CONSULTING REPORT

Prepared for CLOSUP by J2S2 Consultants

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EXECUTIVE SUMMARY

The Center for Local, State, and Urban Policy (CLOSUP) at the University of Michigan's Ford School of Public Policy has found that users across their target audience, including researchers, journalists, and students, have difficulty finding the information they need within the CLOSUP website and MPPS database. To assess the challenges experienced by users, we interviewed seven individuals in order to understand their workflow and processes, as well as observe and question how they search for and interact with data related to public policy in Michigan. This study was conducted over the course of three months in partnership with CLOSUP and focuses on CLOSUP's Michigan Public Policy Survey (MPPS). Interviews, observations, and usability tests regarding CLOSUP's website were conducted.

This report documents methodology, findings, and recommendations in relation to the website architecture, page layout and content, and question search function. Our overarching finding is that the website itself is the most valuable finding aid for users. Instead of introducing a new search tool or finding aid, we recommend improving the usability of the MPPS website to help users understand the survey and find content. Below are the findings for each category:

Website Architecture

- The current grouping of survey data makes it difficult to explore and navigate between themes. Users are often unsure what terminology to use in order to find what they are looking for within the MPPS.
- Newcomers to CLOSUP have difficulty differentiating between public and private data and are often unaware that more information exists through IRB approval.
- The website architecture makes it difficult for new users accustomed to current design conventions to find what they need.
- Users find reports to be incredibly helpful, but both new and experienced users had difficulty searching through reports to find key information.
- The content of pages, including headers and terminology, do not reflect the ways that non-CLOSUP users might search for information.

Page Layout And Content

- People find the amount of content on pages overwhelming.
- People are drawn to the graphs on the main CLOSUP page.
- Non-expert users find the survey methodology jargon confusing.

Search Function

- Survey question search function only runs exact-word matching queries on the question text leading to poor results.

INTRODUCTION

CLOSUP'S MISSION

Founded in 2001, CLOSUP is a research center in the Gerald R. Ford School of Public Policy at the University of Michigan focused on producing and disseminating policy-relevant research on local, state, and urban issues. In addition to publishing research, CLOSUP advances their mission by sponsoring events, coordinating internships for students, contributing content for undergraduate courses, conducting surveys, and maintaining a website with resources for researchers, students, government officials, journalists, and members of the public.

CLOSUP conducts the Michigan Public Policy Survey (MPPS) which is a semiannual survey of local government leaders covering 1,856 jurisdictions in Michigan. Since it began in 2009, the MPPS has collected opinions and impressions of government officials across Michigan to inform other local officials, the business community, and the public about policy views and priorities within government.

PROJECT GOAL: IMPROVE DATA ACCESS AND USABILITY

CLOSUP has found that users across the board, including researchers, journalists, and students, are having difficulty finding the information they need within the CLOSUP website and MPPS database. As a result, the office receives phone calls asking for guidance toward the appropriate data. CLOSUP's goal is to facilitate the discovery of their datasets and tabulations. To this end, we conducted research and interviews to:

- Evaluate existing search features for MPPS data on the CLOSUP website, and
- Make design recommendations to attract more data users and facilitate the exploration of MPPS data.

BACKGROUND

USER-FRIENDLY WEBSITE DESIGN

Though CLOSUP has a wealth of incredible data, our research has shown that new and experienced users have difficulty finding what they need without assistance from CLOSUP staff. Though its current audience consists primarily of professors with internal review board (IRB) approval, CLOSUP's administrators have expressed a desire to broaden the reach of its data to include students, journalists, and other members of the media. Our mission is to help CLOSUP achieve its goal of facilitating access to MPPS survey data by helping users easily locate the information they're looking for within the system, as well as increase their awareness of the full range of MPPS data that is available with IRB approval.

Using information recorded during user interviews, our team created an affinity wall to show the relationship between user feedback across the spectrum, from students and seasoned journalists to expert users like the CLOSUP staff. By grouping user feedback into categories, we were able to identify clusters that highlighted specific pain points. One of the largest clusters appeared around the issue of content, specifically the ways in which information is presented on the page and how it influences users' interactions with the site. Many of our findings center around the idea of making content within a page easily scannable which is something of increasing importance for audiences hoping to find the information that they need quickly and efficiently.

Across the web, users are becoming increasingly accustomed to websites and databases that emphasize the user experience, designed and architected to allow newcomers to a site to locate desired information without any outside assistance. As MSNBC's Jim Ray notes in a Stanford video report on data journalism, there is an increasing demand for raw data that can be visualized by experts at news organizations and disseminated to the public. "The amount and the access to data from different places is exploding," Ray says. "[...] The federal government is actually releasing data in a fairly raw format and really isn't trying to spin it in any way. They're just saying, 'these are the numbers, do with them what you will.'"[1] In order to make use of the data, however, journalists must first be able to access it. This rise in data accessibility and trend of updating web pages every few years to adhere to current design conventions has led to a decrease in user patience for sites that require more time to learn; instead of spending time exploring a given website to find what they need, users will either seek information elsewhere or, in some cases, reach out to the site's staff for assistance.

One challenge that organizations like CLOSUP face is striking the balance between accessibility and maintaining the confidentiality of identifying information. For newcomers to the site, it is often unclear whether the data they seek resides in the public or private datasets, and CLOSUP currently does not have an established mechanism for guiding users to the specific data sets that would be most helpful to their research. As a result, users often call CLOSUP staff for assistance, who then refer them to additional data sets that might better answer their questions.

In order to increase the use of its data, CLOSUP must make strides toward increasing the "scannability" of each page. Our team identified the following key issues surrounding content, and explored ways

[1] McGhee, Geoff. "Journalism in the Age of Data: A Video Report on Data Visualization by Geoff McGhee." Stanford University, 1 Jan. 2010. Web. 14 Feb. 2016.

[2] ibid.

of addressing them in our findings and recommendations section later in this report.

- People appreciate reports, but have difficulty scanning the page to pull out key findings. They are also unable to use the general search function to quickly highlight key terms.
- Wording on the CLOSUP site is wonky, potentially alienating users unfamiliar with survey terminology. Website does not follow industry web conventions.
- Data is grouped by year, not theme, making it difficult to see thematic trends at a glance.
- Organization and size of text makes scanning difficult.

Our team has broken these key findings into a series of manageable recommendations that can be implemented as time allows. By implementing the small changes elaborated later in this report, CLOSUP can increase the usability of their site and expand their reach to new audiences.

SEARCH AND DATA FEATURES

In the last five years, governments and public entities have made increasing amounts of the data they collect public. This has provided a significant opportunity for citizen activists, researchers, students and the general public to use this wealth of data to improve government and citizen services at the local, state and national levels. The results are impressive, with projects ranging from improving health and education to making the federal budget more transparent and accessible.

Behind the success of the open data movement lies important best practices that make data discoverable and usable by end users.[3] Perhaps the most important is accessibility. One important tenet to making data accessible is releasing it in formats that lend themselves to easy and efficient reuse via technology. This implies two things. First, the formats must be open, meaning they can be used within any software system, whether it's proprietary or not. And second, they should be released in a variety of formats. Structured formats such as JSON, CSV and XML are more machine readable and easier to manipulate by serious researchers and data scientists. HTML, PDFs and text files give those without deep technical training an easy way into the data.

In addition to raw files, open data portals can make data more accessible by providing tools such as search, interactive visualizations, pre-run statistics tables and mapping. According to the authors of The Craft of Information Visualization: Readings and Reflections, the most difficult task a user faces when confronted by a new and large database is to actually know which questions to ask in the first place.[4] Information visualization and discovery tools help mitigate this by giving the user a tool to gain an overview of the data, explore it rapidly, test hypotheses and eventually discover which questions to ask. University of Maryland computer science professor Ben Shneiderman defines seven ways to do this. They are: overview, zoom, filter, details-on-demand, relate, history and extract.[5] Advanced filtering is one of the most useful tools for a user. Sliders, buttons and other direct manipulation queries provide instant feedback allowing a user to do their own data exploration. Zooming and filtering provide another way for a user to explore subsets of the data and gain further insight. These tools are common on many websites and data portals.

[3] "Open Data Policy Guidelines." Sunlight Foundation Blog. Accessed February 14, 2016. https://sunlightfoundation.com/opendataguidelines/.

[4] Bederson, Benjamin, and Ben Shneiderman. The Craft of Information Visualization: Readings and Reflections. Chapter 1. Database Discovery with Dynamic Queries, pg. 1. Amsterdam: Morgan Kaufmann, 2003.

[5] Shneiderman, B. "The Eyes Have It: A Task by Data Type Taxonomy for Information Visualizations." Proceedings 1996 IEEE Symposium on Visual Languages, July 1996, 2. Accessed February 06, 2016. http://drum.lib.umd.edu/bitstream/handle/1903/466/CS-TR-3665.pdf?sequence=2.

Search is also an invaluable tool to help users find specific information in a data-set or subset. While keyword searching and boolean queries provide simple ways to retrieve information, they do not always find data at the granular level a user wants. In fact, one of the biggest issues in information retrieval is still relevance according to the authors of *Search Engines, Information Retrieval in Practice*.[6] Simply comparing the text of a query with the text of a document and looking for an exact match produces very poor results in terms of relevance. This is referred to as the vocabulary mismatch problem.

Various methods exist to solve this problem including ranking algorithms, topical relevance, query suggestion, query expansion and semantic indexing. One of the easiest and most intuitive for users is query expansion. It allows users to give additional input on query words or phrases, possibly suggesting additional query terms. A familiar implementation of this is the auto suggest box that drops down like on the Google search engine. This provides the user with alternative queries that may provide a closer approximation to the information they are actually searching for. To implement this feature, an organization needs to have a thesaurus for terms in their data. While complex statistical and machine learning algorithms exist to create these, a smaller organization can build its own thesaurus with human editors. A user search can then reference this thesaurus providing a greater relevancy in the results.

As noted later in our findings and recommendations, CLOSUP should strive to improve the discoverability of information on its site. By implementing the simple changes to its question search feature elaborated later in this report, CLOSUP can achieve this.

METHODOLOGICAL OVERVIEW

In order to gain the necessary insights to provide solid recommendations to the our team used a variety of methods in order to gain insights into the challenges facing MPPS's data collection, acquisition, distribution, and discovery processes. Our main approach involved interviews and analyses. In each interview, at least two members of our team were present. Each member took on the role as either a notetaker or moderator/interviewer. Interviews lasted from 45 to 90 minutes. Following all interviews, our team held a debriefing session. Annotated notes from the interviews were shared amongst members via Google Drive.

We began by interviewing our key stakeholders: those that work for CLOSUP. During this stage, our main goal was to understand the various roles each member of the team was responsible for. After gaining a clear understanding of CLOSUP's mission and team, we began our contextual inquiry. The contextual inquiry involved two parts. The first were a set of standard questions about the each team members' key responsibilities and how they accomplish them, followed by observing them work in their natural environment. During the observation stage, members of our group interceded between tasks in order to ask questions to gain greater insights into the work that was being done. In total, we interviewed and observed three members of the CLOSUP team. The members included the Project Managers of CLOSUP and MPPS and a Research Specialist.

Following interviews with our client, we began to approach those outside of this organization. These individuals included one member of the press and two master's candidates from the Ford School of

[6] Croft, W. Bruce., Donald Metzler, and Trevor Strohman. Search Engines: Information Retrieval in Practice. Chapter 1. Search Engines and Information Retrieval, pg. 4. Boston: Addison-Wesley, 2010.

Public Policy. These interviews involved understanding how survey experts, those in the Ford School, and non-experts, members of the press, interact with CLOSUP's site and the data housed there. In order to gain a better understanding of this, we asked questions related to their past experiences with data and surveys. From there, we asked them to perform searches related to public policy and government in Michigan. We then observed how users interact with CLOSUP's website.

Our final interview was with a worker at Inter-university Consortium for Political and Social Research (ICPSR). Our interview with this individual was conducted in order to understand the process other organizations take to make data on their site visible and discoverable.

Target Population

Our target population includes workers at CLOSUP, members of the press, and data and survey experts.

Recruitment Process

We recruited all interviewees through CLOSUP or the Ford School of Public Policy.

Participants

We interviewed a total of seven individuals. There were three male and four female interviewees. Some interviewees were survey and data experts, and others were not.

Analysis

Upon completion of each user interview, we analyzed our findings together as a group. Following each interview, we reviewed each other's annotated notes at meetings, debriefed with one another, and discussed our findings. Once all user interviews were complete, our team held an interpretation session in which we created an affinity wall. This "wall" gathered all our findings from each interview, which we then grouped by theme in order to relate interviews to one another and find commonalities. Through this exercise, we were able to pinpoint specific challenges that CLOSUP and its potential users face. We then brainstormed ways in which to combat these challenges, which guided the recommendations found in the next section.

Jake of Team J2S2 decides where the next affinity note should go. The affinity wall allowed us to group related information from interviews with different members of the target audience to generate key findings.

FINDINGS & RECOMMENDATIONS

OVERVIEW

CLOSUP develops and promotes several finding aids to help people discover data on the website. These finding aids include the MPPS survey question database, pages describing the content of each survey wave, a list of questions and topics covered more than once, links to pre-run data tables organized by survey wave, and PDFs of survey questionnaires.

Our interviews suggest that the CLOSUP website itself is the most valuable finding aid for users.

Our goal was to evaluate and improve upon these finding aids. However, our interviews suggest that the website itself is the most valuable finding aid for users. With the current website structure and page layout, CLOSUP risks losing users before they encounter the official finding aids. Instead of improving the existing finding aids in isolation, we recommend improving the usability of the MPPS website as a whole to improve data discovery and user satisfaction.

WEBSITE ARCHITECTURE

Finding 1: The current grouping of survey data makes it difficult to explore and navigate between themes. Users are often unaware what terminology to use that will yield the results they're looking for.

Evidence: Through observations and interviews, we found that people tend to search by theme based on the research they are conducting. While our interviewees were enthusiastic about the amount of information available to them through CLOSUP, the terminology used on the site often did not match the terms people had in mind. For example, a person conducting research into road use and maintenance would see very different results searching for the words "road," "roads," and "infrastructure," all of which relate to the common theme of the research.

Recommendation 1a (Long-term): Group survey data thematically, and make it easy to navigate between themes. Our research examined how new users within the target audience find and access data on the web, and found that they prefer to see information grouped by topic when searching for data. An organization that does this well is the Pew Research Center, which groups related information into an easily-scanned page that helps users find what they're looking for.

Recommendation 1b (Long-term): Make it easy for users to compare survey data for a specific question across years.

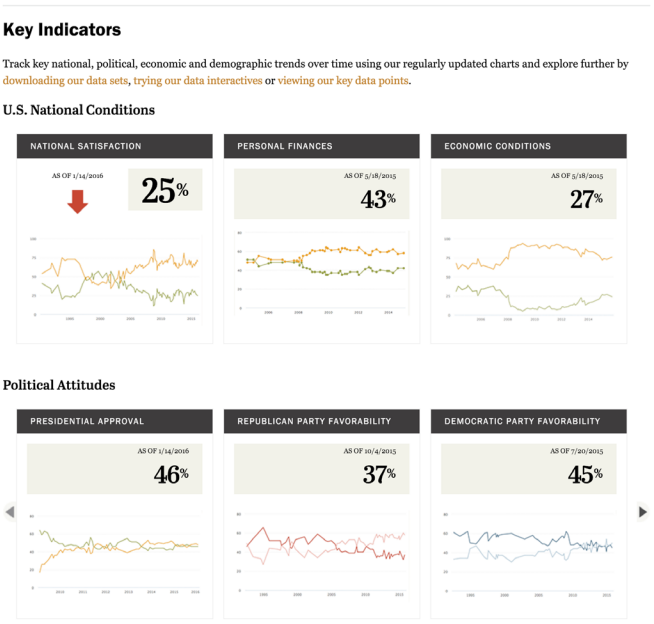

Fig. 1: The Pew Research Center groups its data thematically, allowing users to quickly find what they need.

Finding 2: Newcomers to CLOSUP have difficulty differentiating between public and private data, and are often unaware that more information exists through IRB

approval.

Evidence: While interviewing an internal user of the system, we noticed that the numbering of questions within a wave jumped from 15 to 17. Internal users of the system know that this indicates that question 16 is an open-ended question and excluded for confidentiality, but newer visitors to CLOSUP might simply think this is a typo. Though the CLOSUP site details the distinction between public and private in the "Data Access" section, this distinction is not clearly indicated on subsequent pages (see Fig. 2). As a result, newer users to the system may not realize the depth of information that exists, and might not know to request IRB approval to see this data.

Fig. 2: The CLOSUP website does a great job of describing public and restricted datasets, but this information is difficult for new users to find.

Recommendation 2 (Long-term): Structure the site in a way that clearly shows the differentiation between public and private data so that users are aware that more data is available with IRB approval. There are many ways to do this that merit further investigation, including navigational tabs, a placeholder button or icon to indicate that additional information is available with IRB approval, or simply a line of text at the beginning of each dataset describing this distinction.

Finding 3: The website architecture makes it difficult for new users accustomed to current design conventions to find what they need.

Evidence: During interviews with new and experienced users of the CLOSUP website, we found that the overall organization of the site presented a challenge for new users, particularly those accustomed to sites with the navigation menu running horizontally along the top of the site. In interviews, we asked each participant to find information related to a pre-specified topic; in most cases, users went to the left-hand MPPS navigation, read through the menu options, and then exited that menu in favor of the search box in the upper right-hand corner of the site. In one instance with an experienced user of the system, it was easier to pull the paper copy of the survey than to use the website to find that information.

Recommendation 3a (Short-term): Perform an information architecture audit of the CLOSUP site to help visualize the flow of information from page to page. This will help see where content like reports, questions, and study pages can be better organized and categorized.

Recommendation 3b (Short-term): Separate frequently asked questions (FAQ) section out of the "overview" page, where it is currently nested under the link "more info." This information is crucial to users understanding how valuable MPPS data is and should not be more than one click away.

Recommendation 3c (Medium-term): Keep the information in the right sidebar both concise and consistent to make it a place users know they can turn to for quick links to helpful informa-

tion. Our research found that most people pay very little attention to this side of the page due partly to the amount of content displayed there; by editing this content to include only the most important information and repeating it across pages, CLOSUP can make better use of this space. Another solution might be to redistribute the content currently contained within the right-hand navigation across the rest of the site, allowing CLOSUP to simply remove this section and devote more screen-space to the rest of its content.

Finding 4: Both new and experienced users report difficulty searching through reports to find key information.

Evidence: Research and interviews showed that the component of the CLOSUP site that users liked the best were the reports, which clearly show patterns in the data surrounding key issues and present key findings to users without them having to analyze the data themselves. However, users often got stuck in the reports trying to pull out information specific to their topic of study due to a lack of searchability. Many reports are uploaded to the site using Issuu, a digital publishing tool that does not allow for users to perform command + F searches for keywords. This frustrated the majority of our users, who confused the Issuu-generated sidebar ads with page thumbnails, and were unable to locate a "back" or "escape" button to leave the Issuu window.

Recommendation 4 (Short-term): Instead of using Issuu to digitally publish reports, embed reports directly on site either as easily-downloadable PDFs or as plain text. This will enable people to search within reports, as well as give them options for how they'd prefer to view the content.

Finding 5: Content of pages, including headers and terminology, do not reflect the ways that traditional users might search for information.

Evidence: As we will describe in more detail below, the way that CLOSUP defines "data" is different from how non-expert users might think of the term. This difference in the way people from the policy world and those outside of it define MPPS-related concepts, including students and journalists, surfaced in user interviews and caused confusion for people accustomed to seeing certain language used as headers on sites with downloadable data. On other sites that researchers or journalists might visit to find data, navigation menus are fairly consistent and guide users to pages containing similar content (See Figs. 3a-d). Because CLOSUP's site is arranged differently from what users are used to seeing, our research found that users across the professional spectrum find it challenging to locate the data they need.

Recommendation 5 (Long-term): Follow web conventions that have become standard in the data industry, such as including a "data" tab and a "publications" tab that leads users to a page where they can filter by year or by theme.

PAGE LAYOUT AND CONTENT

Finding 6: People find the amount of content on pages overwhelming. The text-heavy pages with a small font size make it challenging for users to scan pages to discover whether the information is relevant for them.

Evidence: After the first glance at a page, several users expressed confusion about the content

available, summarized by one student who said, "I don't have a good idea of the topics covered from this page." While answers to many user questions are in the existing text, new users are reluctant to spend time reading it closely. One student user shared that she wants to know she is in the right place for information before taking the time to read the text. When another user navigated to the Research page, he saw the small print and said it would just turn him off from using the site if he were in a rush. The small font size was challenging for all of the users we interviewed. During the site navigation portion of the interviews, people visibly leaned closer to the screen after opening the CLOSUP page in order to read the text.

Recommendation 6a (Medium-term): Reduce the amount of text on each page. Users are willing to read paragraphs of text once they are reasonably confident they are in the right place, but the text is ignored by users browsing the website.

Recommendation 6b (Medium-term): Use descriptive section headings to help people scan content. Descriptive headings will help users scan pages and identify information that is most relevant to their search. Increasing the number and descriptive content in headings will also help with the preceding recommendation. Improved headings will reduce the need for large paragraphs of text.

Recommendation 6c (Short-term): Increase the font size of text on the website. Users will spend more time reading if the text is easier to see.

Finding 7: People are drawn to the graphs on the main CLOSUP page, and they like the thumbnail versions of the reports as helpful previews of the content.

Evidence: When our users started their search on the main page of the CLOSUP website, they were all drawn to the images in the carousel and selected the bar graph about policing from the most recent MPPS report. However, one user expressed disappointment that clicking on the graph led to text instead of more graphs, saying "this is not what I expected." Adding images and icons can also break up long sections of text to improve the scannability of pages. One user was overwhelmed by the long list of report links, but the same user expressed appreciation for the thumbnails of reports in a different section of the website. She added, "I want more images or graphics to illustrate the links."

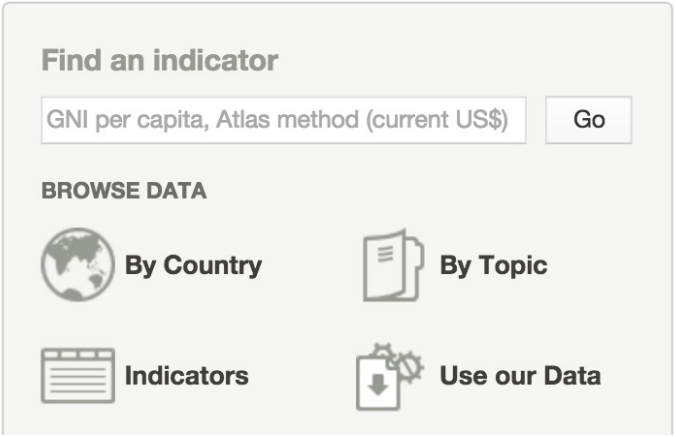

Fig. 3: The World Bank utilizes semantic icons to help users find the information that they need at a glance. Source: World Bank Open Data page, available: http://data.worldbank.org/

Recommendation 7a (Medium-term): Include more images or icons to help users navigate pages. For new users scanning the website, icons will help them understand the categories of topics covered by MPPS. For returning users, the familiarity of the icons will help them navigate quickly to the data they need.

Recommendation 7b (Long-term): Include more graphs with MPPS data on the website (see Pew example in Fig. 1). Users are drawn to the graphs on the website, so these should be leveraged to showcase the important topics covered by the MPPS. Graphs can serve as the hook to get users engaged and curious about the other content MPPS has to offer.

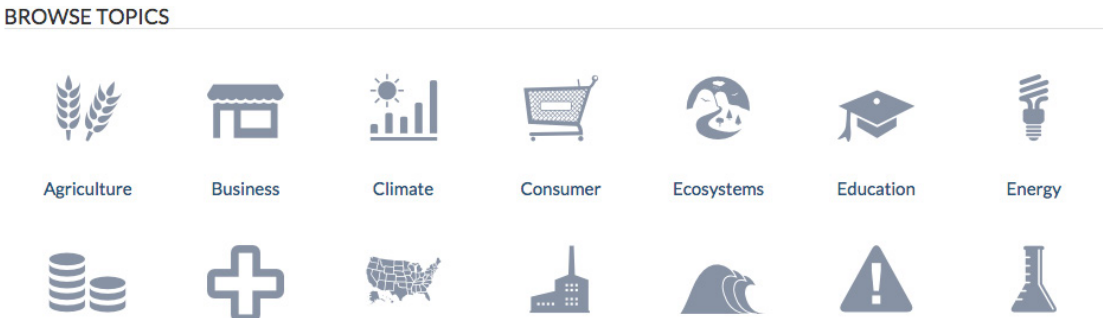

Fig. 4: Information on Data.gov, the U.S. government's open data site, is grouped thematically. Like the World Bank, it uses semantic icons to allow users to quickly find their area of research. Source: U.S. Government's Open Data Portal, available: http://www.data.gov/

Finding 8: When non-expert users read the content on the website, they find the survey methodology jargon confusing.

Evidence: The two student users were unfamiliar with the survey jargon they encountered on the website. For example, during an interview one student said, "wave doesn't mean anything to me." We also discovered that users and CLOSUP use the word "data" differently. Based on the comments non-CLOSUP users made in searching for information, we believe "data" in their minds includes tables, figures, and reports. However, the word "data" on the MPPS website is used as shorthand for the underlying datasets which are accessed through ICPSR. When searching for information about public policies in Michigan, users selected "Data Access" from the menu and were surprised to find detailed instructions for requesting the dataset rather than statistics about MPPS topics.

Recommendation 8a (Short-term): Reduce use of survey methodology jargon, especially in headings, links, and menu names. Expert users still understand plain language, so needs of both users will be met.

Recommendation 8b (Medium-term): Adopt a broader use of the word "data" to include content that is the result of analysis by CLOSUP researchers. When reviewing existing content on the website or adding new content, consider how non-experts will interpret the word "data."

QUESTION DATABASE SEARCH FUNCTION

Finding 9: CLOSUP provides a searchable database of MPPS survey questions from every survey conducted to help users find topics they're looking for. A significant issue with this feature is that it only runs exact-word matching queries on the survey question text. For example, a query for transit will not turn up anything related to public transportation even though they are synonymous. This vocabulary mismatch problem may preclude a user from discovering a full set of relevant data.

Evidence: As noted in the background research section, information retrieval experts confirm that simply comparing the text of a query with the text of a document and looking for an exact match produces very poor results in terms of relevance. Our interviewees confirmed this saying things like, "I can't think of a good data search experience but this is one of the worst" and "changes in survey question wordings can make searching difficult." One user also needed to use trial and error to find the correct search term. In our interview with CLOSUP staff, they identified this as one of the greatest frustrations for their users.

Recommendation 9: Incorporate a simple tagging index in the question database to make search results more relevant for users.

Implementation: CLOSUP should add a new column to their MySQL database called tags. Here, they can add comma separated keywords that describe a survey question e.g. transit,transportation. Once the new column is added, the search query in the PHP script will need to be updated. The easiest and most robust option for this will do the following:

1. Take the user's search query and split it into a list of each word. So the query "roads in michigan" would be separated into (roads, in, michigan).
2. Loop through each word in the query and check the tag column for a match.
3. If no matches are found, fall back to the regular text-based search already implemented on the site.

Considerations: This solution requires a low investment while providing a medium-to-high impact in the short-term. The time needed to add the new index into MySQL and update the PHP script is trivial. The longest time commitment will be tagging the questions in the database. It would be up to CLOSUP to decide whether they want to retroactively tag every previous question as this would require a significant time investment. If not, they can tag each question going forward for every new survey wave. This does not take much time and will allow for future bulk updating if new terminology arises for a survey theme.

Example:

	#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
☐	1	**id**	int(4)			No	0		Change Drop Primary Unique More
☐	2	**tags**	varchar(1500)	utf8_general_ci		Yes	*NULL*		Change Drop Primary Unique More
☐	3	**question_text**	varchar(743)	utf8_general_ci		Yes	*NULL*		Change Drop Primary Unique More
☐	4	**question_number**	varchar(4)	utf8_general_ci		Yes	*NULL*		Change Drop Primary Unique More
☐	5	**year**	int(4)			Yes	*NULL*		Change Drop Primary Unique More
☐	6	**wave**	varchar(6)	utf8_general_ci		Yes	*NULL*		Change Drop Primary Unique More
☐	7	**link**	varchar(101)	utf8_general_ci		Yes	*NULL*		Change Drop Primary Unique More

Fig. 5: MySQL MPPS question database with new tagging index. **Tags** is of varchar type with length 1500 and NULL default value.

←T→		id	tags 1	question_text	question_number	year	wave	link
☐	Edit Copy Delete	1027	transit,transportation	Which of the following, if any, do you believe are...	Q48c	2013	Spring	http://closup.umich.edu/michig public-policy-sur...
☐	Edit Copy Delete	269	transit,transportation	Please identify the extent of your jurisdiction's ...	Q5b	2010	Fall	http://closup.umich.edu/michig public-policy-sur...
☐	Edit Copy Delete	295	transit,transportation	For what types of services or activities is your j...	Q9b	2010	Fall	http://closup.umich.edu/michig public-policy-sur...
☐	Edit Copy Delete	1324	transit,transportation	Now thinking about how the	Q36i	2014	Spring	http://closup.umich.edu/michig public-policy-sur...

Fig. 6: Database entries showing example of tags transit and transportation which are separated by a comma. *For Corresponding PHP code, see appendix, fig. 2.

CONCLUSION

Since 2009, CLOSUP, through the MPPS, has provided valuable insight into public policy in Michigan for local government leaders, academic researchers and the media. However, many users face frustration when trying to access the data and use it for in-depth public policy research and reporting. CLOSUP would like to change this and make the data more visible. Our goal was to find out why CLOSUP is not achieving this and what changes they can make to do so. To accomplish this, we interviewed seven individuals including CLOSUP staff, public policy graduate students, a member of the press, and an external data expert. These interviews, along with background research and other analysis, led us to conclude that CLOSUP should focus on making their website the primary finding aid for their data. Currently, they provide several finding aids like a questions database search feature, a list of reports, and pre-run statistical tables. Rather than improving these one-by-one, a usability overhaul of the entire site will improve data discovery and user satisfaction. To that end, we propose that CLOSUP restructure their website architecture to improve user navigation and flow; condense their content and page layout to allow users to quickly scan and understand the content; and, finally, improve their question search feature to increase information discoverability. We firmly believe these recommendations will help CLOSUP better achieve its mission of conducting, supporting and fostering applied academic research to inform local, state, and urban policy issues.

J2S2 CONSULTING TEAM

JESSAMINE BARTLEY-MATTHEWS

Jessamine came to Michigan to pursue user experience design after spending three years working in visual and digital communications at the Washington Office on Latin America (WOLA). While at WOLA, she worked closely with policy experts and journalists to ensure that policy recommendations were clearly communicated to each target audience. Prior to joining WOLA, she spent two years as a Peace Corps Volunteer in Nicaragua.

JAKE SILVA

Jake spent five years working in international affairs in Washington, DC while also moonlighting as a freelance web developer. He returned to graduate school in 2015 to pursue a degree in information focusing on human-computer interaction and data science. His goal is to use design, data and development to build useful products that add value to people's lives.

SALENA SOMANI

Salena joined the University of Michigan in 2015 to pursue a degree in Information Science after completing her Bachelor of Science in Psychology and minor in Informatics. She is interested in human computer interaction, user experience design and research, and social computing as a means to promote prosocial behavior.

SASKIA DEVRIES

Saskia spent five years as a statistician with the International Programs Center of the U.S. Census Bureau providing technical assistance in 11 developing countries. Following her passion for poverty alleviation and quantitative work, she returned to graduate school to pursue dual degrees in public policy and information science, specializing in information economics for management. She is combining her interests in public program design, data communication, behavioral economics, and user experience to support people with decision-making in health, employment, civic participation, and more.

APPENDIX

CLOSUP Search

About 135 results (0.30 seconds)

Michigan local leaders have positive views on relationships with ...
Michigan local leaders have positive views on relationships with county **road** agencies, despite some concerns. « Return to policy survey listing ...
closup.umich.edu/.../michigan-local-leaders-have-positive-views-on- relationships-with-county-**road**-agencies-despite-some-concerns/

Local leaders say Michigan **road** funding needs major increase, but ...
Local leaders say Michigan **road** funding needs major increase, but lack consensus on options that would raise the most revenue. « Return to policy survey ...
closup.umich.edu/.../local-leaders-say-michigan-**road**-funding-needs-major- increase-but-lack-consensus-on-options-that-would-raise-the-most-r...

The Michigan Public Policy Survey (MPPS) Fall 2014 County **Road** ...
This page's data represent a special supplemental survey of county **road** commissions and departments. For the main Fall 2014 MPPS survey of county, ...
closup.umich.edu/michigan-public.../fall-2014-county-survey.php

CLOSUP Search

About 135 results (0.20 seconds)

Transportation Funding: Highways, **Roads** and Bridges | Center for ...
Return to research brief listing. March 2010. Abstract. This fifth brief in the series provides an overview of transporation funding for highways, **roads** and bridges, ...
closup.umich.edu/.../transportation-funding-highways-**roads**-and-bridges/

Michigan local government leaders' views on private **roads** | Center ...
Return to policy survey listing. July 2015. Abstract. This report presents the opinions of Michigan local government leaders on issues related to private ...
closup.umich.edu/.../michigan-local-government-leaders-views-on-private- **roads**/

Download in pdf format
File Format: PDF/Adobe Acrobat
... of issues surrounding **roads** and bridges in their jurisdictions, from their current ... Where **roads** are in poor condition, local leaders believe they have multiple ...
closup.umich.edu/files/mpps-fall-2014-michigan-**roads**.pdf

Fig. 7: Results from general searches (top navigation) for "road" and "roads" give users very different results. While the top listing for "road" provides a report from 2015, the top result from a search for "roads" is a report from 2009.

Results of search for: infrastructure for all years

Year	Wave	Number	Question	Tables
2015	Spring	Q4k	Comparing your jurisdiction's current fiscal year to its previous fiscal year, please consider the ways the following items have changed. Indicate whether - in your opinion - there has been a decrease, an increase, or no change from the previous fiscal year: **infrastructure** needs	see tables
2015	Spring	Q5g	Now, comparing your jurisdiction's current fiscal year to the next fiscal year, please indicate which actions your jurisdiction has taken or is likely to take: Actual **infrastructure** spending	see tables
2015	Spring	Q13a	Regardless of whether or not your jurisdiction expects to have a budget surplus this year, in your opinion, what would be the highest priority for using any potential surplus (if it had one) according to the following groups or individuals? Do you think that they would prefer to spend the budget surplus on public services or **infrastructure**, save that money for future use, use it to pay down any debt your jurisdiction may have, or reduce taxes? Majority of your jurisdiction's Board/Council would prefer to...	see tables
2015	Spring	Q13b	Regardless of whether or not your jurisdiction expects to have a budget surplus this year, in your opinion, what would be the highest priority for using any potential surplus (if it had one) according to the following groups or individuals? Do you think that they would prefer to spend the budget surplus on public services or **infrastructure**, save that money for future use, use it to pay down any debt your jurisdiction may have, or reduce taxes? Majority of your jurisdiction's citizens would prefer to...	see tables

Results of search for: road for all years

Year	Wave	Number	Question	Tables
2015	Spring	Q11a	Thinking about the overall fiscal stress of your jurisdiction today and what you expect it to be down the **road** - including any future financial obligations it may have - on a scale from 1 to 10, where 1 is the best: perfect fiscal health and 10 is the worst: fiscal crisis, how would you rate your jurisdiction's overall fiscal stress today?	see tables
2015	Spring	Q11b	Thinking about the overall fiscal stress of your jurisdiction today and what you expect it to be down the **road** - including any future financial obligations it may have - on a scale from 1 to 10, where 1 is the best: perfect fiscal health and 10 is the worst: fiscal crisis, how would you rate your jurisdiction's overall fiscal stress as you expect it to be five years from now?	see tables
2014	Fall	q2a	We know there are regular assessments of many public **road**s using formal scoring methods, however we are interested in your personal evaluation of the overall condition of **road**s and bridges within your jurisdiction's geographic boundaries. In your opinion, how would you rate the overall current condition within your jurisdiction of state trunk lines and county primary **road**s?	see tables
2014	Fall	q2b	We know there are regular assessments of many public **road**s using formal scoring methods, however we are interested in your personal evaluation of the overall condition of **road**s and bridges within your jurisdiction's geographic boundaries. In your opinion, how would you rate the overall current condition within your jurisdiction of local paved **road**s?	see tables

Fig. 8: These tables represent what a person might see while searching for three different words within the MPPS Survey Question Database, all of which relate to a common theme. While there is some overlap, each search yields a different set of results, unevenly weighting the importance of the search term used and potentially limiting a user's ability to find what they need.

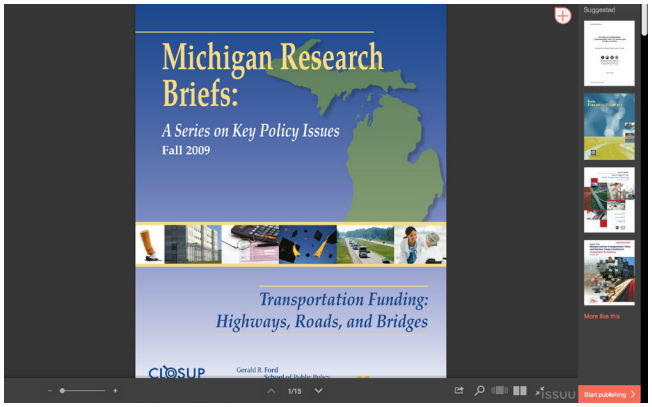

Fig. 9: A screen capture of Issuu, the third-party embedding service used by CLOSUP to display reports on the site. The thumbnail images on the right are links to external pages and advertisements, but users often confused them for report thumbnails.

Fig. 10: The navigation bar for The World Bank website.

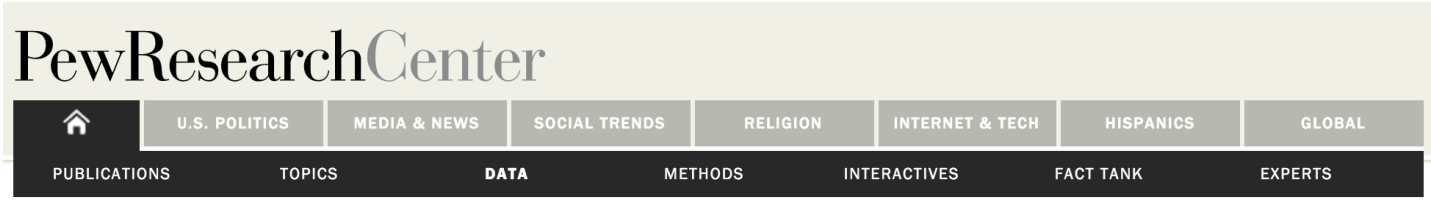

Fig. 11: The navigation bar for the Pew Research Center website. Both the World Bank and Pew share similar terms that reflect industry standards for how users search for information.

Fig. 12: The navigation menu for the Brookings Institution, a research and policy think tank.

Figs. 10-12: Other research organizations with an eye to policy have similar navigation structures that take users to similar places. On each of these pages, "data" link to a page with data sets, while "publications" guides users to an easily scannable page of reports, often grouped by theme.

```php
<?php
if ($searchterm=="") {
        echo "<span class=\"red700\">Please enter a keyword in the search form above.</span>";
}
else {
        // stop words file
        // used to remove stop words like in, on, the for better search results
        include('stop_words.php');

        /* Explode search terms by space into an array
        / E.g. roads in michigan turns into ['roads', 'in', 'michigan']
        /
        */
        $searchterms = explode(' ',$searchterm);

        /* Remove stop words in a loop
        / Roads in Michigan becomes (Roads, Michigan)
        /
        */
        foreach($searchterms as $word) {
                //remove stop words
                if(in_array($word, $stop_words)) {
                        foreach (array_keys($searchterms, $word) as $key) {
                            unset($searchterms[$key]);
                        }
                }
        }
        // Initialize SQL
        $searchSQL = "";

        /* Create SQL query to check against tagging index
        / Loops through every word in user search phrase and constructs corresponding SQL query
        / E.g. "Public transportation in Michigan yields '%public%' OR tags LIKE '%transportation%' OR tags LIKE '%in%' OR tags LIKE '%michigan%'
        */
        foreach($searchterms as $st) {
            // if user searches only one word or if last word in search phrase
            if (!each($searchterms) || count($searchterms) ==1) {
                $searchSQL .= "'%$st%'";
            }
            else{
                $searchSQL .= "'%$st%' OR tags LIKE ";
                }
        }

        // run query on tagging index
        $query = mysql_query(
                 "SELECT * FROM mpps_questions
                  WHERE (tags LIKE $searchSQL)
                  AND (
                         year LIKE '%$year_array[0]%'
                         OR year LIKE '%$year_array[1]%' OR year LIKE '%$year_array[2]%'
                         OR year LIKE '%$year_array[3]%' OR year LIKE '%$year_array[4]%'
                         OR year LIKE '%$year_array[5]%' OR year LIKE '%$year_array[6]%'
                  )
                  ORDER by year DESC, wave ASC, id ASC"
        );

        // if query exists and has more than 0 results make returned results from tagged index
        if($query && mysql_num_rows($query) != 0) {
                $result = $query;
        }
        // if no results were found from tagging index, use original question text search
        else{
                $result = mysql_query(
                        "SELECT * FROM mpps_questions
                         WHERE question_text LIKE '%$searchterm%'
                         AND (
                                year LIKE '%$year_array[0]%' OR year LIKE '%$year_array[1]%'
                                OR year LIKE '%$year_array[2]%' OR year LIKE '%$year_array[3]%'
                                OR year LIKE '%$year_array[4]%' OR year LIKE '%$year_array[5]%'
                                OR year LIKE '%$year_array[6]%'
                         )
                         ORDER by year DESC, wave ASC, id ASC"
                );
        }
}
?>
```

Fig. 13: PHP script incorporating simple tagging index search. Code includes explanations. File corresponds to CLOSUP's mpps-search.php.