

## Introduction

Finding flaws in the design of a piece of software that has been continuously improved since its inception is incredibly difficult. This task is made more difficult when you are unable to test specific use cases with test subjects. Google Maps is a widely used application which can help people find their way in real time, plan trips in advance, or even explore the streets of a city they've never been to. In the absence of users, conducting a heuristic evaluation allows for the analysis of a design with users in mind. While there are several sets of heuristics with which you can examine a piece of software, the following report will illustrate our findings upon the conclusion of an evaluation specifically utilizing the ISO 9241 heuristics.

While all sets of heuristics were developed with the same goal, each set has nuanced differences. For instance, in a different set of standards (Nielsen's Heuristics), the evaluation would be based on how likely a design is to prevent a user from making errors, as well as how easily the user may recovery from an error that they made. While the ISO 9241 standards consider how easily a user could recover from making an error, there is no specific criteria for scrutinizing a design's likelihood to prevent an error in the first place. The overall sentiment is very similar, but subtle variances may mean the difference between finding a flaw in a design or deeming the same design aspect completely acceptable.

The following report will describe the Google Maps interface and some of its most important functionality, as well as our findings after considering each of the seven ISO 9241 heuristics to the design. Beyond that, we will discuss how severe we found each flaw to be and the reason for our perceived severity as well as a description of our potential solutions to each problem.

## Executive Summary

After individually applying each of the seven ISO 9241 heuristics, we convened to discuss our findings. Through this discussion, it was determined that several aspects of the Google Maps interface were found problematic by all members of the group, therefore leading to a higher severity rating. While the purpose of the heuristic evaluation is to find potential flaws in the design, we also sought to point out aspects which we thought were handled really well and should serve as an example for other designers (these aspects will be rated at a severity of 0 in the following report).

Several of our findings are focused on perceived flaws in the *street-view* interface – one of the most intensive functionalities of the application. Despite the fact that, largely, the *street-view* interface successfully meets the criteria for a user-centered design (according to the ISO 9241 Heuristics), these flaws were also deemed to be some of the most severe amongst our findings.

Outside of specific interfaces or aspects of such interface, the heuristic with which we found the highest volume of violations was *Conformity With User Expectations*. This standard scrutinizes aspects of the design that differ from what a user would expect to see or be able to accomplish throughout their interaction with the interface. The problems we found with this heuristic varied from losing the ability to search new places within a specific part of the application to inconsistencies in the interface between different platforms.

While most of the issues found in the design of the Google Maps application are not severe enough to prohibit a user from accomplishing the primary function of the software, the suggested changes would seek to simplify the user experience. From creating a uniform experience across all platforms to standardizing iconography, the results of our heuristic evaluation serve to enhance the usability of an application that has been consistently improved since it was first made available to the general public.

### Interface Description

The interface that we have taken into consideration to perform our analysis is **Google Maps**. Google Maps is a web mapping service developed by Google and launched in 2005. It's functionality includes provision of street maps, satellite imagery, and 360° panoramic views of streets (Street View). It assists the users to get a sense of the real-time traffic conditions, and enables them to perform the task of route planning for traveling by foot, car, bicycle, or any form of public transportation. Google Maps is available as a desktop application as well as a mobile app for the Android and iOS mobile operating systems, however we performed most of our analysis based on our evaluation of the desktop application.

### Evaluation Criteria

We conducted our evaluation based on the ISO-9241 heuristics (Fig. 1). We recognized the issues that we found existed in the interface and categorized each of our findings based on the heuristics they violated. There was also an indication of the severity rating for each of these findings (Fig. 2).

USABILITY HEURISTIC FOR USER INTERFACE DESIGN	
H1	Suitability for the Task
H2	Self-Descriptiveness
H3	Controllability
H4	Conformity with User Expectations
H5	Error Tolerance
H6	Suitability for Individualization
H7	Suitability for Learning

Fig. 1

PROBLEM SEVERITY RATING	
0	Not a Usability Problem
1	Cosmetic Problem
2	Minor Usability Problem
3	Major Usability Problem
4	Usability Catastrophe

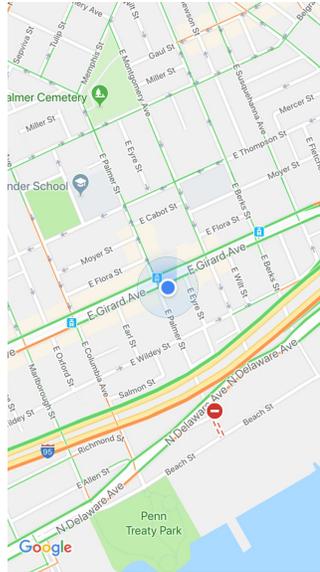
Fig. 2

### Findings

#### *Suitability for the Task*

- 4 - Shadow coming from current location point is not clear that it represents the direction you are facing

- Recommendation: Apple maps uses an arrow, which is much more immediately recognizable. Add more clear direction feature. Compass is not as apparent on Google Maps as you would expect for a map service.



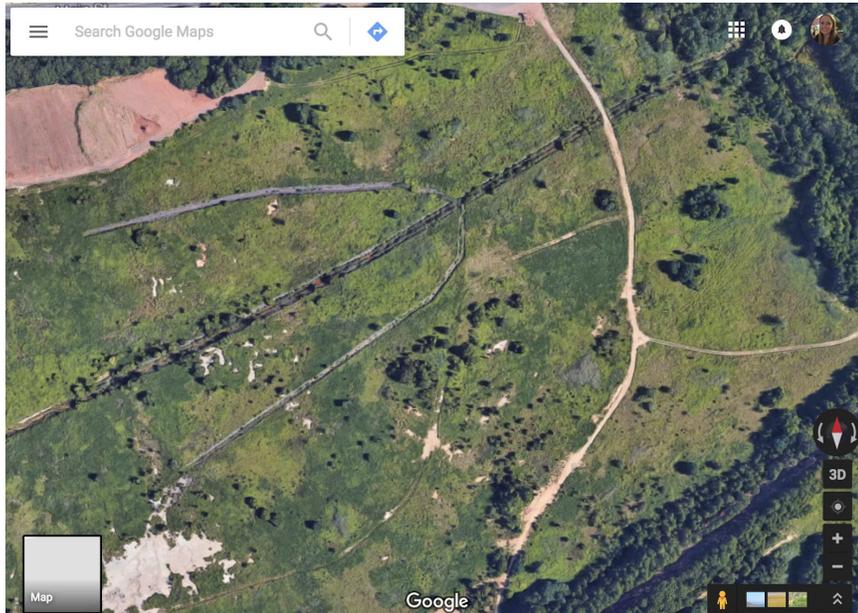
- 3 - When you've reached a limit/boundary of Street View, there is no error message or warning that you can no longer explore that area or you've reached a boundary
  - Recommendation: Alert users when they have attempted to go beyond a boundary with a message along the lines of "You are attempting to explore beyond our boundaries."

Maps provides no feedback that this road is not accessible



### Self Descriptiveness

- 2 - Labeling - there is none except in the Search Bar (Search Google Maps)
  - Hamburger menu unclear
  - Go option without even entering the data
  - Mode of Transportation icon ?
  - Person icon?
    - Directions appear when hover over icons (not intuitive) - explore, street view
  - Recommendation: Label the icons so that users know where to look when in dilemma



### Controllability

- 2 - ON MOBILE; not easy to add stops and switch position in the directions
  - Recommendation: An indication that clearly suggests where to switch the destinations from
- 0 - interface is self-paced; can control map browsing
  - Able to switch view - satellite back to map/zoom in and out

### Conformity with User Expectations

- 2 - Tap once on the screen and all the options go away.
  - Recommendation: include a small arrow or fix a search bar/menu icon in the corner so user know that the option is still available - just collapsed
- 3 - Once click street view you can no longer search locations - singular action in street view
  - Recommendation: Include a search bar within street view.

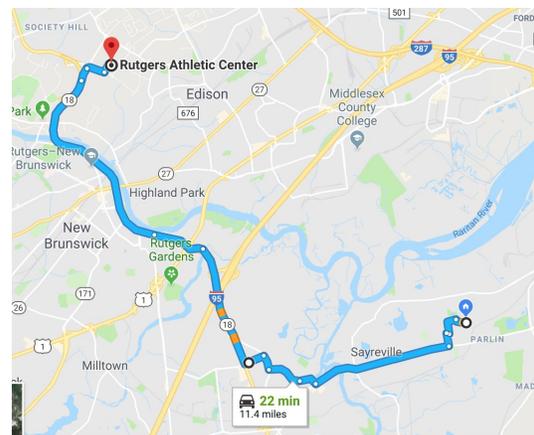
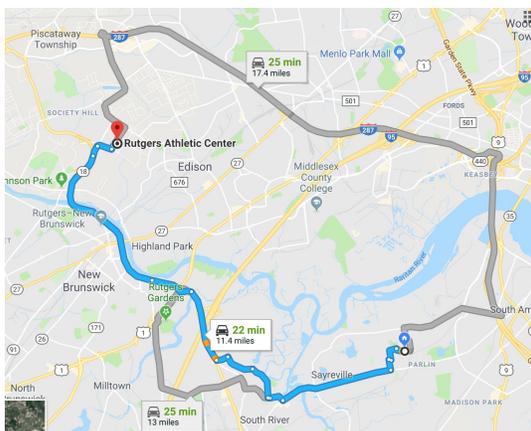
Notice there is no search bar



- 1 - ON MOBILE: exiting your route/directions is displayed by an EXIT button on apple and a simple X on Android. They symbolism is drastically different
  - Recommendation: Consistent interface options between Android and iOS. Keep RED EXIT BUTTON consistent with all versions of the app

*Suitability for Individualism*

- 2 - Route Selection goes away when you edit the route options it gives you
  - Recommendation: Keep all available routes present for easiest/best comparison



*Suitability for Learning*

- 1 - Visibility Issue: Tips and Tricks/Help/Info located at bottom of hamburger menu
  - Recommendation: Add a HELP/Question Mark Icon to the main map page for easy access if there is struggle

## **Conclusion**

Google Maps aims to create a seamless interface for all the users across the globe to ensure a comfortable navigation experience while driving. Their efforts have brought about a very unique and engaging collection for users of all backgrounds in education and technology to explore. In this report, we have pointed out a few alterations to the interface of the application which will further probe the users to interact and engage with the service with minimal confusion or stress.