Usability Study Report
Google Maps Desktop Application
Face-to-Face Interviews

User Experience Design III : Usability Evaluation
March 17, 2018
Coffee and Usabili-Tea (Team 3)
Janna Kline
Matt Tomasello
Shruti Singh
Molly Prower

Table of Contents

Introduction

      This report presents findings from a face-to-face usability study evaluating the desktop version of Google Maps. First, we provide a summary of our findings from asking three participants to perform a series of tasks intended to measure the usability of the desktop Google Maps interface. Next, we discuss specific issues we found to be prevalent, and assign them a severity rating based on their magnitudes within the context of ISO 9241's heuristics. The scoring metric is a scale of 0 to 4, with 0 assigned to interface elements that present no issue, and 4 being assigned to interface elements that severely hinder the experience or greatly violate a heuristic and must be addressed before release for public use. We then provide suggestions to mitigate these issues and improve usability. Following that assessment, using the same set of heuristics and scoring method, we highlight noteworthy features that we believe are effective, functional, and enjoyable for users. Lastly we will compare these findings to a previously conducted heuristic study performed internally within our group, and conclude with a summary of the face-to-face study.

Executive Summary

This report is a face-to-face evaluation of the Google Maps desktop application conducted at Rutgers University. We asked three participants to complete eight tasks within the application, the last two of which one participant did not complete due to time restraints. We observed the participants for 30 minutes each, asking them to think aloud as they complete each task. We then conducted a short exit interview.

Based on our observations we compiled a list of three usability issues and two design successes. We used ISO 9241's heuristics to evaluate them on a scale of 0-4, 0 meaning no issue at all and 4 meaning the issue is critical and must be fixed at once.

Issues:

1. Search Function (3) - The design of the search bar does not indicate the scale of search capabilities to novice users.

2. Adding a stop along a travel route (3) - The process for adding a stop along a travel route is different between the desktop and mobile applications.

3. Saving and labeling favorites (2) - Steps to add places to favorites and label them is not clear. Further more, it is not apparent what exactly is the purpose of the favorites/labels for many users.

Recommendations:

1. Increase the visibility of the search box by enlarging it and adding more descriptive text inside the search box and through tool tips

2. Sync the desktop and mobile functionalities for driving directions and searching for locations or businesses

3. Conduct further research on the popularity and utilization of favorites and labels by users. Based on findings either upgrade the design and functionality or remove in favor of showcasing other Google Maps' features

Successes:

1. Driving Directions - High clarity on driving directions given once destination has been selected. No participants had any issues with related tasks.

2. "Street View" and "Pegman": - Without on-screen direction or guidance the participants found these features easy to learn and use.

The desktop version of Google Maps is a highly functional and user-friendly interface. The needs of a basic or novice user are met with success in functionality, design, and intuitiveness. The performance of the application is strong, with no programmatic errors identified in any of the three participants time on tasks.

However, there are areas that could benefit from enhancing visibility and instruction, and others that could benefit from further investigation of how to improve lesser-known or used features. Examination of these areas may benefit Google Maps by giving it higher prestige as a map program, and encourage novice and basic users, or non-users, to explore the application in more depth, creating more loyal Google customers.

Description of the Google Maps Interface

Google Maps is a web-and-mobile-based application that uses GPS functionality and detailed environmental and user generated data to provide a virtual map of the world. It also provides navigation services, socially accrued information about locations, photographic details such as 360 degree views of specific areas, and other non-traditional mapping program content.

The majority of the desktop interface is a labeled map of the user's surrounding area. The maps' designs are similar to both paper and digital maps found on common websites and programs. Users can scroll around the map by clicking and dragging or using arrow buttons or their keyboard. Users can also zoom in and out; view geo-tagged photos that other users have uploaded; and enter "street view", allowing the user to view the chosen location as if they were physically there.

Other functionalities of Google Maps are accessible through a combination search bar and hamburger menu in the top left. The search bar allows users to search for locations on the map using names or general keywords. Users can search for directions for traveling by different modes of transportation such as automobile, public transit, biking, or walking. Users are also able to schedule trips at specific times or to customize routes. The directions given to the user provide traffic updates and estimated arrival times. Finally, clicking on the button to the left of the search bar expands the hamburger menu and presents the user with a variety of other options, including the ability to save locations to a favorites list, view the map in different modes such as terrain and satellite, get help with using the website, and more.

Conducting the Usability Test

I. Experience with Google Maps

We interviewed three participants for 30 minutes each at the Busch Campus of Rutgers University. We used a team member's laptop and recorded audio and video of the screen during each session. Each participant used a Google Maps account set up for the study only, and each participant's search history was erased before the next person's interview.

Prior to beginning the usability test, each participant was asked to respond to a series of four questions designed to address their current use patterns and familiarity with Google Maps and other mapping programs.

	Participant 1	Participant 2	Participant 3
How often do you use Google Maps on a computer? 1=*Never used* to 6=*Very often*	2	2	4
How confident are you using Google Maps? 1=*Not at all* to 10=*Very confident*	10	7	6
How familiar are you with the features of Google Maps? 1=*Not at all* to 10=*Very familiar*	9	5	6
What other mapping programs online have you used?	subscription service	waze	TomTom, MapQuest

Table 1. Overview of participant previous experience with Google Maps and mapping programs.

II. Task Summary

The participants were then asked to perform a series of tasks.

Task 1: Locate a nearby coffee shop that you would choose to go to. (Follow-up: What influenced your decision to choose that shop?)

Task 2: Add that coffee shop to your favorites and add a label to it.

Task 3: Plan the fastest automobile travel route from Piscataway to Washington D.C. considering traffic. If you left now, how long would it take you to get there?

Task 4: Along the way to D.C., find a gas station in Delaware to stop at and add it to your route.

Task 5: Plan train travel from Union Station in Washington D.C. to the New Brunswick train station, arriving at New Brunswick Station by 4:30pm today.

Task 6: Find an image of the interior of the White House.

Task 7: Submit a review of the last restaurant you ate ate.

Task 8: Find a nearby house with a pool in the backyard.

II. Task Findings

Overall, participants were able to complete most of the tasks with little or no assistance (see Figure 1). All participants were able to locate a coffee shop, plan a driving trip to DC, find an image of the White House, and participants 2 and 3 were able to find a house with a pool (participant 1 did not perform this task due to time constraints). Two-thirds of the participants were able to add a location to their favorites, find a gas station, plan train travel, and submit a review. On average, the tasks were each completed in between 1 to 2 minutes (see Figure 2).
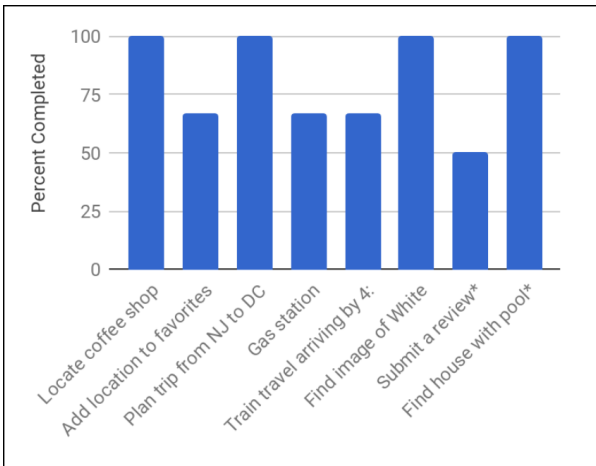

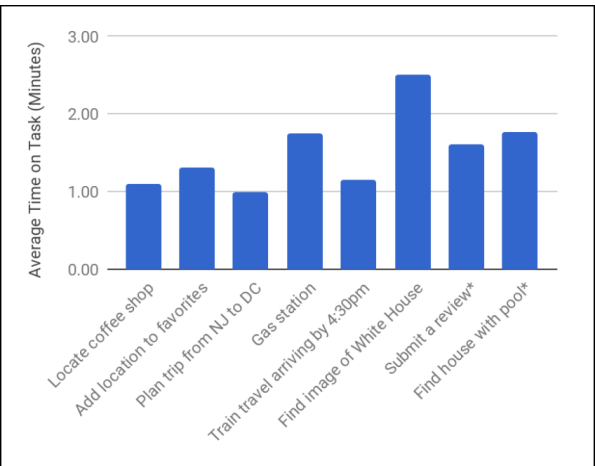*Figure1.* Percentage of users who successfully completed each task.

*participant 1 did not accomplish task due to time constraints

Figure2. Average time (in minutes) for each task

Errors made during completed tasks were minor and participants were able to recover from them without moderator assistance. Each participant made 3 to 4 errors across all 8 tasks. Task 7 (finding an image of the interior of The White House) was the most problematic for users, while Task 1 (locating a coffee shop) was the least problematic (see Table 2).

	Participant 1	Participant 2	Participant 3	Total
1. Locate coffee shop	0	0	0	0
2. Add location to favorites	1	1	n/a**	2
3. Plan drive from Piscataway to D.C.	0	0	0	0
4. Find and add gas station	0	1	0	1
5. Plan train travel arriving by 4:30pm	0	0	1	1
6. Find image of the interior of W.H.	2	1	2	5
7. Submit a restaurant review	n/a*	0	1	1
8. Find a house with a pool	n/a*	0	0	0
Total Errors	3	3	4	10

Table 2. Total number of errors for each task

*participant did not complete task due to time constraints
**participant asked to not complete the task

After completing each task, the participants were asked to participate in an exit interview. First, they were asked to give their overall impression of the desktop application. Two of three participants mentioned that they enjoyed "Peg Man" and street view the most.

> " [I liked] the little man. I wasn't too familiar with that feature."
>
> "I really like the little guy because I like to orient myself with the streets before I go somewhere."

All participants agreed that the easiest task to accomplish was finding directions (task 3). On the other hand, all three participants disagreed on which task was the hardest, citing adding a location to the route, using the satellite feature, and labeling a favorite.

Finally, we asked the participants if they felt that Google Maps met requirements they personally would want in a mapping program, and to rate its ease of use, using a scale of 1-10, with one being "not at all" and 10 being "very much". Both questions averaged at 6.

Recommendations

I. Design Issues

In this section, we outline each usability issue discovered. We describe the issue, indicate the severity of the issue and its related heuristic, provide its context within the usability study along with our reasoning for its severity rating, and present recommendations for design improvements.

Search Function

This feature allows users to search using full or partial addresses as well as non-specific terms (e.g., "coffee shop") and choose from a list of results. However, the design of the search bar does not indicate these capabilities to novice users.

Image 1. Screen shot of Google Maps search bar

Severity Rating: 3
Heuristics: Error tolerance; Sustainability for Learning

Reasoning:
Searching for a location is one of the primary functions of the Maps application. The search is designed with the intention for a user to not have to perform the extra steps involved when searching for or finding an address on a different site (such as a place of business's store locator), or typing a full address in manually. Furthermore, copying and pasting a location from one website or browser tab to another increases the risk for user error.
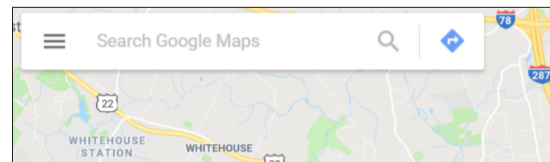
Example from Usability Testing:
Instead of using Google Maps' built in search to locate the required places, a participant opened other tabs in the browser window and used Google.com and other places of businesses' websites to find their addresses. Then, the participant copied and pasted the full address into the Google Maps search feature. The participant continued this pattern for three other tasks, adding time and confusion as to not only what they were trying to do, but also what they were looking for.

> "Am I allowed to use other [browser] tabs?"
>
> "I think this is the location I am looking for.

Recommendation:
We recommend altering the design for the search box to provide better visibility, such as increasing the size of the search box and darkening the text. Aligned with our heuristic recommendations, we suggest an example of search criteria be listed below the search bar (e.g., "Enter a place name or address") (Image 2). We also recommend having a tool-tip for the search box upon a user's opening of the page could help guide users along. Exposing a link to a help section for Google Maps that is not hidden behind a menu would also increase visibility of how to use the program more effectively.
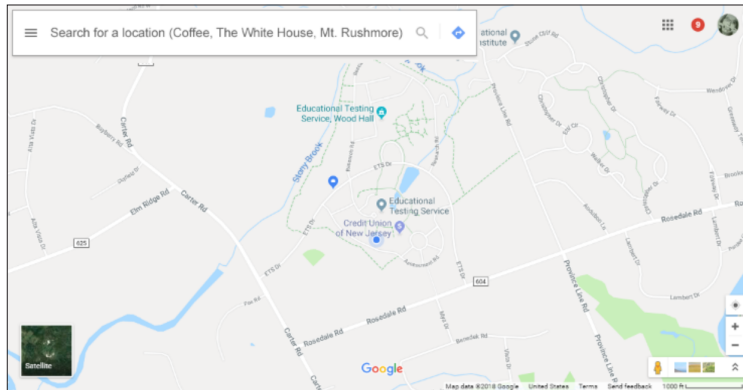
Image 2. Google Maps search bar design improvement example - text

Adding a stop along a travel route

The process for adding a stop along a travel route is different between the desktop and mobile applications. Since all of our participants primarily used the mobile application, they all had difficulty accomplishing this task.
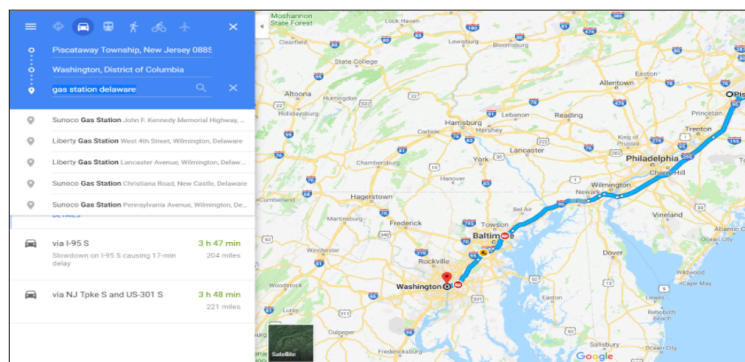

Image 3. Desktop version of Maps' location search in directions mode

Severity Rating: 3
Heuristics: Controllability; Conformity with User Expectations; Suitability of Individualization; Suitability for Learning

Reasoning:
Although the functionality is present in both versions of the application, the execution on desktop is much more complicated. It is difficult to search for a service the user wants in relation to their chosen route and results can include seemingly random locations that are irrelevant to a route. Inconsistencies between interfaces that are not caused by the limitations of the platform should be avoided in design at all costs. Furthermore, in order to place the location you would like as a secondary stop an extra "drag" interaction is required on the desktop.

Example from Usability Testing:
All participants had an issue when we asked them to do this. The two participants that did have an idea of how to complete the task based their actions on how they have interacted with Google Maps' phone application in the past. While two users were able to add a third stop to their route, they were both unable to re-order their trip so that the

newest location was a stop along the way. One user deleted the second stop and re-added it so it was now the last stop. The other user needed assistance.

> "There is usually a way to do this on my phone."
>
> "I'm not sure how to switch the order."

Recommendation:
We recommend providing a more clear system for reordering stops within a multi-part trip. On the mobile app, places are labeled as A, B, C, etc and can be reordered (Image 4). We suggest adding these labels to the desktop app to sync both applications up programmatically. We also suggest updating the application to search for more relevant locations to the user's route.

Image 4 (right). Mobile app with suggestion of labeling locations A, B and C
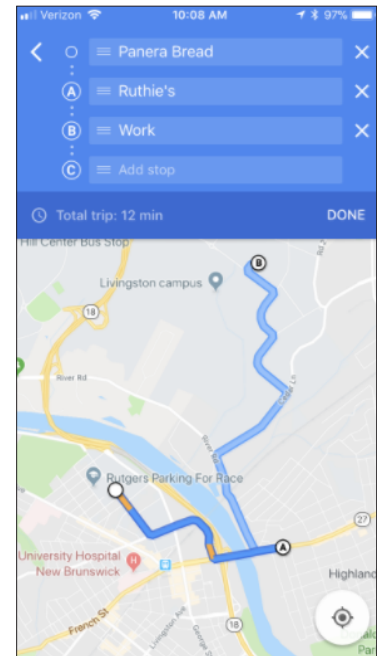
Saving and labeling places

Google Maps provides the ability for users to add places, save places, and label them in their favorites. Our testing suggests that the steps to add places to favorites and label them was not clear to users. Furthermore, it is not apparent what exactly is the purpose of the favorites/labels for most users' needs.

Severity Rating: 1
Heuristics: Controllability; Conformity with User Expectations; Suitability of Individualization; Suitability for Learning

Reasoning:
Users who use Google Maps while logged in are always shown their favorites on the map. Favorites are also suggested during searches as possible destinations. Without more visibility for this control, including labeling, the locations being shown on the map may be confusing to users. Also, favorites seem to be added arbitrarily at times due to users' unfamiliarity

Image 5. Location of saving option in detail view of specific location

with the functionality. Lastly, some users who have privacy concerns may not want to have favorites, and may not understand how to remove these locations from their stored personal data.
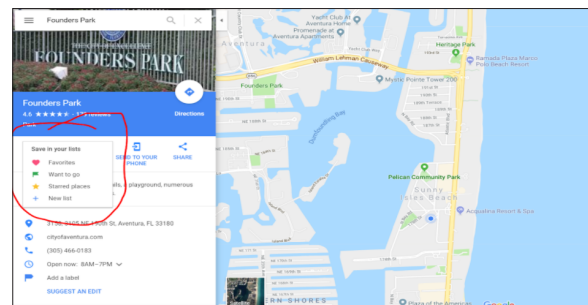
Example from Usability Testing:
Two participants had an error when we asked them to add locations to favorites and labels, and one did not complete the task. The first participant did not know what labeling is. The second participant used Google Maps'

help section to look up how to complete the task, and the third participant said they did not know how to do it and declined to complete the task at all.

> "I tend not to save addresses because I know people are watching and the government knows where I go."
>
> "Add a label on it?"
>
> "I don't think I've ever done the favorites option."

Recommendation:
Labels may or may not be needed on this application at all. Two participants were familiar with the favorites feature, but did not understand the purpose of adding a label. We recommend compiling more analytical data on the use of this feature. If the data shows that this feature is desirable, we would recommend improving its visibility by moving it in the container and/or changing the font color and size (Image 6). If data shows this is a very seldom used feature, remove it all together. Favorites options should also be more prevalent in the application, with more visibility once a user is logged in.

II. Design Successes

There are several major design successes within the Google Maps interface that we would like to highlight.

Clear Driving Directions

High clarity on driving directions given once destination has been selected. No participants had any issues recognizing the details of the directions or interpreting the visual cues.

Severity Rating: 0
Heuristic: Suitability for the Task; Conformity with User Expectations; Sustainability for Learning

Example from Usability Testing:
When searching for directions for the coffee shop and traveling to and from Washington D.C., users had no issues identifying where the directions were, or how to change modes of transportation. When different sets of directions were given, users were clear on which routes were highlighted, which were optional routes, and how to interpret the traffic indicators on the routes.
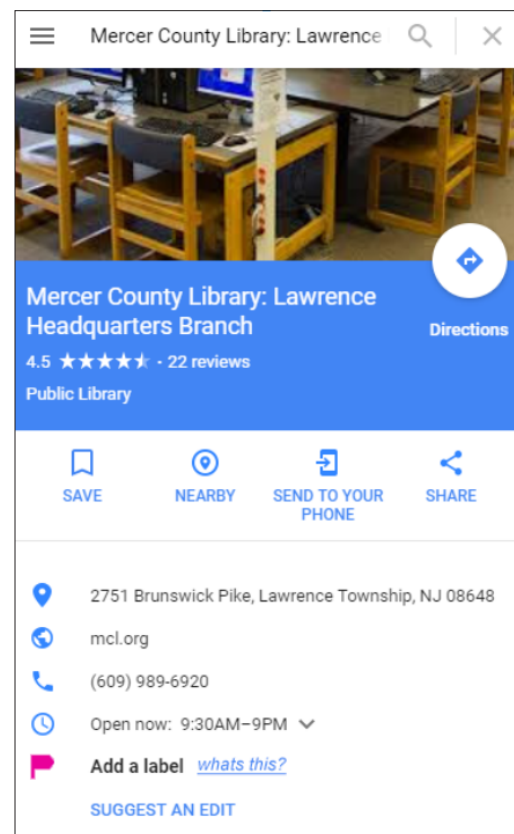

Image 6. Label location option with different text treatment and call out color sample

Street View and "Pegman"

"Street View" and "Pegman", without on-screen direction or guidance, were intuitive to participants. Once given the task to use this feature, they were able to instinctively accomplish the task they were given.

Image 8. Screen shot of street view outside of White House from task given to participants.

Severity Rating: 0
Heuristic: Controllability; Conformity with expectations

Example from Usability Testing:
Given the task to find an internal view of the White House, two out of three participants were familiar with the Street View and Pegman, and were able to complete the task. Although they did not know that the icon could be placed inside of a location, they quickly figured it out without assistance. Of the one participant who did not know about the Pegman at all, once the location of Pegman was revealed to them they had no problem completing the task.

Comparison to Internal Heuristic Study

Two weeks prior to this in-person study our team performed our own heuristic evaluation. When comparing the results of the two studies, we are shown that most of the issues we identified as high severity are confirmed by the user testing study. Issues that matched in both studies included adding areas to your route when getting directions, and confusion surrounding labeled places. An interesting discovery is the issue reported with the search bar. We marked this as a non-issue in our study, but have elevated it to severity rating 3 after observing the participant who demonstrated that the functionality of the search feature was not clear.

We also noticed that during the user testing we did not identify as many issues with the system. This may be due to the nature of the tasks we gave our participants, or the difference in time spent on the application between the participants and ourselves.

Also we have noticed the difference in nature between the two studies. Our team is composed of fans of Google Maps, and are able to use it at an advanced level. Some of our participants were not fans or had barely used it at all. Because of this we were able to get a broader perspective and see an experience with the tool that was not skewed by our own prejudices.

Conclusion

The desktop version of Google Maps is a highly functional and user-friendly interface. The needs of a basic or novice user are met with success in functionality, design, and intuitiveness. The performance of the application is strong, with no programmatic errors identified in any of the three participants time on tasks. While the one large flaw surrounds the search function and the intuitiveness of its capabilities, it still performs its intended use, even when obtaining information available in Maps from a different source. Novice users are still able to perform basic tasks, though the successfulness of the task completion is subjective.

Google Maps provides a multitude of other features not found in other mapping software or applications. However, if the program's intention is to be known for those features, it will need to be finessed in both visibility of these features and explanations of their purpose and how to use them. Business decisions should be made as to whether or not these features are worth improving before introducing new ones, as a population of users may not ever know they exist or learn their full potential without further design affordances.

In conclusion, Google Maps is a successful program, functioning as it should for a user's basic needs, but could benefit from further investigation of how to improve lesser-known or used features. Examination of these areas may benefit Google Maps by giving it higher prestige as a map program, and encourage novice and basic users, or non-users, to explore the application in more depth, creating more loyal Google customers.