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Justin Sikes
Old Dominion University

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Changes to Climate Central's Risk Finder Tool: A Usability Report

Justin Sikes

ABSTRACT

Students in the Fall English 231C Honors Climate Change and Crisis Communication course worked with instructor Megan McKittrick and Dr. Richards to conduct a usability test of Climate Central's *Risk Finder* tool. Using the qualitative data, general trends that indicate potential areas of improvement for the website were identified. Students' tasks were to find volunteers for the usability test through systematic sampling, conduct the test and analyze the audio recordings, and finally to code the data for themes to see if any trends became apparent. Several things became noticeable after looking at the responses of the four research participants, particularly their reported inability to find the information they were looking for, even when such information was on the site. Through their reactions while using the information tool, key areas where website redesigns could improve usability were pinpointed. These areas included installing a loading cursor icon and adding color-coded areas on the interactive map to account for the differing severity of flood risk. Lastly, modifying the help menu to make it stand out may guide users to use the help tools right when they need them.

The purpose of this usability test was to gather information on general reactions to the *Risk Finder* tool. In order to make educated analyses of the data obtained from usability testing, researchers were first given instruction on how to use the *Risk Finder* tool to gain familiarity with it. The next step was to conduct the

usability testing. Testing sessions were recorded to provide audio data for analysis. The audio was then coded and the major themes amongst all of the responses became apparent. Using these themes, the key areas in which the *Risk Finder* tool could be improved were addressed. The help menu and tips for the site could be moved toward the center of the screen in order to attract more attention. Another suggestion would be to add a loading icon or cursor to show that the map was working because some users believed that the map had frozen when it had not.

LITERATURE REVIEW

Climate Central is interested in conducting usability testing sessions to improve upon and receive feedback on their latest technology, the *Risk Finder* tool. This tool utilizes geo-visualization techniques to allow viewers to see potential damage and inherent risks for flooding over nearly any area in the country. Usability testing can not only improve the final product, but can show some very important data

about the tested population sample. Certain population demographics and the relative number of individuals who come away from their sessions with some information will be studied. An important statistic that can be extrapolated from the usability testing population is the number of people who feel impacted enough to take action. There are many such actions a concerned citizen can take to help with a variety of issues that contribute to the global issue of climate change. Some broad areas, such as fire ecology, in which people can act are seldom thought of due to lack of awareness. Fire ecology might seem irrelevant, as it pertains to the effects of domestic fires and wildfires and their effects on the environment and global warming. Fire ecology presents some interesting methods to reduce carbon emissions and is included here to emphasize that there are solutions in areas most people might not consider. Besides a call to action, there are other ways to determine if the usability testing was a success, such as determining if the geo-visualization technique was effective as a means of risk communication. The method of observing

its effectiveness would be based on the sample population's answers to survey questions before and after using the *Risk Finder* tool.

Usability testing has an optimal number of users to test a product (Barnum, 2011). According to Jakob Nielson, a researcher who sought out to maximize the efficiency of usability tests, a group of five individuals will provide about 85% of the errors that should be fixed (Barnum, 2011). A larger group will begin to repeat errors and might not provide any additional information that will be useful (Barnum, 2011). The usability testing that will be conducted by Climate Central will be utilizing four participants who agreed to test *Risk Finder*. Climate Central wants to be sure to find as many flaws as possible with a program such as this that provides a plethora of information. Also, unlike some usability tests, this usability test hopes to gather information about the population demographics. This will allow some additional information to be added to the site as well as provide an early look at strategies that can be used to focus the population demographic that appears to live in the highest flood

risk area. The usability testing session will be composed of a preliminary interview about their opinions to various questions, use of the *Risk* Finder tool, and a post-test interview as well. The goal is to use the qualitative data acquired from the participants' responses since using quantitative data with only four individuals would not offer generalizable claims.

Qualitative data can explain a lot, including which subgroups in the population are the most unaware of their level of risk for floods. A study was done in Canada that took participants through an informative session using various risk communication techniques (Lieske, Wade, & Roness, 2013). Based on the results, the population selected appeared to be unaware of the flood risk of the area in which they lived. Out of the various risk communications used, geo-visualizations such as *Risk Finder* proved to be most successful in raising the level of awareness of its users. This is a trend found in many of the research sources. Based on the data from multiple studies, there is a good chance of producing positive results, whether

it is from the information gathered from the participants or the effectiveness of *Risk Finder* as a learning tool. The demographic information from another study on flood risk, which incorporated data from many demographic studies in flood areas over many years, was interesting in that it pointed to causes of unawareness, such as intentional lack of information by the sellers of property located in high flood risk areas (Burningham, Fielding, & Thrush, 2008). Another factor is economic class due to the correlation of low cost options for lower income families and the fact that many low cost housing options are located in high flood risk zones. The data from these studies is relevant to this study because demographic information of the sample population and data of this study will be contributed to Climate Central's demographic analyses database. This is just one of the many examples of how this research study contributes to the goal of Climate Central's usability test and use of their *Risk Finder* tool.

User responses are very important to the study. In fact, some studies suggest that responses to surveys provided after testing actually better represents the feelings of the testers than the commentary present in the session alone (Law, van Schaik, and Roto, 2014). This means that the opinions of the participants in the post-test interview should be closely analyzed. This can reveal participants' honest opinions about *Risk Finder*. Depending on the answers given by the test subjects, we can examine what they plan to do with the information they have learned. For example, some people might take steps to learn more about flood risks in their area. Some might take the chance to learn more about the way global warming is affecting the sea level. While speculative, it may be that by learning about their individual risk for flooding, people might take certain steps in order to help reduce the effects of global warming.

Possible routes for action that any citizen may take include small efforts to reduce one's carbon footprint, petitioning their government to request a global fire summit, and requesting delegates

to push for industry restrictions to reduce greenhouse gas emissions. Although lessening our carbon footprints is encouraged by many organizations, a subcommittee of Congress held a hearing on emerging technologies and practices for reducing greenhouse gas emissions (Emerging Technologies, 2007). The hearing took place in 2007 and the most important statement made was regarding different techniques that were being used to combat global warming. The Intergovernmental Panel on Climate Change, known as the IPCC, declared that market forces alone would not be effective. It called for drastic actions for governments to enact in order to undertake a large-scale action that could show high effectiveness.

There are several ways that governments can take action to fight global warming. As mentioned earlier, a global fire summit could operate as a catalyst for change. Wildfires and man-made fires contribute between a quarter and a third of all greenhouse gas emissions every year (Huffman, 2014). This means that if a global fire summit was held and nations could set up an effective fire prevention

force, stricter regulations, or other legislative actions, then nearly a quarter of greenhouse gas emissions could be removed without even touching major industries. This can prove to be very effective since, as previously stated, the reduction of carbon footprint by individuals has proven to be ineffective, while governmental actions are now needed. Fire ecology might seem unrelated to this study at first glance, but a closer look reveals a similar interest in rising sea levels. Many areas such as fire ecology are not being looked at by governments around the world because of the lack of awareness of its impact on global warming. Tools like *Risk Finder* could spread awareness and garner a call to action by educating the public about flood risks.

METHODS

Participants were selected using systematic sampling taken from the Polk directories in the Old Dominion library. The sample size was four individuals out of the population we sent letters to, which was

200 people. Individuals were contacted by mail with information regarding the usability test and how to contact the researchers in order to participate.

The data is qualitative, due to the fact that the sample size is small. Users had a pre-test and post-test interview in order to see their opinions before and after interacting with the *Risk Finder* tool, as well as talking as they explored the software without any assistance. This approach utilized a think-aloud protocol, in which users talked to themselves to let the researchers know the reasons they pursued certain links and to understand what drew their attention to certain areas. The sessions were recorded, and the audio files were later transcribed for easier data analysis. The participants' responses were coded into themes to show common trends between the opinions of the four participants.

RESULTS

Researchers worked with four participants: Dean, Elizabeth, Charlie, and Steve (pseudonyms). The individuals represent the middle-aged and elderly subgroups of the population. Researchers transcribed the audio files from the usability testing sessions in order to code for themes. During the coding process, it was determined that only two major themes were present: Risk Perceptions and Technical Problems. A third theme was initially considered — Risk Communication Patterns — but was discarded after concluding that the total of codes falling in the category were miniscule. While not the biggest category, the fact that Technical Problems was such a large category shows that certain features did not meet users' expectations (Figure 1).

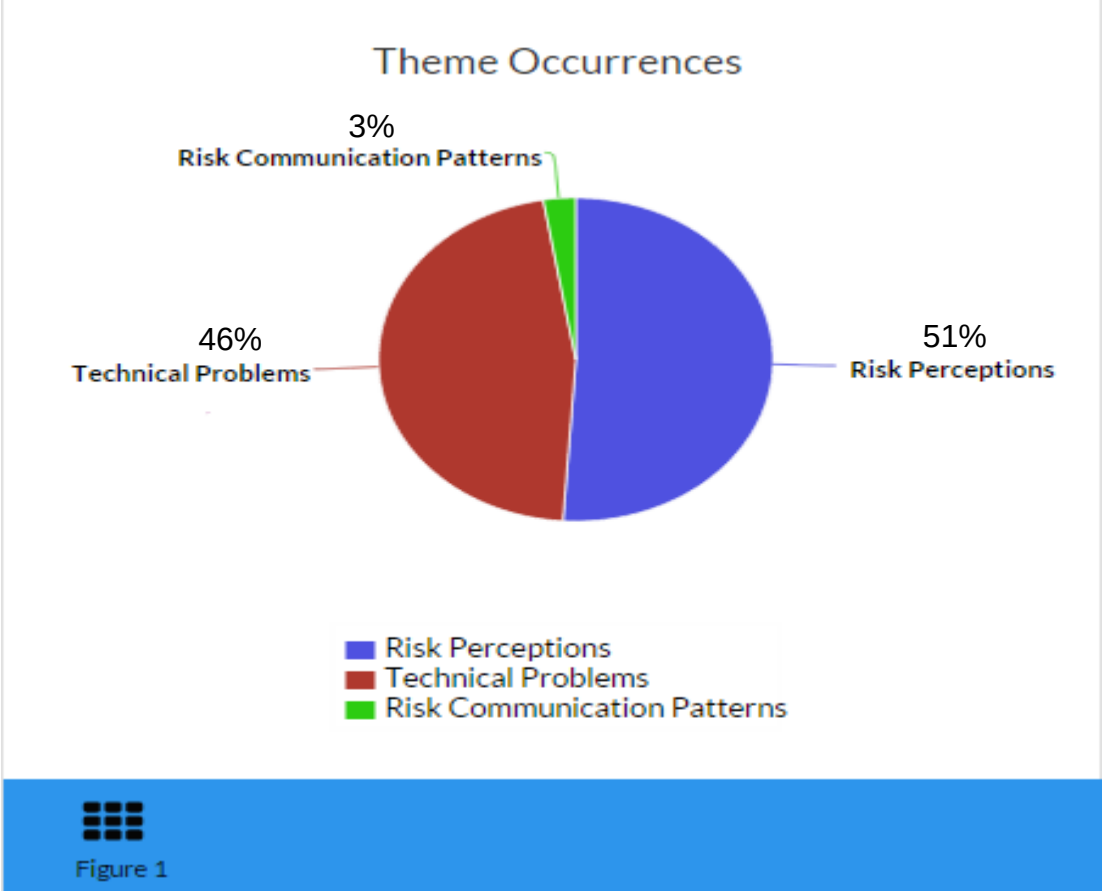

Figure 1

As mentioned, the themes were analyzed to show trends present in all of the four participants. Their responses were then interpreted in the form of recommendations for website redesign.

CONCLUSION

Upon closer examinations of the dialogues from usability testing sessions, researchers were able to narrow down key points that were giving users trouble. The largest problem was the location of the help

menu. Shifting the position of the menu from the side of the screen to a more central location could improve usability. An alternative could be a forced popup that would require the user to decide whether or not to use the help menu upon entering the site, before minimizing to its normal location. In regard to the map tool, the addition of color-coded areas on the interactive map would allow for a quick assessment by the user to which areas were in the most danger from floods. This information would be most useful when already in the city or even a closer zoom, due to the participants' requests to see this system in regards to their homes. In addition to these, results indicate that the test subjects were confused by the meaning of the Social Vulnerability section. During his usability test, Steve stated that he did not understand why the information would be relevant in a flood situation. Adding a brief statement when clicked or hovered over with the mouse may clarify its meaning for users. This statement would ideally explain what information lies behind the tab in question. This would be useful because the user can determine

whether or not the information will interest him or her before selecting it. A final change would be the installation of a loading icon for the map portion of the site. The reasoning behind this is that throughout the sessions a common theme was that the users thought the map was freezing, or that they had somehow not correctly manipulated the map. A loading icon would ensure that the user knows their command is in progress and that the map is working as intended. In summary, changing some factors of the *Risk Finder* tool may make it more usable for general audiences. These changes are: color-coded map areas, a loading icon, explanations of main tabs, and a relocation of the help menu.

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