

*How Communication and Customization Influence Perceived Credibility,  
Usability and Adoption of Dataset Search Tools*

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## Introduction

Search engines have become significant in controlling how we find information on the web today. The definition of a search engine incorporates aspects such as the concept of information retrieval using a keyword (Halavais, 2008). With this ability to type a search term into a search box, finding information you are looking for has become increasingly accessible. Over time, general purpose search engines such as Google have become prominent for web users seeking information but specialized search engines for specific industries or domains have also emerged. This specialization is also known as “vertical search” as opposed to general “horizontal search” (Halavais, 2008). One vertical search that will be looked into in this work is dataset search, now that various dataset search engines have become available to the web. A dataset can refer to a collection of information or observations in a particular format, but for the case of this study, it is referring to a classic table of data (Chapman, 2019). With the increase in recent years of availability of public datasets, users access these dataset search engines for purpose of data discovery and data usage for potential analysis (Lu, 2012). Recognizing that existing dataset search engines focus on one industry or agency, there is a limited number of sites that provide opportunity to retrieve data across domains. With domain specific search engines, sites target an audience within its domain, providing features targeted only to that audience. With data collection and access increasing rapidly, dataset search engines should cater to those users who may not be domain experts or expert data analysts.

The goal of this research is to understand the inner workings behind dataset search functionality and what features should be prominent on these sites as they become increasingly applicable in a data driven world. A content analysis of existing dataset search websites was performed with emphasis on understanding the norms and structures of current platforms for dataset search. Using a website codebook constructed for this project, approximately 30 dataset websites and/or search engines were analyzed. The coding scheme focused on identifying and categorizing different features and functionalities of the website to find an intended result, such as the search bar, the filters for refining and reordering of results, or the functions to view, manipulate and download the data. From this, it became clear the largest takeaway was the consistency of features tailoring to one target audience for these websites, the expert users. Catering to expert users creates a consistency in the design of these sites that fails to include novice users.

One main functionality that poses a problem for inexperienced users is the search process itself. Many features in these sites are centered around the search bar, expecting users to form search queries in order to find the dataset they are looking for. This is troublesome for users who are not always sure what they are looking for, unable to construct a search query. Customization in popular websites has become increasingly prevalent, however, in the current state of dataset search, it is lacking. Should this be the case? Customization, a mechanism that aims content to one specific user, could provide the opportunity for users to sift through content tailored to

specified interests (Kalyanaraman, 2006). This feature could eliminate the search term from the search process, tailoring datasets based on users interests or past activity, ultimately providing a more successful search process. This rationale has motivated the research described in this report, testing the relationship between customization and perception in dataset search users who range from beginner to expert. Another area that is examined in this work is computer-mediated communication in regards to dataset search websites. Various research has supported the linkage between communication abilities and users' evaluation and attitude towards a specific site (Teo, 2003). While examining the current state of communication functionality, there is limited ability for users to contact data sources and authors directly on the site. Although there are a few outliers from this norm, such as Data.World, streamlining the ability to communicate with providers would help enable users in the search process. Access to dataset providers through functionalities including but not limited to commenting, following, emailing, and sharing can alleviate questions and eliminate time from the search process. This is another feature of interest in this experiment, understanding if these abilities will benefit non-expert and expert users in their search task. The hope is that these non-traditional features prove to be able to facilitate searches for non-expert users and allow for the increase in causal dataset searches.

## **Literature Review**

In order to understand the website features in question (computer-mediated communication and customization), the concepts behind the functionality and prior work with similar research questions provide insight into this work.

### **Computer-Mediated Communication**

Communication as a function on websites, is more formally called Computer-mediated communication (CMC). It was defined in Oxford University Press's ETL Journal as "an umbrella term which refers to human communication via computers" (Simpson, 2002). We are using CMC to define the functionality of communication capabilities in website search and while presenting different levels of CMC, understand how it can be useful and necessary for non-expert users. Specifically, CMC is the user communication through the medium of computer systems and can be broken down into two branches, synchronous and asynchronous. Synchronous CMC includes interactions in real time, such as live text, video, or audio chats in comparison to asynchronous CMC. Examples of asynchronous CMC can be seen as email, discussions forums, or any other non-instant communication platforms with the use of a computer (Simpson, 2002). In relation to this experiment, asynchronous CMC will be an independent variable in discussion.

### **Website Customization**

Customization, the other independent variable in this experiment, focuses on the ability to set filters based on personal preference during account creation. Customization can aid non-expert

users to “make their own selections about what they want to see, or set preferences for how information is organized or displayed. It can enhance user experience because it allows users to control their interaction” (Schade, 2016). This is separate from personalization, in regards to website design, as personalization is not controlled by the user, instead by the system being used. A common example of this is feed suggestions based on previous searches by a user. Customization can vary through different websites based on the website's purpose and function, however, for this experiment customization will focus on setting domain preferences for suggested datasets on a user's feed. Interfaces that use customization adapt themselves to “users' needs, interests, preferences, or knowledge (Alpert, Karat, Karat, Brodie, & Vergo, 2003)” (Kalyanaraman 2006).

### **Perceived Credibility**

While looking at communication and customization, credibility will be measured to test these theories. Credibility is an important measurement in order to help understand how the non-expert perceives the website and the functionality it possesses. Credibility looks at the users trust and reliability after interactions with a website, proving that higher levels of credibility lead to higher rate of return. For this experiment, measuring credibility will allow us to see how a novice user interprets the functionality in a way they can align with. This poses the first two research questions:

**RQ1:** How do website affordances in computer-mediated communication affect perceived credibility of a website?

**RQ2:** How do website affordances of customization capabilities affect perceived credibility of a website?

There are various existing frameworks of credibility that have been looked at in preparation for this study including the work of expert BJ Fogg. He has published various research papers on measuring the *perception* of credibility by users including *The Elements of Computer Credibility* (1999) which will be mentioned throughout this paper. Credibility, simply put by Fogg, is defined by trustworthiness and expertise. “Taken together, these ideas suggest that highly credible computer products will be perceived to have high levels of both trustworthiness and expertise” (Fogg, 1999). Credibility can be measured differently depending on the features of a said website. Furthering this idea, Fogg speaks to three main sources to measure when looking at credibility, that can be defined as 1) the operator (the person or organization offering the site) 2) the content (information via the site) 3) design (the structure of the site). (Choi, 2015). For the interface given in this experiment, credibility will be measured for the site itself (source credibility), the other users and the data they provide (content) (Appelman, 2016) (Meltzer, 2010). Understanding credibility also would entail understanding the users perceived quality of

the data being provided. Content quality will also be measured for credibility information (Kang, 2010).

### **Perceived Usability**

Usability, the other dependent variable in question will be measured based on the effects of customization and CMC. Usability in terms of web site design has become an increased topic in research with advancements in technology. With endless interface functions and combinations, how the user interacts with the interface design has an effect on the perception of the website itself.

**RQ3:** How do website affordances in computer-mediated communication affect perceived usability of a website?

**RQ4:** How do website affordances of customization capabilities affect perceived usability of a website?

Usability also has been deconstructed into different frameworks in past literature. For this experiment it is important to understand why higher perception of usability is beneficial for the user. Jakob Nielsen has focused on usability in his research, defining it as “a quality attribute that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process ”(Nielsen). Usability incorporates 5 quality components in which a product can be used in order to achieve a goal: learnability, efficiency, memorability, error, and satisfaction. Because the interface in this research will not be active, it is important to look at the usability of the *design* of the interface. The measurement of usability has proven its importance over time when looking at success and repeated usage of sites. Low usability sites can lead to unsatisfied users and lack long-term success (Teo, 2003).

## **Hypothesis Development**

### **CMC and Credibility**

Creating computer-mediated communication for an interface would entail functionality for users to communicate to each other on the platform. This would allow for users to stay on the site itself and directly interact with other dataset authors and peers. Existing functionality that is considered to be CMC include comment capabilities, forum boards, direct messaging, email, etc . These functions vary in importance depending on the purpose of the site. For example, social network sites are created for computer-mediated communication, whereas other sites, this communication is just an optional feature. Eliminating social networking sites from the question, does CMC affect how a user views the credibility of a source? The paper *Some like it lots: The influence of interactivity and reliance on credibility*, provides a similar research question, studying the effect of interactivity on credibility (Johnson, 2016 ). This study explores the

credibility of 15 sources of political information, investigating the different levels of interactivity, and assesses perceptions of the site after use. The results showed that interactivity significantly influenced perceived credibility, with 9 out of 15 relationships showing this significance.

In today's world, it is common to hear from prior experience of our peers when questioning trust in something. Websites like Tripadvisor and Yelp have become incredibly popular and credible through the input of their users. These platforms allow users to access feedback of the community in order to assess credibility of restaurants, hotels, experiences, etc. Based on the knowledge presented, the hypothesis for the research question will be that there is a positive correlation between CMC and credibility.

**H1:** User's perception of computer-mediated communication has a positive impact on the perceived credibility of the website.

**H1a:** Such effect between a user's perception of computer-mediated communication and perceived credibility of the website will be moderated by individual difference variables such as expertise and technology fluency.

### **Customization and Credibility**

Customization would allow a user to input into the system specific preferences to make the system more individualized. This is very common in mobile apps as well as various websites when setting up user accounts. These preferences allow the system to tailor content specific to a user. How does this tailoring affect how the user perceived credibility though? This question similarly has been examined in the work of Jean Beier in *The Effects of Customization and Recommendation Source on Reader Perceptions of a News Website*. Beier found partial support for customization, positively interacting with reader's perceptions of news websites including interpretation of credibility, quality, and representativeness of content (Beier, 2007).

**H2:** User's perception of website's affordance of customization has a positive impact on the perceived credibility of the website.

**H2a:** Such effect between user's perception of customization and perceived credibility of the website will be moderated by individual difference variables such as expertise and technology fluency.

### **CMC and Usability**

Computer-mediated communication could exist on sites through various functions. These functions could be either essential or nonessential to the mission of the site however, for those

sites that's main purpose are not CMC, should they be including it in their design? Will this help users feel as though the website is more efficient and effective? In the paper *An empirical study of the effects of interactivity on web user attitude*, this is also a research question in mind, stating both forms of CMC have the potential of improving a website's usability (Teo, 2003).

**H3:** User's perception of a computer-mediated communication has a positive impact on the perceived usability of the website.

**H3a:** Such effect between a user's perception of computer-mediated communication and perceived usability of the website will be moderated by individual difference variables such as expertise and technology fluency.

### **Customization and Usability**

Looking at customization and usability, it is easy to imagine that there is a positive correlation between these two factors. Customization is ultimately trying to help the user find what they need faster and more efficiently, elements that define usability. Web environments with customization affordance modifies how the site provides information specific to a user. The goal is to make the experience tailoring to users uniquely (Kalyanaraman, 2006). In the article *Web Site Usability, Design, and Performance Metrics*, this question was also of interest. Findings suggested that successful web environments took advantage of interacting with the user through customization. (Palmer, 2002).

**H4:** User's perception of a website's affordance of customization has a positive impact on the perceived usability of the website.

**H4a:** Such effect between a user's perception of customization and perceived usability of the website will be moderated by individual difference variables such as expertise and technology fluency.

## **Method**

### **Design**

An experimental study was posted online using Amazon's Mechanical Turk online crowdsourcing system. This platform allowed us to reach internet users across different domains, such as education level and industry. The goal of using this platform was to reach users, especially non-expert dataset users of all backgrounds, to understand their perceptions when shown a new site.

The questionnaire randomly presents the participant with an interface. Four interactive "websites", titled Data.Assist, were designed (Appendix 1), each with varying degrees of

communication and customization. The four conditions were: low customization and low communication, high customization and low communication, low customization and high communication, high customization and high communication. A condition was randomly selected for each respondent. Each interface was created on the Adobe XD platform, allowing for slight interactivity in order for users to visualize the functionality of a live website. Although these interfaces were active on live links, they were on previews of a real webpage. This disclaimer was informed to every participant. For interfaces with high customization functionality, the design began asking the user to indicate a topic of interest. Once a topic was clicked, the interface specified to the user that the datasets were based on the topic they indicated interest in. For those interfaces with low customization, that functionality was not present. The previews with high communication provided functionality for users such as share, comment, contact, and follow buttons. The interfaces lacking communication did not see any of these abilities. Controls on these interfaces included overall uniform design and aesthetic on any feature or information presented that did not relate or influence communication or customization variability. Each questionnaire included the same prompt, tasking users to imagine searching for a dataset surrounding technology and its effects on society.

### Sample

Mechanical Turk is an efficient way for data collection over a large number of participants in a short time frame. The survey was posted on Mechanical Turk from April 17th and was available for completion through April 19. MTurk respondents who opted to participate were compensated \$2.00 for the completion of the 15 minute survey. 121 individuals accessed the survey, yielding 99 participants (~82%). Participants' gender included 64% male, 32% female averaging in age between 45-54 years. Education level included 16% completed a high school or GED degree, 49% completing a bachelors program, 20% a masters. Participants' ethnicity and race included 6% Asian, 3% Black or African American, 4% Hispanic, Latinx or Spanish Origin, and 75% White or Caucasian.

Condition	Low Communication	High Communication
Low Customization	25	25
High Customization	23	26

### Measurements:

#### Credibility

In the questionnaire, two types of credibility were measured, source credibility, content credibility. Respondents indicated opinions for each type using a seven point scale (1- not at all,



7- extremely). For source credibility, respondents indicated perceived reliability, expertise, reputability, trustworthiness and bias of Data.Assist (Metzger, 2010). Similarly, for content credibility, respondents ranked the datasets presented on Data.Assist based on perceived accuracy, authenticity, believability, representation, and erroneousness (Appelman, 2016). Understanding the perceived content quality of information on the sites, respondents indicated how the information appeared to be complete, concise, consistent, clear, and coherent on Data.Assist (Kang, 2016) (Dickinger, 2013). In each scale it was important to use “appears to be” for describing Data.Assist due to the limited functionality of this preview.

### **Usability**

In order to measure usability, it was important to make sure the participant understood this was a preview and to imagine the site with full functionality. In the interface, for example, if the comment button was clicked, a message would remind the user of the preview's limited capabilities. However, when imagining the usability of this site, it is important for the user to understand that commenting is a feature present. In order to gain a sense of the usability, the System Usability Scale was adjusted to fit this specific scenario (Brooke, 1996). Each prompt could be rated on a scale from “1. Strongly Disagree” to “7. Strongly Agree”. 7 points was again used to align with the credibility scales. The prompts used wording such as “I imagine this site would...” to help the user visualize past the preview.

### **Usefulness of Communication and Customization**

While adjusting existing scales to my experiment, it was important to ask questions that were based on the independent variables that either or were not presented in the interfaces that were interacted with. Using the same 7 point scale, respondents were posed with phrases that had to do with both customization and communication. These questions consisted of phrases similar to “I think it would be useful to” followed by a unique feature such as “contact the dataset author”. This is another way to measure users' overall perception of the potential abilities on Data.Assist.

### **Technology Fluency**

Other scales of value for this experiment include a scale for fluency of technology use, and expertise in the areas of dataset search. “A number of search usability studies have assessed the effects of knowledge of the search process itself, contrasting expert and novice searchers, although there is no consensus on the criteria for these classifications” (Hearst, 2009). Even though there is no consensus, this scale was included for additional information that could affect one's perceived usability of this site. This will be of interest to me to look further into during the data analysis stage.

### **Dataset Expertise**

Another scale to note is expertise in regards to both the topic prompt presented and experience and understand with data and dataset search. Respondents were asked to choose levels of expertise on a 7 point scale from strongly disagreeing to strongly agree. Scales for dataset expertise were familiarity and previous experience with dataset search as well confidence in data interpretation (Lee, 2016).

### Topic Expertise

When the survey began, each respondent was prompted with a scenario about finding a dataset on the effects of technology on society. If respondents have expertise in this area, the perceived credibility of the datasets presented on Data.Assist can be swayed (Hearst, 2009). Scales for topic expertise included competence, knowledgeable and following of topic technology and its effects (Wood, 2016).

### Adoption

This experiment is based on the idea that non-expert users will feel more at ease using dataset search websites and feel more comfortable in their casual searching. With the hopes of most of the participants being non-expert users, it is important to understand the desire of adoption after viewing the site mock up. This was measured using three scales (1.Strongly Disagree to 7. Strongly Agree). The statements included likeliness to use this website in the future, recommending this website to peers, and likeness of account creation on this site (Belanche, 2012) (Kim, 2009) (Dickinger, 2013).

### Results

Empirical data gathered in the experimental study were analyzed using factorial ANOVA tests that examined the effect of the independent variables (i.e. CMC and customization) and individual difference variables (i.e. dataset expertise, topic expertise, tech fluency) on the outcome variables (i.e. credibility, usability, adoption). Prior to testing the hypotheses, scale reliability was assessed using Cronbach's  $\alpha$ . As shown in Table I, all of the scales yielded Cronbach's  $\alpha$  greater than 0.70, indicating high scale reliability (Santos, 1999).

**Table I: Reliability**

<b>Variables</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Alpha Reliability</b>
Source Credibility	5.34	0.99	0.709
Content Credibility	5.51	1.09	0.9152
Content Quality	5.43	1.08	0.8859

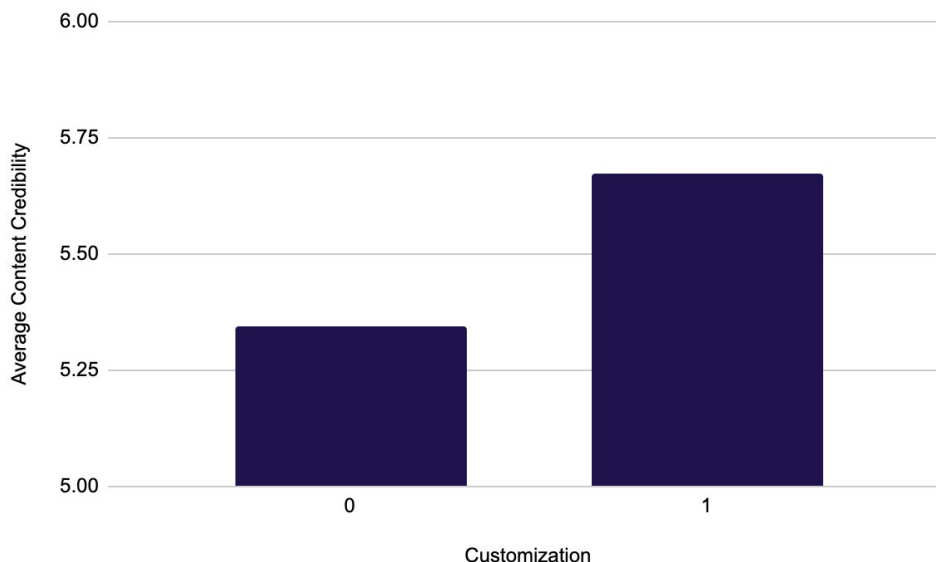
Average Credibility	5.42	0.98	0.9367
Average Usability	5.21	1.18	0.8438
Usefulness of Communication	5.87	0.87	0.843
Usefulness of Customization	5.79	1.01	0.8308

### **Credibility**

H1 has hypothesized that a user's perception of computer-mediated communication has a positive impact on the perceived credibility of the website. H1a hypothesized such an effect between a user's perception of computer-mediated communication and perceived credibility of the website will be moderated by individual difference variables such as expertise and technology fluency. A factorial ANOVA was conducted to examine if there is evidence to support these hypotheses. There was no statistical significance supporting a main effect of computer-mediated communication,  $F(3,95)=0.3181$ ,  $p=0.5741$ , or interaction effect from individual difference variables, thus H1 and H1a were not supported.

H2 hypothesized that a user's perception of a website's affordability of customization has a positive impact on the perceived credibility of the website. A factorial ANOVA was conducted that examined the effect of customization and topic expertise on content credibility. There was a marginally significant main effect found,  $F(3,95)=3.105$ ,  $p=0.0922$ . Simple main effects analysis showed that the presence of customization rated content credibility higher, thus, H2 was partially supported.

**Figure I: Main Effect Between Customization  
on Perceived Content Credibility**

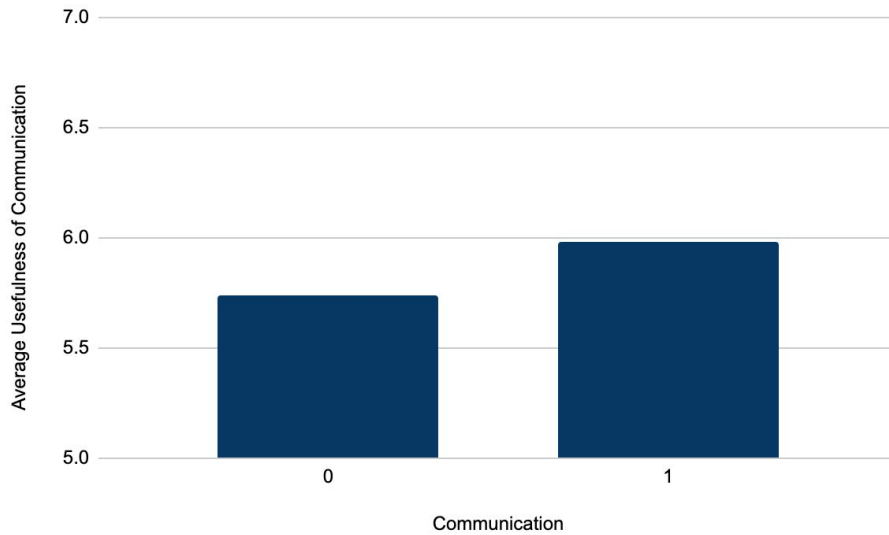


H2a hypothesized such an effect between a user's perception of customization and perceived credibility of the website will be moderated by individual difference variables such as expertise and technology fluency. A factorial ANOVA was conducted to examine if there is evidence to support this hypothesis. There was no statistical significance supporting an interaction effect of individual difference variables with customization, thus H2a was not supported.

### Usability

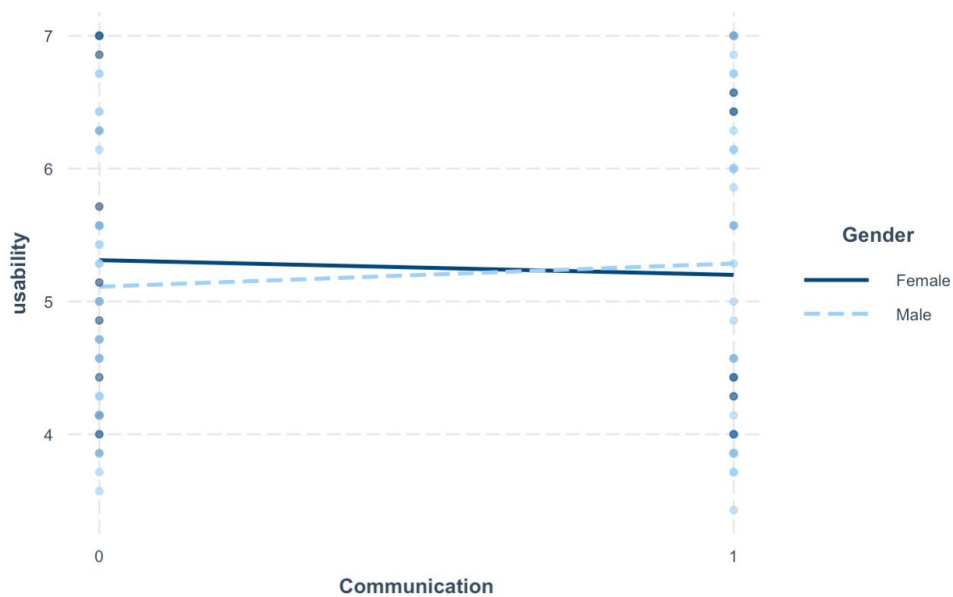
H3 has hypothesized that a user's perception of a computer-mediated communication has a positive impact on the perceived usability of the website. A factorial ANOVA was conducted that examined the effect of communication and education on usefulness of communication. The results revealed a marginally significant main effect between communication and usefulness of communication  $F(3,95)=2.379$ ,  $p=0.0879$ . Simple main effects analysis showed that the presence of communication rated usefulness of communication higher. A factorial ANOVA was also conducted that examined the effect of communication and gender on usefulness of communication. Similarly, the results revealed a marginally significant main effect between communication and usefulness of communication  $F(3,91)=2.839$ ,  $p=0.0774$ . Simple main effects analysis showed that the presence of communication rated usefulness of communication higher. Thus, H3 was partially supported.

**Figure II: Main Effect Between Computer-Mediated Communication on Perceived Usefulness of Communication**



H3a hypothesized that such effect between user’s perception of computer-mediated communication and perceived usability of the website will be moderated by individual difference variables such as expertise and technology fluency. A factorial ANOVA was conducted that examined the effect of communication and gender on perceived usability. There was a marginally significant interaction between gender and the effects of communication on perceived usability,  $F(3,95)=1.252$ ,  $p=0.0895$ . Thus, H3a was partially supported.

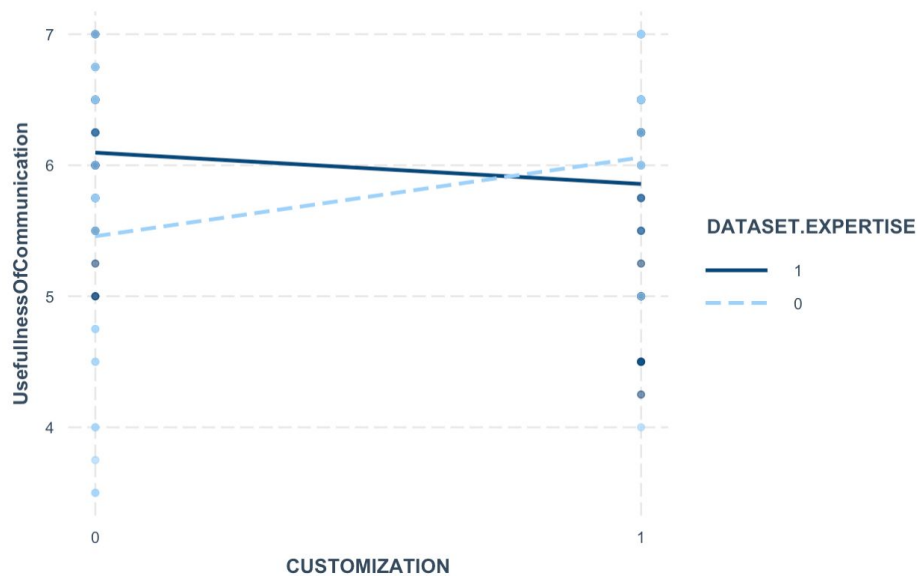
**Figure III: Interaction Effect Between Computer-Mediated Communication and Gender on Perceived Usability**



H4 has hypothesized that a user's perception of a website's affordance of customization has a positive impact on the perceived usability of the website. A factorial ANOVA was conducted to examine the relationship between customization and average usability. There were no significant findings,  $F(3,95)=0.4950$ ,  $p=0.4834$ . Thus, H4 was not supported.

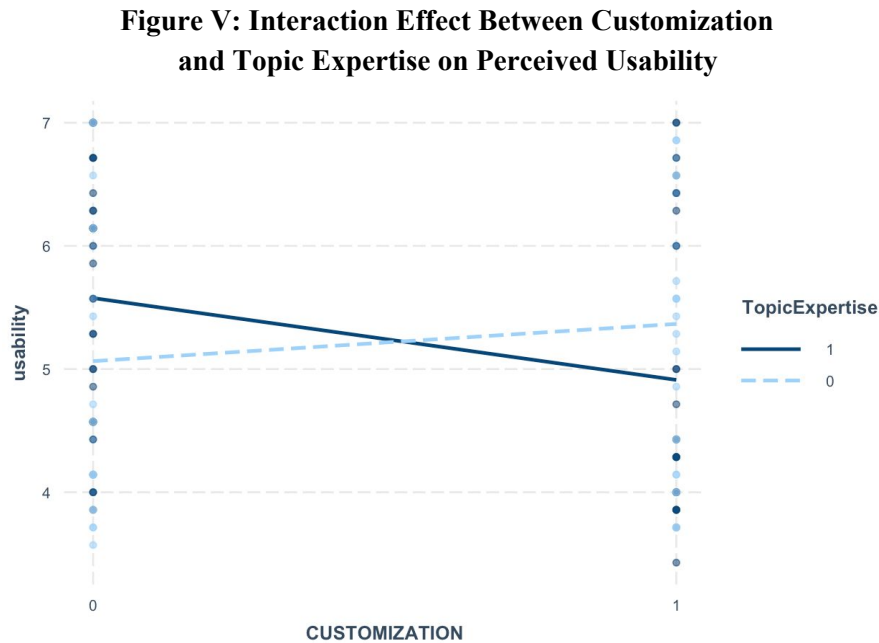
H4a hypothesized that such effect between user's perception of customization and perceived usability of the website will be moderated by individual difference variables such as expertise and technology fluency. A factorial ANOVA was conducted that examined the effect of customization and dataset expertise on perceived usefulness of communication. There was a statistically significant interaction between dataset expertise and effects of customization on perceived usefulness of communication,  $F(3,95)=2.84$ ,  $p=0.0163$ . For non-expert users, the presence of customization features on the dataset search interface has led to an increase in perception of usefulness of communication features (Figure IV).

**Figure IV: Interaction Effect Between Customization and Dataset Expertise on Perceived Usefulness of Communication**



A factorial ANOVA was also conducted that examined the effect of customization and topic expertise on perceived usability. There was a marginal significant interaction between topic expertise and effects of customization on perceived usability,  $F(3,95)=1.188$ ,  $p=0.0845$ . For those experts of the topic of technology and its effects on society, the perception of usability decreased when presented with features of customization. Non-topic experts perceived usability

to be higher when presented with customization affordance (Figure V). Thus, H4a was supported.



## Discussion

The results of this experimental study proved to show partial support for the hypothesis in question. Specifically, findings supported a main effect of customization affordance on perceived content credibility, as well as a main effect between computer-mediated communication on perceived usefulness of communication. There was also evidence supporting interaction effects between dataset expertise and topic expertise on independent variable customization. Additionally, there was evidence supporting an interaction effect between gender and computer-mediated communication.

Within these findings, the evidence supports that tailoring datasets relevant to non-expert users increases perception of usability. The ability for the novice user to search through suggested content based on indicated topics reduces the need for using a search query. This could avoid the difficulty of search query creation not only for non-dataset experts but non-topic experts as well. Non-dataset experts lack the experience of searching for datasets, however with customization, the site can customize towards the user, eliminating the user's time of sorting to find a usable dataset. Non-topic experts lack the expertise to construct various search queries; customization allows tailoring based on what the user has indicated need for. Overall, novice users lack experience in quickly finding what they are looking for. Tailoring functionality could decrease search time and provide a better user experience for non-expert users.

This evidence highlights the importance of designing functionality for different kinds of audiences, not just those who are experts. For dataset search engines, most functionality is targeted to those frequent proficient users; however, this becomes problematic for attracting new users to a site, ones who might be inexperienced. Designing features for different populations can increase the user's experience and increase perceived satisfaction.

## **Limitations**

This experimental study used previews of dataset search websites as the research stimuli. The lack of full functionality on this preview was a significant limitation in this study. Having participants interact with the CMC and customization features on a live site may lead to greater levels of perceptual, attitudinal and behavioral effects. Additionally, the current design only showed individual data authors as the dataset sources. It would be interesting to examine if other types of sources, such as governmental agencies or research institutes, might influence users' perceptions of content credibility. Lastly, both CMC and customization are means through which users can express their thoughts and specify their needs. There would also be value in discovering whether these affordances may enhance the level of personal agency of the users: Would users feel empowered through using these features during dataset search? If so, how would the increased sense of agency affect the perception of a website? Personal agency theory can provide a theoretical foundation for understanding the positive effect of such technological affordances that enable greater user expression in completing dataset search tasks.

## **Conclusions**

This experimental study was focused on how technological affordances such as computer-mediated communication and customization can change the interactions for users on dataset search websites. In a world where data is becoming increasingly prevalent, it will become necessary for everyone to understand and interpret data. But in order for this to happen, users are going to need to find this data. This is why it is incredibly important to focus on the methods that facilitate dataset search to newcomers. This study focused specifically on the variation of methods of communication and customization affordance on dataset search websites and the perception of these varying processes. Web environments have found success with interactions with users through customization and communication (Palmer, 2002), however from previous content analysis, there showed a lack of these features on dataset search websites. Specifically, there is a positive relationship between customization affordances and perceived credibility as well as a positive relationship between communication affordance and aspects of usability, supporting the notion that these features can positively increase users' perception of dataset search websites. Furthermore, looking at individual differences such as education level, technology fluency, and related domain experience, proved to play a role in perceived usability



and credibility. In order to aid support to non-expert audiences, these individual differences need to be considered in the design process of dataset search websites.

This research looks to the future of casual dataset searching and the features that can aid dataset search retrieval and usage. It highlights the importance of understanding new users' needs who may not be experts in dataset search or a specific topic or domain. The integration or option of non-traditional search features on dataset search engines can increase perceptions of these sites and widen the audience of users. The results from this experimental study provide design options and insights for creating better, more usable dataset search tools especially for non-expert, infrequent users.

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## **Appendix**

### **Appendix 1: Interface Design and Links**

Search 345,000 Datasets

Search

Search Topics

Energy Finance Science Health Technology Education Agriculture Consumer

Recent Uploads

**BuildBPS: Facilities and Educational Data for Boston Public Schools** [View this Dataset](#)  
 Data Author: Sarah Anderson Mar 2, 2020  
 BuildBPS compiles vast amounts of data and allows for ongoing analyses that can be used to guide and inform decisions related to school building investments. An assessment team of architects and educational planners visited all of Boston Public Schools' buildings, collecting and organizing information on the physical condition of each building and their educational suitability to the programs offered within...

**Data from: The food waste hierarchy as a framework for the management** [View this Dataset](#)  
 Data Author: Jeffrey Murray Jun 14, 2018  
 The unprecedented scale of food waste in global food supply chains is attracting increasing attention due to its environmental, social and economic impacts. Drawing on interviews with food waste specialists, this study construes the boundaries between food surplus and food waste, avoidable and unavoidable food waste, and between waste prevention and waste management. This study suggests that the first step towards a more sustainable resolution of the food waste issue is to adopt a sustainable production and consumption approach and tackle food surplus and waste throughout the global food supply chain.

### Interface A: Low Communication and Low Customization Manipulation

<https://xd.adobe.com/view/e853fbd8-32d4-4d99-735b-235498f75de8-9e62/?fullscreen&hints=off>

Hello, welcome to Data.Assist.com!

Looking for datasets? Tell us what areas you are interested in!

Energy  
 Finance  
 Agriculture  
 Economics  
 Technology  
 Education  
 Consumer Goods  
 Health  
 Science  
 Local Government

Search 345,000 Datasets

Search

Search Topics

Energy Finance Science Health Technology Education Agriculture Consumer

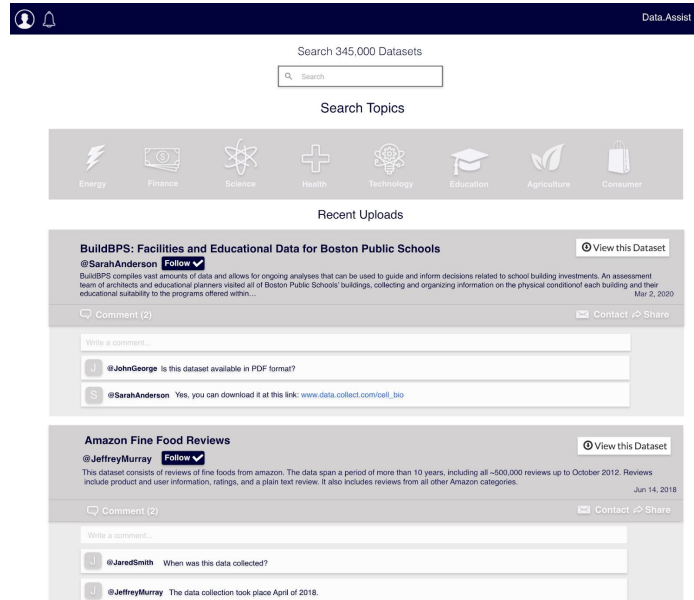
Based on the Topics You Indicated Interest In:

**Total technology spending worldwide 2014-2019** [View this Dataset](#)  
 Data Author: Sarah Anderson Mar 2, 2020  
 The statistic shows the total technology spending worldwide from 2014 to 2019. In 2018, the global tech spending is forecast to amount to 3,212 billion U.S. dollars. The global technology market includes telecom services, tech outsourcing and hardware maintenance, tech consulting and systems integration services, software, communications equipment, and computer equipment.

**Science, Engineering and Technology Statistics** [View this Dataset](#)  
 Data Author: Jeffrey Murray Jun 14, 2018  
 These statistics provide an analysis of the government financing of SET activities in the UK, describe the relationship between the funders and performers of Research and Development (R&D) in the UK (government, higher education, business enterprise, charities and overseas), report on business enterprise R&D expenditure.

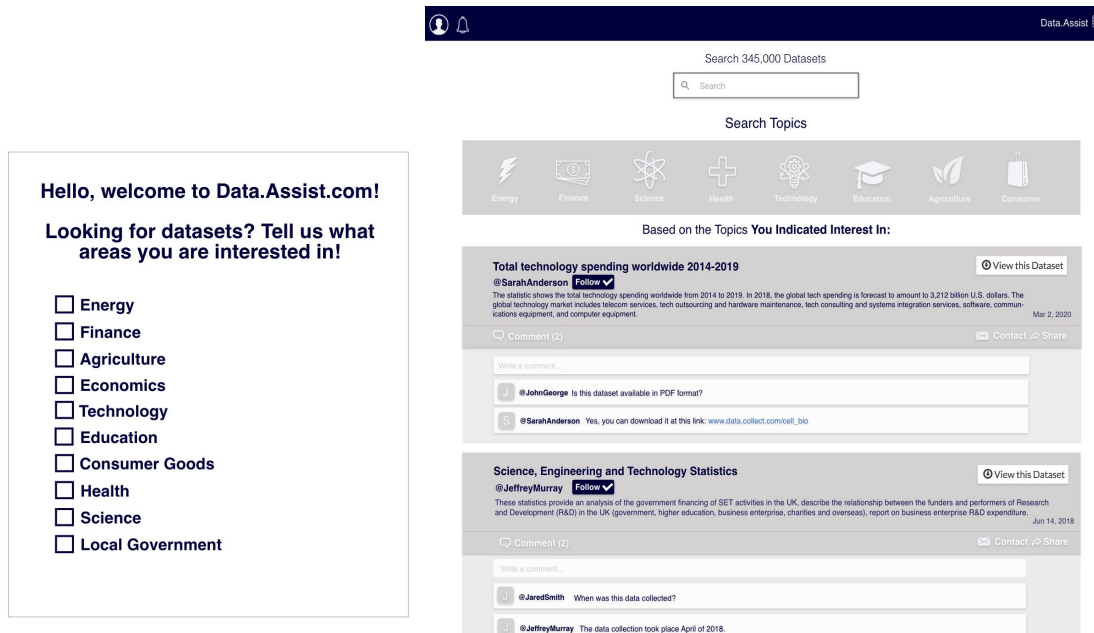
### Interface B: Low Communication and High Customization Manipulation

<https://xd.adobe.com/view/7a93f06b-17b4-498b-7a7f-1c6498bc837d-0ca2/?fullscreen&hints=off>



**Interface C: High Communication and Low Customization Manipulation**

<https://xd.adobe.com/view/d054e8a8-9a1e-4a2b-51e4-flaa2e03f642-a665/?fullscreen&hints=off>



**Interface D: High Communication and High Customization Manipulation**

<https://xd.adobe.com/view/c46df095-9915-479c-5b4b-c0954ccae30a-b25c/?fullscreen&hints=off>

**Appendix 2: Research Questionnaire**

## Check Manipulation

Please write down all the features present in this website. (Please include all features available if this website was fully functioning, not just a preview. E.g. dataset preview.)

Does the website allow you to indicate your interests?

- Yes
- No

When prompted, which topic did you indicate interest in?

- Energy
- Finance
- Agriculture
  
- Economics
- Technology
- Education
- Consumer Goods
- Health
- Science
- Local Government

Does Data.Assist have the capability to communicate with other users (e.g. comment, share, follow):

- Yes
- No



	1. Not at all	2	3	4	5	6	7. Extremely
The datasets presented by Data.Assist appear to be authentic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The datasets presented by Data.Assist appear to be believable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The datasets presented by Data.Assist appear to be representative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The datasets presented by Data.Assist appear to be error-free.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate your agreement with the following statements about the information on Data.Assist.

	1. Not at all	2	3	4	5	6	7. Extremely
The information on Data.Assist appears to be complete.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information on Data.Assist appears to be consistent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information on Data.Assist appears to be coherent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information on Data.Assist appears to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information on Data.Assist appears to be concise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Intention

Please rate your agreement with the following statements about the Data.Assist website.

	1. Strongly Disagree	2	3	4	5	6	7. Strongly Agree
I would be likely to use this website for dataset search in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend this website to others for dataset search.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be likely to create an account on Data.Assist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Expertise

Please rate your agreement with the following statements. Note that expertise in this area was NOT required to participate in this experiment.

	1. Strongly Disagree	2	3	4	5	6	7. Strongly agree
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	1. Strongly Disagree	2	3	4	5	6	7. Strongly agree
I have previous experience with dataset search.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident in my abilities to interpret and understand data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am familiar with existing dataset search engines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate your agreement with the following statements. Note that expertise in this area was NOT required to participate in this experiment.

	1. Strongly Disagree	2	3	4	5	6	7. Strongly Agree
I feel competent in the topic of technology and its effects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel knowledgeable about the topic of technology and its effects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I follow the topic of technology and its effect very closely.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Technology Use

Please rate your agreement with the following statements.

	1. Strongly Disagree	2	3	4	5	6	7. Strongly Agree
In general, I am hesitant to try out new technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable learning new technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel as up-to-date on technology as my peers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To ensure you are answering the survey attentively, please choose the option of Strongly Disagree for this question.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Demographics

What gender do you identify as?

- Male
- Female
- I prefer to self-describe:
- I prefer not to answer

What is your Ethnicity/Race? Select all that apply to you.

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic, Latinx or Spanish Origin
- Middle Eastern or North African
- Native Hawaiian or Pacific Islander
- White/Caucasian
- Other race, ethnicity, or origin, please specify:
- I prefer not to answer

What is the highest degree or level of school you have completed?

Which of the following categories best describes the industry you primarily work in?

- Not employed
- Retired
- Agriculture, forestry, fishing, or hunting
- Arts, entertainment, or recreation
- Broadcasting
- Education--College, university, or adult
- Education--Primary/secondary (K-12)
- Education-- Other
- Construction
- Finance and insurance
- Government and public administration
- Health care and social assistance
- Hotel and food services
- Information--Services and data
- Information--Other
- Processing
- Legal services
- Manufacturing--Computer and electronics

- Manufacturing--Other
- Military
- Mining
- Publishing
- Real estate, rental, leasing
- Religious
- Scientific or technical services
- Software
- Student
- Telecommunications
- Transportation and warehousing
- Utilities
- Wholesale
- Other industry, please specify: