger portions of the population operate in an information economy aided by sophisticated information technologies. This general mission to create good user interfaces is a primary motivation for the research in which we are engaged.

Today, statistical agencies offer CD-ROM products that provide traditional summaries and reports along with actual data sets and extraction and manipulation tools. Citizens can access entire data sets through FTP and then use commercial or personal specialized tools to analyze the data, thus competing with the products and services offered by government as well as the non-governmental organizations. Most importantly, government agencies have begun to deliver the traditional products (e.g., indexes, summary tables, reports) as well as data sets and tools via the WWW. A few years experience has demonstrated that the entire federal statistics community enterprise of analyzing and disseminating summary interpretations is under great stress to evolve

to meet the diverse needs of a broader portion of the population. Our work over the past four years demonstrates both the value and long-term viability of official reports and summaries and the need for new products and services. In particular, the development and testing of the Relation Browser tool suggests one way that federal agencies may add new kinds of value for the citizenry by providing new views of available data and new ways to serve one's own information needs. Providing such views requires policy and organizational culture changes that collect and maintain additional information about the statistics across departments and agencies.

Relation Browser Prototype Version 2

Based on the usability testing in the 1998-99 phase of work, several changes were made to the Relation Browser (RB). The main change deleted the filter checkboxes and made the date and region attribute sets tab-selectable alternatives to data type. Other improvements included: the website list was alphabetized; labels and basic instructions were added; the highlight color for mouseover was changed from the color used when topics were selected; the actual number of websites for each data type was added to the bars; the date ranges were collapsed for the 1990's into two 5-year increments; the website list was expanded to a wider window directly below the two attribute lists; the two select all and clear all buttons were combined into a single toggle button; the size of the overall window was changed to fit on a single screen; and alt tags were added in the HTML to make the prototype available to text-only browsers and assistive devices. Figure 1 displays a screen dump for this revised version (version 2.0) of the Relation Browser. The first goal of the current work was to conduct a field test of this revised tool.

The Relation Browser Online Test

Based on the usability testing done in the Spring of 1999 the RB was revised (see 1998-1999 final report for design revision rationale) and a link to the tool was added to the Fedstats website. Because the RB is a Java applet, only web browser versions that support Java could access the tool. In order to get public feedback for the tool, an online questionnaire was created and Office of Management and Budget (OMB) clearance to use the questionnaire was sought. The questionnaire aimed to determine whether the RB provided users with an overview of the available federal statistics, general impressions about the usefulness of the tool, and elicited information about the settings in which users were accessing the site. The questionnaire was drafted, discussed with BLS staff, and revised. The final questionnaire contained 10 Likert-scaled questions, one checklist question, and two open-ended questions. See Appendix A for the questionnaire. The questionnaire was approved by OMB in October, 1999 (OMB Clearance Number 1225-0059).

The RB tool was maintained at a server at the University of North Carolina Interaction Design Laboratory. A feedback button was added to the RB (shown in Figure 1, reflecting the 2.01 version). The questionnaire and all data collected were served, stored, and maintained at the Fedstats server. Thus, the network flow was as follows: a user clicked the "experimental site map" button either on the Fedstats home page or from the Fedstats site map page; the Java applet and metadata files from UNC began to download to the user's machine (this could take 60-180 seconds or more on a modem connection on a busy network or 5-20 seconds with a faster connection); when loaded, the RB interface and accompanying data was available for use and if the user was willing to provide feedback, they clicked the feedback button and the questionnaire

form was downloaded from the Fedstats server and displayed; when the user clicked the questionnaire form submit button, their responses were stored on the Fedstats server. The Fedstats Webmaster subsequently sent the responses file to UNC for analysis.

Figure 1. Relation Browser Version 2

This is an experimental tool that requires Netscape 4.5 (or higher) or Internet Explorer 4.0 (or higher). Please be patient as the tool may take some time to load. After you have used the tool, please take a few minutes to give us some feedback on it.

[Feedback](#)

FEDSTATS RELATION BROWSER
(Highlight topics to see overviews of data types, regions, or dates)

Topics (total # of sites)

Select All Topics
Agriculture (10)
Crime (11)
Demographics (37)
Economics (25)
Education (6)
Energy (13)
Environment (14)
Health (18)
Income (4)
Labor (6)
National Accounts (5)
Natural Resources (17)
Safety (7)
Transportation (17)

Information Attributes

Data Types | Regions | Dates

Data Type / # of Sites	0	150
Reports	<div style="width: 7.33%;"></div>	11
Tables	<div style="width: 0%;"></div>	0
Downloadable Datasets	<div style="width: 6.67%;"></div>	10
Searchable Datasets	<div style="width: 0.67%;"></div>	1
Graphs / Charts	<div style="width: 2%;"></div>	3
Maps	<div style="width: 4%;"></div>	6
Photos / Videos	<div style="width: 2%;"></div>	3

Web Site	URL
Air	http://www.ncdc.noaa.gov/
Earth	http://www.ngdc.noaa.gov/
Ecosystem status	http://www.epa.gov/ecoplaces/
Environmental Monitoring Systems	http://es.epa.gov/oeca/idea/index.html
United States Geological Survey	http://www.usgs.gov/
Introduction of Toxic or Hazardous Substance	http://www.epa.gov/opptintr/

IDL Relation Browser v. 2.01A

In the first days of accessibility (early November), the questionnaire feedback button was displayed (as part of the HTML that called the Java applet) while the applet was loading and some users clicked on it before the RB had actually loaded. A clarifying message was provided in early December.

Results of Online Test

Transaction logs for the RB tool include the IP address of the request, the date and time of the request, and the specific file requested. Because the RB is a Java applet, the HTML page for the RB tool is always the first request followed by a call for the Java applet jar file (a compressed file with the various Java classes) and three data files containing the data the applet uses. A total of 34956 requests were logged from November 12, 1999 to May 3, 2000. Due to a system failure, logs from May were lost. These requests do not include any requests coming from IP addresses associated with UNC so development and testing requests are mainly not included (there may be a small number of development or testing requests included through work done at home where ISP IP addresses that are dynamically assigned would appear in the logs). Because the logs consist of the applet request and three associated file requests but no records of what users actually examined while they used the applet or what sites they eventually clicked on, no attempts to do session analyses were made. One indicator of usage is that 7697 unique IP numbers were included in the requests. Because Internet Service Providers (ISPs) dynamically assign IP addresses (and individuals may use different machines), we cannot conclude that there were 7697 different users of the RB over this time, but it is highly likely that the RB was used by perhaps 7000 different users.

A total of 74 responses to the questionnaire were received from November 12, 1999 to May 3, 2000. Using the 7697 unique IP addresses as a conservative base (likely fewer unique users for this denominator value), this represents less than a 1% response rate. These respondents voluntarily chose to complete the questionnaire and had already chosen to use an experimental/optional tool from the Fedstats site, so they cannot be considered a statistically representative sample. For the purposes of judging the potential usefulness and usability of a new interface technique, they served this research well by giving general impressions and specific reactions to the design and possible deployment. Table 1 summarizes the responses to the scaled questions. Percentages are rounded up at the .5 threshold, thus percentages may not sum to 100.

Table 1. Online Questionnaire Summary

How effective overall was the “Information Attribute” screen in giving you useful information about topics that interest you? (*check one*)¹

Highly effective.....	27 (42%)
Somewhat effective....	20 (31%)
Slightly effective.....	8 (13%)
Not effective.....	6 (9%)
Did not use.....	3 (5%)

Which of the “Information Attributes” offered did you find most useful? (*check one*)

Data types....	39 (68%)
Regions.....	10 (18%)

Dates..... 8 (14%)

I found that the amount of information that this tool provided on its Web page was: (*check one phrase to complete the sentence*)

Far too much..... 0 (0%)
More than desirable.... 7 (12%)
About right.....38 (63%)
Less than desirable.....11 (18%)
Far too little..... 4 (7%)

How well did this browser tool help you do things with FedStats that you couldn't do with any other FedStats tool or tools? (*check one*)

Extremely well...15 (21%)
Somewhat well...16 (22%)
Not very well..... 7 (10%)
Not at all well.... 7 (10%)
No opinion.....28 (38%)

I find this tool useful for understanding what statistics are available from the federal government, that is, for obtaining an *overview* of the statistics available.

Strongly agree.....32 (43%)
Somewhat agree.....19 (26%)
Somewhat disagree.... 5 (7%)
Strongly disagree..... 4 (5%)
No opinion.....14 (19%)

I find this tool useful for *finding specific statistical information*, like the number of public high schools in the United States

Strongly agree.....12 (16%)
Somewhat agree.....17 (23%)
Somewhat disagree....10 (14%)
Strongly disagree.....12 (16%)
No opinion.....23 (31%)

I found this tool very effective for achieving one or more personal goals in my visit to FedStats today

Strongly agree.....22 (30%)
Somewhat agree.....14 (19%)
Somewhat disagree.... 9 (12%)
Strongly disagree..... 9 (12%)
No opinion.....20 (27%)

I would like to see this tool permanently added to the Fedstats web site?

Strongly agree.....36 (49%)
Somewhat agree.....10 (14%)
Somewhat disagree.... 2 (3%)
Strongly disagree..... 4 (5%)
No opinion.....22 (30%)

How often do you use Fedstats? (*check one*)

Never before today.....37 (56%)
Less than once a month..13 (20%)
About once a month.....12 (18%)
About once a week..... 3 (5%)
More than once a week... 1 (2%)

Are you now using this site from:

Home.....21 (32%)
Office/workplace...37 (56%)
School..... 6 (9%)
Library..... 1 (2%)
Other..... 1 (2%)

What was the primary reason you had in mind when you tried using this tool? (*check one*)

I just wanted to test it out and see what it would help me do that might be useful. **29 (43%)**
I wanted to see if it would give me a broad overview of the statistical data available through Fedstats **6 (9%)**
I wanted to see if it could help me gather general federal statistical information **5 (7%)**
I wanted to see if it could help me find very specific federal statistical information **24 (35%)**
Other (please explain) **4 (6%)**

Note that 43% of the respondents strongly agreed that the RB gave them a good overview, whereas only 16% strongly agreed that the RB helped them find specific information. These results illustrate that respondents did see the value of the tool for the purpose for which it was designed—helping users gain an overview. This is important as the RB is meant to be an adjunct to search tools rather than a stand-alone tool. It is not surprising that two-thirds of the respondents preferred the data type attribute as most useful since it was the default attribute provided. Respondents did not seem to be overloaded by the amount of information, in contrast to some of the subjects in the usability testing. It may be that those willing to use an experimental tool and also provide feedback are more open to novel interfaces. More than 40% of the respondents saw some capability in the RB that they did not find elsewhere (either responded extremely or somewhat well to the question about new capabilities). Half the respondents strongly supported adding the RB tool to the Fedstats repertoire.

It is interesting to note that more than half of the respondents had never used Fedstats before that session. About one-third of the respondents reported that they were accessing Fedstats from home. Together with the large volumes of access federal websites receive, these data reinforce the trend toward more generalized access to federal statistics, i.e., access and use is broadening to larger segments of the population than economists, statisticians, journalists, researchers, and other highly trained specialists who traditionally have been the primary users of government statistical data.

The two open-ended questions yielded a rich set of commentary. Table 2 provides the entire set of comments made by participants. In the Table, some of comments are truncated after 250 characters. All comments are included below and no semantic changes were made (i.e., spelling was corrected but not, grammar) except to expunge names as some respondents supplied their names. The comments offered by respondents show strong support for the RB as well as some strong criticism of it. A rough categorization of the 39 comments in the question includes 18 highly positive; 18 generally positive; and 3 negative comments. The most commonly noted feature related to the ability to categorize sites by attributes such as data type, region, and date (18 comments related to this feature). Nine comments related to the overview feature (e.g., “It was helpful to see where the links went before clicking on them.”; “...made it easy to see what site & agencies had useful information on specific topics.”; “Collecting the broad diversity of information sources produced by numerous federal government organizations...”). Five comments noted the availability of direct links to agencies (perhaps references to the URLs in the results set, which was specifically mentioned by usability test participants). Four comments

note time saving (e.g., “The quick ‘pop-up’ of information.”; “The quick snapshot...”). Three comments were strongly negative (e.g., “Confusing as hell.”; “Did not run.”). Many positive comments as well as suggestions for improving the tool were offered in the Suggestions for improvement comments. The most common comment (10 comments in this category) related to the need for help or additional examples. A help feature was added in the subsequent revision of the RB. Another issue mentioned in seven comments relates to infrastructure issues, e.g., improving the speed of applet loading or problems loading the applet. Older browsers that do not support Java were surely the cause of some of these problems, but the slow loading issue is a basic infrastructure issue that will remain for some time. Although some optimization is possible to make the applet and files load faster, this will remain an issue for people with slow network connections. Six comments related to display issues such as small fonts, opening new browser windows when different sites were selected, and having to scroll to see all categories or results. These are design tradeoffs that depend on user display monitors and general lack of screen real estate. Making the fonts larger is an easy option but will entail scrolling for users. Seven highly positive and three highly negative comments were offered without specific suggestions. Seven comments offered suggestions for improvement. Suggestions about additional details for specific websites were the main basis for the subsequent version of the RB but some suggestions (e.g., adding city data) related to underlying data rather than the interface.

- **Table 2. Respondent Comments on Features and Improvements**

In your own words, what is the *best* thing about this browser tool?

- The mouse overview of statistical/download availability by topic and date was very handy: a fast, easy way to understand the site and organize a search.
- The date information and also the region information. I’m a government documents librarian and it’s great to see that international information can be gained from US sites.
- Links
- I think it looked pretty cool but did not find what I was looking for
- Region, I believe tells me the lowest level of geography. Date, I believe tells me how current the data is.
- The ability to see al of the reports and/or data that is available in a certain category is extremely helpful. This is in direct contrast to the other way of browsing the website whereby one must continually back up and try something else to get at
- Being able to see the start dates is a spectacular feature.
- Listing the number of reports under the different categories
- Very Nice...
- Did not run
- Realtime graphic representation of "depth" of information on a given topic
- Better indication of where stats might bee found with out having to go back and forth as normal
- List of links by topic.
- I found it helpful in find site information specific to areas that interest me. I liked that it opened up a separate browser page so if I wanted to go back to the relation browser I could with no problem and without backing up through all the pages I
- Most useful was the compilation of urls by category, which made it easy to see what site & agencies had useful information on specific topics.
- The web links
- I liked the breakdown of the different data types available.

- None confusing as hell
- The index that showed if the data was regional, if it has graphs, etc.
- I found the browser's features to be very helpful in that I didn't have to click on each little stat that interested me. Just running the pointer over an area of interest and it appeared within my view and made it so easy to read.
- Collecting the broad diversity of information sources produced by numerous federal government organizations and making search and access convenient.
- I bit confusing in the automatic switching between site URL and info about the site's holdings. I liked the three perspectives on the site's holdings - type, time and level of geographic detail
- The quick "pop-up" of information
- Being able to sort the available web sites by data types or regions or dates was most useful to me. I was able to more accurately select the web site that would most likely contain the information or the type of information that I needed.
- It was more of an overview that showed me where the bulk of info was and how to access it.
- I really liked browsing at the specific web sites listed on the bottom window and knowing at the same time the types of files I would most likely find; the dates are also helpful. Congratulations! I think it is a very useful tool. [name expunged]
- The quick snapshot it gives, rather than having to go in loops and into lists of lists. I am teaching a course to American Indian health care providers who will be doing research, and rather than needing to tell them each place they could check to find
- The links to the other sites where information existed.
- Production of web sites (as well as links) corresponding to my information needs. I was just expecting info stats this is great.
- None
- Ability to visually illustrate the type of data available at the sites.
- What I have found so far has not help me at all. As mayor of a small city you have nothing for me. Thank you [name expunged]
- Links to the different Federal Information websites categorized.
- I really like the web addresses showing the agencies that are searched for the data.
- The ability to see what's available instead of stumbling blindly through the USGov's zillions of Web pages. ;)
- It was helpful to see where the links went before clicking on them
- I liked the categories, and the ease to locate, select, and navigate.
- The specific websites to find exactly what I'm looking for. I never knew how to word it just right without being taken down a "side road".
- Ease and speed of use.

Finally, please suggest *improvements* to the tool

- This is [name expunged]. I like the recent changes to FedStats but am not impressed with the relations browser. It did point out some flaws in the FedStats site that I'll point out. I do not, however, think it helps find data. I could be wrong, but I would
- Search terms need to be expanded
- As above: clearly mark the link as "download." expected to arrive at the linksite and read something about this before (choosing) to download. but please keep this on the site!
- I'd like to be able to click on a category, say, the 1960's in the Dates section and be given the addresses of the pages containing the info. That would be optimal and I'd probably start skipping the traditional search method altogether since
- Could not scroll down list of URLs for a given subject. Major problem.
- This is amazing. If and when I can find a use for this tool, I will buy it.
- Instructions

- Many of my URL choices did not let me go "back" to the FedStat page. Pretty soon I had about 7 or 8 FedStat windows open.
- 1) The list of Topics at the left does not show completely. The last button showing is "Natural Resources (17)". Please make the list longer. I'm running WinNTW 4 (SP6a), with MS IE 5. My video card is a Diamond Viper 550 set to 1600x1200. 2) I wo
- The site needs to give much greater assistance in actually taking users to the data sources that are cataloged. It is great to see that the data is available but very frustrating to find that you still have to then go search for it from the many
- Got the following message: "Applet Applet! can't start: class Applet1 not found"
- Look and feel is clunky
- Kind of annoying that a new browser opens each time a link is selected. I like that it opens a new browser, but not a new one each time. I would prefer it if the link opened in the same browser window previously selected. Also, since the attr
- I did not understand the Color change of the topic buttons. More information on how to use the browser might help.
- The displays of the Information Attribute screen were interesting, e.g. what types of data were available, for what dates, etc. Unfortunately, knowing that there were, say, 3 searchable databases for a given category didn't help in actually accessing
- A similar, java enabled tool that helps the user compose tabular data would be helpful. The present system to build tables uses HTML and radio buttons. Tabular data could then be placed in a suitable format for use with STAT programs such as SPSS,
- Be more clear in description
- You need a "How to Use" section that is clearly marked.
- It took a few minutes to figure out how to use the options available. For example, what happens when you select a topic, more than one topic, etc. It was a bit distracting when the URL info and the data types swap back and forth on the bottom se
- It's not entirely clear to the first-time user exactly what's being offered at the bottom -- it's not clear that the items are clickable, at first. The Information Attributes section is still baffling -- am I somehow limiting my search or is thi
- It totally stinks. No live links. No information that stays on the screen long enough to be useful.
- Everything
- When I highlight "crime" I can't see the bottom of the page that tells me what datasets are included in that section. The format needs to be changed, or it should allow me to highlight crime and then scroll down so I can get all the benefits from th
- Can't really think of any. If the rest of the federal government worked this efficiently, we would be getting our tax money's worth. Almost.
- Slow load
- Add a confirmation before launching new browser window to site. It would be very helpful to use the tabs as additional filtering criteria; after selecting the main topic, limit search to sub-county with historic data.
- Text was a bit small
- The information at the bottom changes if you move your pointer in a downward motion. For example, I clicked on a category (not a rollover) and then related web sites appeared in the box at the bottom. When I moved my pointer downward, it changed to
- Gosh, it's such a great tool that it's really hard for me to say that anything "needs" improvement. Perhaps the sensitivity of the "flipping" in the lower panel could be decreased somewhat. I found it a bit aggravating that, when trying to grab the
- The red/blue text to hard to read! I would like to see more direct links to the reports/tables/downloadable data/etc. that are graphed in the right panel. Good job so far, keep it up!
- Too soon for me to tell.

- This site wouldn't load. I got a message about some applet which couldn't start and the whole thing stalled. I think it needs more work.
- This was so INCREDIBLY SLOW in loading that this single disadvantage far, far outweighed any possible productive use.
- Ability to look click on the individual sites and get a quick overview of what type of databases are available.
- I would have liked to click on "Map" and have all of the links that have maps. Having all of the subdivisions set up that way would help so I don't have to scour through each of the listed web site when trying to find a map (or report, etc.)
- Load time
- City information.
- I thought the new browser was easy to use and provided a lot of information without having to click around a lot. I wouldn't change it, but please make it a permanent fixture of your site.
- I want to know if i can access census tract numbers for the local levels [email address expunged]
- I like a general overview of any database to make sure I am not wasting time trying to find data that would never be there. Some examples of types of searches are helpful for the infrequent searcher.
- The links area would benefit from having additional summary data available before going to the site.
- It would be nice to have a pop-up box giving a brief description of the data source. Some of the titles are less than useful. Even enhanced titles would help to determine whether to visit the web site indicated or not. Thanks for a GREAT enhance
- It would be better if we knew more about what were were looking at, it was a little bit of guess work the first time I used it.
- Download time.
- Specific instructions on cross referencing ie. economics to demographics. Is it automatically done when each is highlighted?
- No opinion

The field test online questionnaire yielded valuable feedback on the efficacy of the Relation Browser. In general, the responses and commentary were highly positive and lends support for the RB as an alternative tool for the Fedstats site. The experience of mounting and testing the site within the development group and in the Fedstats group was itself valuable as we learned how to define goals, explain our mission, and reflect on the possibilities for the tool and what would be necessary to deploy it as a permanent addition to the Fedstats interface repertoire.

Revised Relation Browser: Version 3

Based upon the feedback from the questionnaires, commentary from members of the Fedstats and BLS working groups and from students in Marchionini's classes, and our own reflections on the tool as we reported on its design and use, a third iteration was created (see Figure 2) and a usability test conducted in the spring of 2000. The revision included a help button that displayed a text overview of the tool (see Figure 3). Help was activated by mousing over the help button. The most significant change was in the results window. Rather than the website title and URL, we aimed to give more specific information about each site to further inform users about contents before they commit to clicking on the site name to load that URL's page. To accomplish this, a table was displayed showing which of the attribute values were contained in that site. For example, in Figure 2, the Administration for Children & Families website has reports, tables, and searchable datasets, but does not have downloadable datasets, graphs, maps,

or photos/videos². Note that to see the photos/videos column, a right scroll is necessary. Figures 4 and 5 show the tables for the same settings with Region and Date attribute tabs selected respectively. It is easy to see that the Administration for Children & Families site offers data at the state level and only from the 1996-2000 time range. Scanning Table 4 vertically shows that, for the sites displayed, only the Child Abuse website offers data for substates (other demographic sites are displayed by scrolling).

This technique offers significant advantages to users (several of the participants in the usability test noted how useful this could be). It is a logical extension of the overviews given by the coordinated windows in the main body of the interface in that it provides a preview of specific sites. The main windows allow users to explore the number of websites and types of data available for the official categories (14 topics or programs) of websites and the results window then allows the user to see the types of data available in specific websites in a chosen category. There are conceptual subtleties involved, however, as novices must first understand the categories and then the data attributes. For the first case, there was considerable evidence in last year as well as this year's usability tests that even sophisticated users did not associate data or agencies with these categories. For example, two subjects stated that they knew CPI was produced by BLS but selected the economics category rather than labor as they used the tool. In the second case, some users did not understand the use of the term "attribute" and some did not understand "downloadable" or "searchable" data sets. There was also some confusion about dates with respect to whether this referred to dates of coverage or dates of release. As with all search interfaces, people must map their personal terms that represent their information need onto terms actually used in the interface to take advantage of the look ahead capabilities of the RB.

In addition, there are implementation and control mechanism challenges for this feature. The table is not displayed until the user places the mouse in the results window (presumably, users focus attention on the specific sites and are prepared to see previews for the specific sites). When they move the mouse out of the results window, the table is replaced with the URL for those sites. In the usability testing, several participants specifically noted the advantages of seeing the URLs as well as the titles. The mouse movement actions to control these displays is yet another thing to learn and somewhat subtle as people are not used to substantial changes taking place through simple mouse movements. A complicating factor for usability testing in the prototype was a requirement to move the mouse in and out of the results area to activate the table, thus complicating the learning process (this was an artifact of the event management design of the prototype). Finally, the challenges of screen real estate forced use of small fonts and still required some scrolling in the results window. Several subjects in the usability testing noted that the fonts were hard to read. For generalizability purposes, it is important to recognize that the RB design lends itself to situations with a small number of attribute sets (in the Fedstats case, topic, data type, regions, and dates), each of which has a small number of attribute values (14 topics requires small fonts and the bulk of the screen to display without scrolling).

² Note that these web sites were indexed in Spring 1999 and characteristics may have changed.

Figure 2. Relation Browser Revised (Version 3)

This is an experimental tool that requires Netscape 4.5 (or higher) or Internet Explorer 4.0 (or higher). Please be patient as the tool may take some time to load. After you have used the tool, please take a few minutes to give us some feedback on it.

[Feedback](#)

FEDSTATS RELATION BROWSER
(Highlight topics to see overviews of data types, regions, or dates)

Help

Topics (total # of sites)

Select All Topics

Agriculture (10)
Crime (11)
Demographics (37)
Economics (25)
Education (6)
Energy (13)
Environment (14)
Health (18)
Income (4)
Labor (6)
National Accounts (5)
Natural Resources (17)
Safety (7)
Transportation (17)

Information Attributes

Data Types
Regions
Dates

Data Type / # of Sites	0	150
Reports	<div style="width: 15%; background-color: blue;"></div>	26
Tables	<div style="width: 12%; background-color: blue;"></div>	18
Downloadable Datasets	<div style="width: 12%; background-color: blue;"></div>	18
Searchable Datasets	<div style="width: 6%; background-color: blue;"></div>	9
Graphs / Charts	<div style="width: 3%; background-color: blue;"></div>	5
Maps	<div style="width: 2%; background-color: blue;"></div>	4
Photos / Videos	<div style="width: 1%; background-color: blue;"></div>	1

Web Site	Reports	Tables	Dowlo	Search	Graphs	Maps
Administration on Aging	X	X	X			
Adminstration for Children & Families	X	X		X		
Adoption Assistance & Foster Care	X					
Agency for Internal Development	X		X	X		X
Aging Population	X	X	X		X	X
Agriculture Research Service			X			
Child Abuse	X					
Child Care	X	X				

Relation Browser v. 2.3

Figure 3. Relation Browser Help Window Open

This is an experimental tool that requires Netscape 4.5 (or higher) or Internet Explorer 4.0 (or higher). Please be patient as the tool may take some time to load. After you have used the tool, please take a few minutes to give us some feedback on it.

Feedback

This tool aims to give you an orientation to the many different federal statistics websites. As you roll the cursor over different topics, the number of websites that have different types of information (e.g., reports, tables, etc.) is shown with both a blue bar and numeric value in the attributes column to the right. To see how many websites have information for different geographic regions and dates, click on the tabs at the top of the attributes column.

In the bottom window, the specific websites included in the blue bars are listed along with the types of information available in those sites. If you click on a topic, the website address is shown until you place the cursor in this window, then the information type is shown.

Use this tool to get an idea about the different types of statistical data available from the federal government and then either follow the links to specific websites or go back to the Fedstats home page and type in a query.

Relation Browser (of data types, regions, or dates) Help

Information Attributes

Regions Dates

# of Sites	0	150
		26
		18
Table Datasets		18
e Datasets		9
Charts		5
		4
Photos / Videos		1

Safety (7) Transportation (17)

Web Site	URL
Administration on Aging	http://www.aoa.gov/
Adminstration for Children & Families	http://www.acf.dhhs.gov/
Adoption Assistance & Foster Care	http://www.acf.dhhs.gov/programs/cb/stats
Agency for Internal Development	http://www.info.usaid.gov/
Aging Population	http://www.aoa.gov/aoa/stats/statpage.html
Agriculture Research Service	http://www.ars.usda.gov/
Child Abuse	http://www.acf.dhhs.gov/programs/cb/
Child Care	http://www.acf.dhhs.gov/programs/atrisk

IDL Relation Browser v. 2.3

Figure 4. Relation Browser with Region Attribute Tab Active.

This is an experimental tool that requires Netscape 4.5 (or higher) or Internet Explorer 4.0 (or higher). Please be patient as the tool may take some time to load. After you have used the tool, please take a few minutes to give us some feedback on it.

[Feedback](#)

FEDSTATS RELATION BROWSER
(Highlight topics to see overviews of data types, regions, or dates)

Help

Topics (total # of sites)

Select All Topics
Agriculture (10)
Crime (11)
Demographics (37)
Economics (25)
Education (6)
Energy (13)
Environment (14)
Health (18)
Income (4)
Labor (6)
National Accounts (5)
Natural Resources (17)
Safety (7)
Transportation (17)

Information Attributes

Data Types
Regions
Dates

Region / # of Sites 0 150

International	<div style="width: 10%; height: 10px; background-color: blue;"></div>	8
National	<div style="width: 20%; height: 10px; background-color: blue;"></div>	23
Regional	<div style="width: 5%; height: 10px; background-color: blue;"></div>	6
State	<div style="width: 20%; height: 10px; background-color: blue;"></div>	25
Sub-State	<div style="width: 5%; height: 10px; background-color: blue;"></div>	5

Web Site	International	National	Regional	State	Sub-State
Administration on Aging		X			
Administration for Children & Families				X	
Adoption Assistance & Foster Care				X	
Agency for International Development	X				
Aging Population		X		X	
Agriculture Research Service		X			
Child Abuse		X		X	X
Child Care		X		X	
Child Support Enforcement				X	

Relation Browser v. 2.3

Figure 5. Relation Browser with Date Attribute Tab Active

This is an experimental tool that requires Netscape 4.5 (or higher) or Internet Explorer 4.0 (or higher). Please be patient as the tool may take some time to load. After you have used the tool, please take a few minutes to give us some feedback on it.

Feedback

FEDSTATS RELATION BROWSER
(Highlight topics to see overviews of data types, regions, or dates)

[Help](#)

Topics (total # of sites)

Select All Topics
Agriculture (10)
Crime (11)
Demographics (37)
Economics (25)
Education (6)
Energy (13)
Environment (14)
Health (18)
Income (4)
Labor (6)
National Accounts (5)
Natural Resources (17)
Safety (7)
Transportation (17)

Information Attributes

Data Types
Regions
Dates

Date / # of Sites 0 | 150

Pre - 1960s	<div style="width: 10%; height: 10px; background-color: blue;"></div>	6
1960s	<div style="width: 15%; height: 10px; background-color: blue;"></div>	10
1970s	<div style="width: 15%; height: 10px; background-color: blue;"></div>	10
1980s	<div style="width: 25%; height: 10px; background-color: blue;"></div>	18
1990-95	<div style="width: 35%; height: 10px; background-color: blue;"></div>	23
1996-2000	<div style="width: 45%; height: 10px; background-color: blue;"></div>	34

Web Site	Pre-1960s	1960s	1970s	1980s	1990-95	1996-2000
Administration on Aging				X	X	X
Administration for Children & Families						X
Adoption Assistance & Foster Care				X	X	X
Agency for Internal Development		X				X
Aging Population	X	X	X	X	X	
Agriculture Research Service						X
Child Abuse						X
Child Care				X	X	X
Child Support Enforcement		X				X

Relation Browser v. 2.3

Usability Test

Nine subjects were recruited to participate in a usability test conducted at the BLS Cognitive Laboratory in mid-March, 2000. The five female and four male subjects were all experienced professionals: four were librarians, three were news analysts/journalists, and two were research analysts. These subjects all had substantial WWW experience and were paid a \$25 stipend for participation. Six of the subjects reported regularly using BLS and other statistical sites while the other three reported occasional usage of BLS and other statistical sites. Only one subject reported using Fedstats, three had looked at Fedstats but did not use it, and five had never looked at or used Fedstats before the testing.

The same testing protocol as in the previous year's study was used with minor changes to reflect the revised tool (e.g., since there were no filters, no questions were asked about filters; since a help function was added, reactions to the help were sought, and since attribute values for specific websites were added in the results windows, reactions to this addition were sought). The same six tasks were used and subjects did three with the Fedstats sitemap and three with the RB. Sessions lasted 40-60 minutes and a video recording was made from three video sources (camera on face, camera on keyboard/mouse, and display screen) and the audio recordings of participant utterances.

Summary of Site Map responses. Participants were generally familiar and comfortable with the organization and usage of the Fedstats site map. The site map is similar to those found on many other WWW sites by providing a hierarchical and alphabetical list of selectable links. They found it to be a useful entry point to the underlying data. One subject noted: "It looks like it covers everything...broad enough but specific enough to point you in the right direction." Another said: "It was useful...to get into the first layer...for example coal, energy or natural resources...but it doesn't really help you get into the lower layers." The alphabetical organization was important to participants. One noted: "I like the organization...I respond well to alphabetical lists of broad groupings...It's easy to get into and easy to navigate." Participants also mentioned specific things they liked about the site map. One liked the subtopic explanations in the site map, noting: "Yes, especially the things on right...you could glance at it kinda fast." Another pointed out that the number of categories (programs) seemed appropriate: "15 or so is the right amount (topics)...if you did more it might be too much."

Although participants were able to use the site map, some pointed out that using it required practice or domain knowledge. One participant noted: "I guess as a person who has a mind block about statistics but has to find them...need some way to educate me about the way that things are arranged...so I can link to keywords...maybe even like a tutorial." Another observed: "It helped that I was familiar with the data. If not, I'm not sure this would be helpful for someone not familiar. No knowledge of reports and what's in them...it might be difficult." The site map served as a familiar baseline from which to investigate the Relation Browser, which is a distinct tool from others in the Fedstats repertoire (e.g., keyword search, A-Z and agency list, Mapstats, site map) but more similar to a site map functionally for comparison and reflection purposes.

Summary of Relation Browser Responses. Participant reactions to the Relation Browser ran the gambit from delight to confusion but were overall quite positive about the possibilities of

using it in their work. Several noted that it would be helpful in one or more ways. They saw the possibilities for gaining overviews of federal statistical sites from several perspectives. First, some noted that the tool set up a process for understanding what is available. One noted that “it funnels you to information.” Another said: “Get good jumping off point to broad overview of categories that are available. I can see what kind of websites are available.” Second, one participant said it revealed relationships among the data: “To enable the searcher to understand the available websites on different subjects and to connect—to see the correlations between different subjects and relevant government agencies. To give the searcher understanding of the regions covered, types of data and time periods covered.” Third, one participant noted that more information was provided: “This allows you to drill down into topics and go in to see data type, dates, etc. Gives you a lot more information, more robust.” Fourth, half the participants said something about the forms of information (attributes) as beneficial features of the RB. “This is very good for getting an overview...it tells you what is included. As a researcher, I’d like this because it tells me how the data are available, plus this gives the URLs...this is a much more direct way.” Another said: “The fact that a lot of this information is coming from a lot of different websites...its pulling from a lot of different sites...the way this is organized is really phenomenal...it’s breaking it down by the way people really look for this information...by data, region, even though I don’t really understand everything, I know about tables...downloadable datasets, I’m sure..but that would be excel or spreadsheet...get the number of websites. This really helps me zero in on topics...I have a much bigger overview of what is available, I’m not just blindly going down this road.” Another said: “Well, I like how it gives data date and region.” Clearly, these participants saw several ways that the RB can provide an overview of data.

Another theme that was mentioned by multiple participants was the possibilities of saving time with the RB. One participant saw saving steps while searching by giving the example of using regional attributes to quickly eliminate examining sites: “If you are looking at industrial output and see no X under international....It takes an unnecessary step out of the process.” Another said: “It will help save you time in the long run...click on a topic, hold onto it and then go down there to see what is in the different websites, by reading down, it is very clear what is there.” Yet another participant said: “This one would save me time with dates and regions but I’d have to get used to it.” Other features mentioned favorably were displaying the actual URLs and the idea of using the tool as a bookmark management system.

Although these comments illustrate excellent promise for the RB, half the participants made some comment about needing some time to get used to using it. One participant suggested that reporters without Internet experience would have difficulty, noting: “Oriented more to the expert.” Three other participants noted: “I like it...but I’m not sure it would be used a lot by the novice.” “[A] little more explanation, help.” “Useful but hard for me...tricky....If I used it a lot I’d find it very useful....If I was required to find statistical data one or two times a day I’m sure I’d use it.”

Three participants specifically mentioned that they would like to have a keyword search capability. Because the RB was tested as a separate interface rather than as one aspect of Fedstats, the keyword search facility Fedstats offers was not available. These comments do illustrate the need for a variety of tools in any information retrieval environment. There were

several specific suggestions for improvement. One participant complained about the terminology: “Things that aren’t clear like ‘information attributes’ ..has more to do with personality like nice hair.” Two subjects questioned the value of the graphical bars showing how many websites had specific data types (redundant since the numeric values were there). One noted that the fonts were hard to read. Two respondents were bothered by the amount of screen activity. One said: “There is so much happening...when roll the mouse over, there is so much going on, roll here, something happens, go there, something else happens. Just too much going on.” Another reported: “Its annoying to see things changing and going in and out (referring to the Xs in the results tables).” Clearly, people need orientation to new tools and adopt styles of interaction that will continue to increase the range of alternatives interface designers must provide for public-access applications.

In sum, participants liked the RB but eight of the nine subjects noted that the site map was more familiar and easier to use. Subjects preferred different tools for different tasks: the RB was preferred as an *overview tool* and the site map was preferred for *finding specific information*. They noted that the RB gave more information, most commonly citing the data type, region, and date attributes and the URLs as examples of information given by the RB but not the site map. These results support the use of the RB as an overview tool that could be used as an adjunct to traditional tools such as the site map, A-Z list, agency list, mapstat, and keyword search tools. Clearly, the additional information provided in the RB gives people new views of federal statistics but these new views come with associated costs of processing and understanding. When understood as an alternative to existing tools (rather than replacement), the RB was a welcome addition for many of the subjects.

Implementation Issues

As one of the participants in the usability test noted, “[It is] important to get data right,” and several people at government agencies noted, it is crucial that the data associated with each website (e.g., what data types, dates, regions are available for that site’s data) must be accurately identified and updated as needed. In developing Relation Browser, we examined each of the websites and made judgments about (indexed) each of these attributes. Clearly, what is essential for a full implementation is for knowledgeable individuals from each of the websites to properly index the site. One procedure for this is to send a template to each webmaster with instructions for characterizing their site. The template (see Figure 6 for the template that was used with the original data collection) could be implemented as a website form and instructions to complete the form could be sent via email to alert webmasters to characterize their site(s). As webmasters submitted the completed template, the results would be added to the database on the Fedstats server. This would populate the database initially. A policy for updating the database should allow webmasters to update at their option (e.g., whenever major changes to the site were made) as well as periodically (e.g., every six months a reminder to update the database using the web-based template would be sent to all webmasters).

Figure 6. Data collection template.

Website Name:
URL:
Program (topic):
Agency:
Region International____National____Regional____State____Substate____

DataType Report____Table____Timeseries____Downloadable Dataset____Searchable
sataset____Graphs/Charts____Maps____Photos/Video____Other____

Time Period pre60s____60s____70s____80s____90-95____96____97____98____99____

The RB applet incorporates all the data for the 200 websites within the Java Jar file that is transferred to the client machine. Because 200 is a relatively small number of websites, scalability is not a large issue for data transfer. Maintaining the accuracy of the web sites as they evolve is an issue, however, it is impractical to change the applet each time one of the 200 sites adds new attributes or corrects previous values. Clearly, a database is required to store and maintain the attribute values for each website. A database scheme was designed to accommodate these data and a version of the applet created that read the data from the database on the fly as users passed the mouse over topics. The intention was primarily to demonstrate the database backend that will support data collection and maintenance within the Fedstats agencies. Directly linking mouse moves to database queries was implemented as a curiosity to see how the lookup and transfer delays would affect the dynamic query feel of the interface.

The database scheme used five tables (site, topic, data_type, region, and date) in a MySQL database and a Java applet that captured mouse moves and sent a query to the database through a JDBC interface. Figure 6 shows the flat file form of the data and Figure 7 gives the entity-relationship diagram for the relational database. Thus, each time the mouse is moved, a query is sent to the server and the data types (or dates or regions depending on which attribute set is selected), site names, and URLs are returned to the applet for display. Although this is a typical way that online transaction systems work with form fill or selection buttons, excellent connectivity is crucial in a dynamic query environment where each mouse move executes a query. When we tested the tool under highly controlled conditions (server and client machines in same building over 100 Mbs Ethernet connectivity), the resulting user experience was problematic as there is much screen ‘stutter’ as new values are loaded over the network with each mouse move. As expected, mouse over queries to remote databases greatly degrade the immediacy and naturalness of the dynamic query experience.

The practical recommendation is to simplify the Java applet to query the remote database upon startup and transfer the data to the client side (as was done in the RB versions field tested). Because this is not a transaction system that updates by the second, this solution seems sensible for actual implementation. It offers the best total solution since the data collection and maintenance necessary in the backend can take full advantage of a database management system while the user interface can offer highly interactive exploration options made possible by having all the data on the client machine. The database experiment described above demonstrates how this total solution can be implemented.

Summary of Relation Browser Development and Testing

Over a two-year period the Relation Browser tool has undergone three design iterations that involved two laboratory usability tests and one field test. In addition to informing the ongoing improvement of the tool, the usability tests demonstrate that the RB is a viable and potentially valuable addition to the tools and services offered by Fedstats. Although not all users reacted positively to the RB, many were highly pleased with it and noted that it helped them gain an overview of what federal statistics are available and how they are organized, and that the tool would save them time and effort when seeking federal statistics. Even with explanation, it is difficult for some to see the RB as an additional tool to be added to the Fedstats repertoire, adding new types of value rather than replacing the existing search tools and services. Although the RB can be used as an entry point for selection-based searching (e.g., drilling down through menus instead of typing textual queries) for statistical data, that is not its primary advantage and many users in the tests assumed it was meant as a search tool in place of query interfaces and other selection based interfaces such as hierarchical menus, maps, and alphabetical lists. Part of this is due to the testing that isolated the tool from the rest of the Fedstats repertoire.

The work reported here demonstrates that adding the RB to the repertoire makes sense and will bring benefits to a significant portion of the population. What remains is for federal policy makers to determine whether the costs of adding the tool are worth these benefits. The main costs lie in collecting and maintaining a new set of data that cuts across agencies. This is mainly a political cost of negotiation and collaboration as all Fedstats partners must agree that the data template is applicable to all sites and commit to requiring already over-burdened webmasters to take on another task. Given the potential for improving and extending citizen access to federal statistics and the opportunity to explore new ways to help citizens help themselves, we recommend that serious consideration be given to deploying the Relation Browser in Fedstats.

Extending Relation Browser “Look Ahead” Concepts to the BLS website

The RB incorporates several design ideas: providing looks ahead to existing information through mouseover control mechanisms; and providing new views of the underlying information through indexing that cuts across sources. The first concept is relatively straightforward to adapt to other settings and what follows is an outline of how mouseover mechanisms might be applied to give BLS users looks ahead from the recently revised home page.

The basic idea is to take each of the twelve buttons on the BLS site and add a mouseover (tooltip) that presents the same information that would be available currently if the user clicked

on the button. Thus, when the user mouses over the “Data” button, a popup window would display the list of choices available if the user would click on the button. Ideally, the items in this list would be selectable but even if simple “tooltip” techniques are used the list will provide a look ahead so that users can make a more informed decision about following the Data link. In the table that follows (Table 3), terminology is based upon BLS webpage vocabulary but modified to clarify and elaborate what will be found at the webpage. Efforts were made to keep the text lengths short to avoid screen clutter when the look aheads pop up and also so that screen readers could verbalize the texts succinctly.

Table 3. Look Ahead Suggestions for Twelve BLS Services

Data

Most Requested Series: select from a list of popular time series

Selective Access: specify query for time series

News Releases: select from a list of recent news releases

Series Report: specify query for a specific time series

FTP: download large data files

Economy at a Glance: select summaries of leading economic indicators

Economy at a Glance

National or Local Indicators

- Unemployment rate

- Change in payroll employment

- Average hourly earnings

- Consumer Price Index

- U.S. Import Price Index

- Employment Cost Index

- Productivity

Industry at a glance: employment by industry

Keyword Search of BLS Web Pages

Type a keyword question

Surveys & Programs

Employment & Unemployment: Select from list of 9 surveys and data

Prices & Living Conditions: Select from three indexes and a survey

Compensation & Working Conditions: Select from 6 surveys and data

Productivity & Technology: Select from 3 indexes and a report

Employment Projections: Select an employment estimates or Occupational Outlook Handbook

International Programs: Select from one index and 2 reports

Publications & Research Papers

Monthly Labor Review Online: research journal
News Releases: select from a list of news releases
Information Sources
MLR: The Editor's Desk
Special Publications
Catalog
Compensation & Working Conditions
Issues in Labor Statistics
Research Papers
Occupational Outlook Quarterly
Occupational Outlook Handbook
Career Guide to Industries

Regional Information

Select one of 8 regions from a US map

News Releases

Major Economic Indicators: select from the latest releases
Most Recent News Releases by Topic: select releases by topic
Schedule of News Releases: select from 4 categories
Archive: select from old releases
Employment & Unemployment: select from 6 monthly and 23 other releases
Prices & Living Conditions: select from 5 releases
Compensation & Working Conditions: select from 11 releases
Productivity & Technology: select from 4 releases
Employment Projections: select from 2 releases
International Programs: select from 2 releases
Regional News Releases: select releases from 8 US regions

Occupational Outlook Handbook

Access career information in three ways
 Search by occupation
 Browse occupational categories
 Browse a list of all occupations

K-12 Educational Resources

Career categories
Teacher Guide
BLS Career Home Page
Dept. of Labor Educational Resources

Contact Information

General questions

National

Regional

Specific questions on time series or surveys

Employment & Unemployment

Prices & Living Conditions

Compensation & Working Conditions

Productivity & Technology

Employment Projections

International Programs

Other Surveys

BLS Mission Management & Jobs

Mission Statement

Senior Management Officials

Fellowships

International Training

Strategic Plan

Jobs: opportunities to work at BLS

What's New

Latest News Releases

MLR: The Editor's Desk

Other reports and releases

The layering made possible by mouseover windows allows all this information to be viewed on a single screen without a single mouse click. The only technical challenge to this strategy is placing the popup windows so they do not occlude the button over which the mouse rests. A design decision is the wait time for a mouse to rest before the popup window is displayed. If users are given the option to turn off the lookahead feature, a one second delay is suggested.

If Dynamic HTML layering or other technologies (e.g., Java, Flash) are used, then the popup window items can be made selectable, thus creating shortcuts to the data as well as lookahead. A more difficult challenge is to create new indexing that cuts across the twelve 'buttons' (services) to give users alternative views of the overall range of BLS data and specific previews for individual services. This challenge remains for future work.

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Appendix A. Online Questionnaire

OMB Clearance Number: 1225-0059

Expires: 06/30/99

On-line Questionnaire

ON-LINE QUESTIONNAIRE—FEDSTATS RELATION BROWSER

Thank you for trying a new way to interact with the FedStats website, and for answering these few questions about your experience. Your feedback is important to us. When you have answered all the questions, just click the “Submit” button at the bottom of the page. Your answers will be automatically stored in a completely secure database on the FedStats server, and all personal information will be removed.

Please respond to these questions by checking the box beside the numerical rating that best represents your position.

How effective overall was the “Information Attribute” screen in giving you useful information about topics that interest you? (*check one*)³

- Highly effective Somewhat effective Slightly effective Not effective Did not use

Which of the “Information Attributes” offered did you find most useful? (*check one*)

- Data Types Regions Dates

I found that the amount of information that this tool provided on its Web page was: (*check one phrase to complete the sentence*)

- Far too much More than desirable About right Less than desirable Far too little

How well did this browser tool help you do things with FedStats that you couldn’t do with any other FedStats tool or tools? (*check one*)

- Extremely well Somewhat well Not very well Not at all well No opinion

³ The “check one” option will be implemented using radio buttons, which prevent multiple items being checked

Now, here are some statements about the tool. Please check *one* answer to indicate how much you agree or disagree with each.

I find this tool useful for understanding what statistics are available from the federal government, that is, for obtaining an *overview* of the statistics available.

- Strongly agree Somewhat agree Somewhat disagree Strongly disagree No opinion

I find this tool useful for *finding specific statistical information*, like the number of public high schools in the United States.

- Strongly agree Somewhat agree Somewhat disagree Strongly disagree No opinion

I found this tool very effective for achieving one or more personal goals in my visit to FedStats today

- Strongly agree Somewhat agree Somewhat disagree Strongly disagree No opinion

I would like to see this tool permanently added to the Fedstats web site?

- Strongly agree Somewhat agree Somewhat disagree Strongly disagree No opinion

Finally, here are just a few questions about your usage of FedStats and the World Wide Web.

How often do you use Fedstats? (*check one*)

- Never before today Less than once a month About once a month About once a week More than once a week

Are you now using this site from:

- Home? Office/ Workplace? School? Library? Other?

What was the primary reason you had in mind when you tried using this tool? (*check one*)

- I just wanted to test it out and see what it would help me do that might be useful.
 I wanted to see if it would give me a broad overview of the statistical data available through Fedstats
 I wanted to see if it could help me gather general federal statistical information
 I wanted to see if it could help me find very specific federal statistical information

□ Other (please explain) _____

In your own words, what is the *best* thing about this browser tool?

(Text box provided)

Now, what is the *worst* thing about this tool?

Finally, please suggest *improvements* to the tool.

(Text box provided)

Thank you for your comments and advice! If you are satisfied with all your answers, click on the “SUBMIT” button below.

SUBMIT

Appendix B. Usability Testing Protocol

Fedstats Overview Usability Testing

A. Welcome

[subject invited to sit at computer, monitor off. Fedstats and RB are loaded with Fedstats in active window, full screen mode]

[be sure to clear cache before each subject arrives]

My name is _____ and I'd like to thank you for helping us get preliminary reactions to a prototype interface tool. This tool is meant to help people get an overview of the different statistical products made available by 70 government agencies. This session will take no more than one hour and it is important that you understand that we are interested in assessing this system, not your knowledge or performance. We will videotape this session so your face may be linked with your actions and shown in research meetings outside BLS but none of the data that we collect will be attached to your name.

First, tell me a bit about your experience.

What type of work do you do?

How often do you use a computer?

How often do you use the WWW?

Do you regularly use federal government statistics?

Have you ever used the Bureau of Labor Statistics website?

Have you ever used the Fedstats website?

Other statistical websites?

B. Fedstats

[turn on monitor]

Look at this home page and please read the statement of purpose. [give time to read]

One way to get an overview of a website is through a site map--usually a table of contents for the site. Please click on site map.

Does this overview help you get a sense of what is available?

I'm going to ask you to start with the site map and find some specific information. We are more interested in how you would try to find these statistics than in actually locating them. [After 3 minutes, stop subject, thank them, and go on to next question]

1. Beginning with the Fedstats site map, find the average per capita health care costs for a US citizen. [\$3925 in table, just shy of \$4000 in text at HCFA]
2. How much coal was produced in California in 1997 [none from table]
3. What is the latest value of the consumer price index? [165 in March 99 at BLS]

[turn off monitor]

How useful is the site map for finding specific statistical information?

How useful is the site map for gaining an overview of the kinds of statistical information produced by the federal government?

C. Relation Browser

I am now going to ask you to try out an alternative tool for the site map you have just used. I'd like you to think about the pros and cons of such a tool as we work and at the end of the session we will discuss them.

[turn on monitor and activate RB window, ask subject not to touch the mouse until asked to do so]

Please study the screen. The topics are the same as those on the site map. What do you think the numbers in parentheses after each topic mean?

[After response, tell them this is the number of federal websites that have statistical information on that topic]

Please use the mouse to roll over the topics but do not click the mouse.

What do you think is happening in the data type window?

Please click on a topic. What do you think is happening in the data type window? In the results window below?

Please click on a website. Within that website, you will find statistical reports, tables, etc.

Close the website.

Click on the topic again. Note that it releases the highlighting and list of websites.

Click on another topic. What do the bars tell us here?

Click on another topic. Note the data type column and results box. What happens when more than one topic is selected?

Click on the help button. Read the help. Does it help you understand this tool?

[Turn off monitor]

Let's discuss this tool. Based upon this brief introduction, please tell me your first impressions about this tool. What might it be used for? How is it like the site map you used earlier? How does it differ from the site map?

I will now ask you to do a few tasks like the ones you did earlier.

[turn monitor back on]

1. Find the average K-12 public school expenditure in the U.S. [\$7163]
2. Find the most recent cost of a barrel of crude oil.
3. What is the latest producer price index value?

[Note for all the tasks, do not let users go very long--we are interested in how they start and use the site map and RB]

How many websites have downloadable data sets for health?

How many federal websites offer demographic statistics?

What do the bars represent?

What is the difference between mousing over a topic and clicking on the topic?

What happens when the filter check boxes are deactivated (e.g., if only substate and regional are checked)?

What is meant by substate regions?

What do the X's in the results window mean?

D. Debriefing

Would you find this tool useful if you were trying to understand what statistics were available from the federal government; that is, does it provide an overview of the available statistics?

Would you find this tool useful if you were trying to find statistical information like the number of public high schools in the US?

How would you compare the relation browser to the Fedstats site map?

What was confusing about this tool?

What could be improved?

What could be added?

What is the best thing about this tool?

What is the worst thing about this tool?

Thank you for your help in testing this prototype tool!

