

Spartan Consulting Co.



Product Evaluation:

APPLE MAPS



Harshada Bhide-Apte: 010764845

Alexander Chao: 008591024

Gregory Costedoat: 008291881

Graciela Medrano: 011525904

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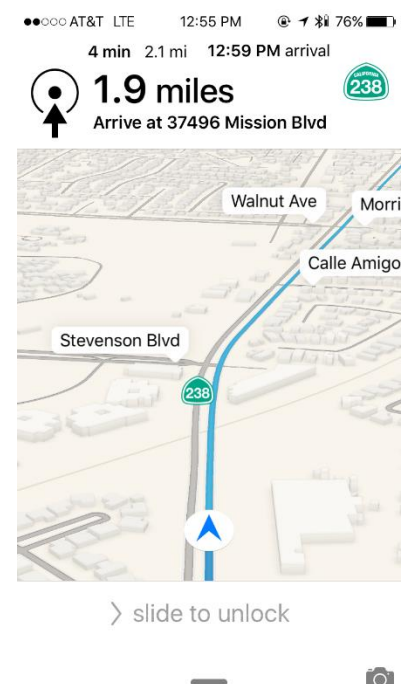
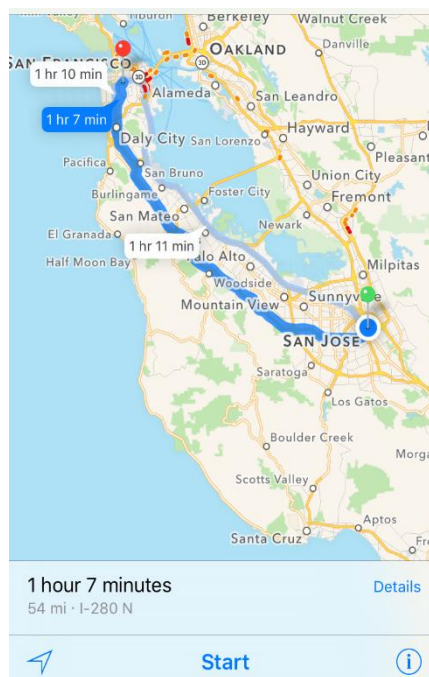
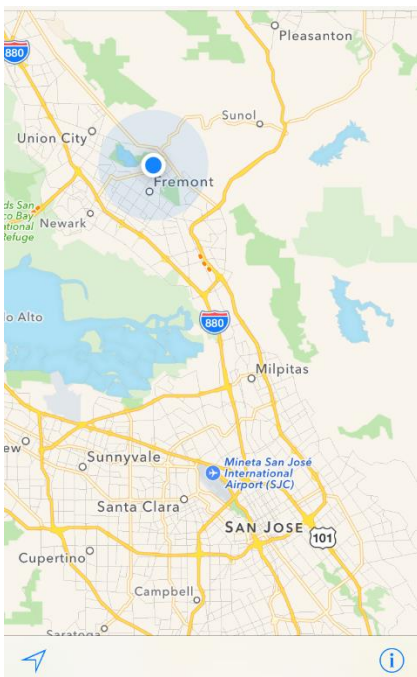
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Introduction: Product Selection (TEAM)

The product of interest for the current evaluation is the Apple Maps mobile application (iOS 9.3.5). Considering that this is a product that is used on a regular basis by many people, and given the importance of being able to easily obtain accurate directions, Spartan Consulting believes that through an iterative process, the product could be further optimized. Given the popularity of competitor products like Google Maps and Waze, it is important to determine where Apple Maps could improve user experience through new, innovative, and intuitive interactions. Another reason for selecting this product was that it could potentially affect a large population, as the product is included in every iPhone purchased.

Product Description (TEAM)

Apple Maps is a mobile application that provides users with information regarding how to get to a desired destination. The application allows users to input their desired address or the name of a place that they wish to visit if they do not know the exact address (e.g., Home Depot or In-N-Out Burger). Once a desired location is input into the application, users are provided with real time map and step-by-step directions as to how to get to their destination. Further, the other main features of Apple Maps includes providing information about which route is the fastest, estimating trip duration for various forms of transportation (e.g., personal vehicle, public transportation, walking), and allowing users to share information with others.



Core Questions (TEAM)

The following *core questions* were identified as being the most important criteria that needs to be examined in order to determine if the experiences that users have with the Apple Maps will entice them to continue using the product and encourage them to consider using other Apple products.

1. Can users look at the map and easily determine where they are going and their orientation in space?
2. Do users understand the functionalities of the icons contained within the application?

User Profiling (TEAM)

The following personas were based on principles from (Miaskiewicz et al., 2011). The personas serve as a presentation of the different types of user profiles. Each persona has a different level of experience with the application and is attempting to fulfill different needs.

George (Novice user; uses public transportation)

George recently purchased his first iPhone, moved to a new city, and does not own a vehicle. He recently landed a job at a company on the outskirts of the city. Therefore, he wants to use Apple Maps in order to determine the most efficient forms of public transportation and driving services. Because George has never owned a smartphone, he has trouble finding features that are not readily visible and identifying the functions of icons that are not intuitive. He often finds himself walking back-and-forth to orient himself on the map.



Elroy (Intermediate user; drives his own vehicle)

Elroy occasionally uses Apple Maps, especially when going on vacation with his wife. He enjoys renting a car and exploring. While driving around new places, he and his wife enjoy visiting the popular tourist attractions. He also uses the Apple Maps to find gas stations, rest stops, and ATM's in these new areas. Because he is generally unfamiliar with the areas that he vacations in, he frequently searches for gas stations and rest stops while on the way to a destination.



Elizabeth (Advanced user; drives her own vehicle)

Elizabeth is a behavioral therapist who frequently uses Apple Maps to help her with directions when driving to her clients' homes at various locations. In order to be punctual, she must be aware of which routes are fastest and where traffic is the heaviest. Elizabeth is generally pressed for time and must quickly input directions into her phone.



Interface & Feature Evaluation (TEAM)

The interface and feature evaluation examines both the good and bad qualities of Apple Maps in regards to established usability principles. Some of principles we based our evaluation falls under concepts such as representative design, primacy of perception, and affordances.

Representative design would suggest that the Apple Maps product must be ecologically valid: apple maps should consider in their designs the context of how users actually use their application. *Primacy of Perception*: Given the fast paced environment that Apple Maps is generally used in (e.g., at a red light), it is important to emphasize this principle to ensure it reduces the amount of effort and time for users. *Affordances* optimize the system by reducing the negative affordances which minimize the amount of errors while allowing users to easily recover from mistakes.

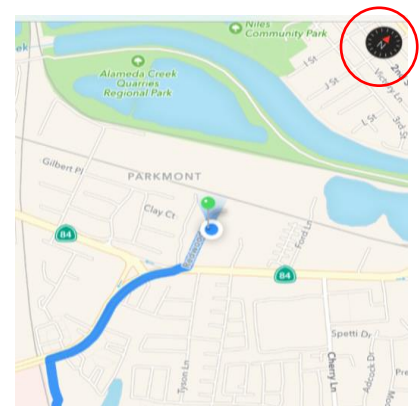
Good Qualities

This section examines qualities of Apple Maps that properly implements various usability principles.

Compass

The compass displayed at the right upper area of the map is very useful. It's simple to use and very straightforward.

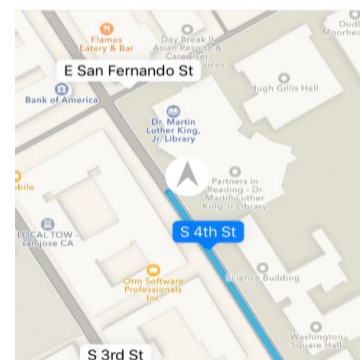
Representative Design: Designers of the product were conscious enough to consider the context of how users may potentially use Apple Maps. Some may focus on using cardinal directions in order to help with navigating their environment.



Map Visible when Phone Locked

When your phone is in lock mode and you turn on the screen, it is your screensaver.

Easy Access: Despite being locked, users are still able to easily access their navigation without having to unlock, while keeping Apple Maps active. This also allows users to conserve more battery over time while still being able to access the map they are using.

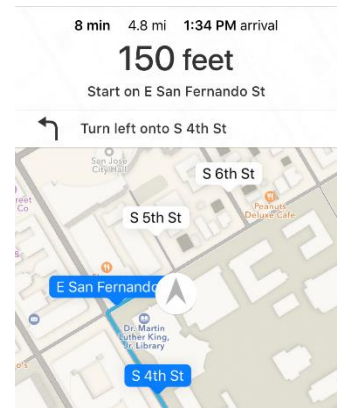


Visually Appealing

Apple's map UI during travel is visually appealing.

It excludes irrelevant stimuli from its design in order to lighten cognitive load.

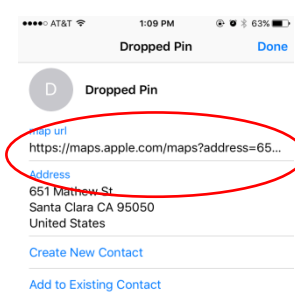
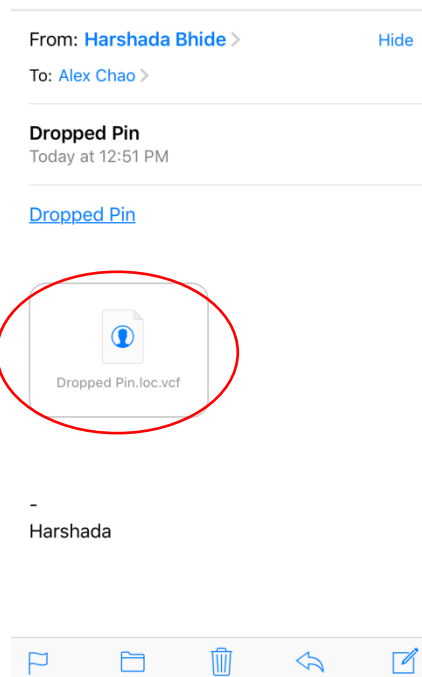
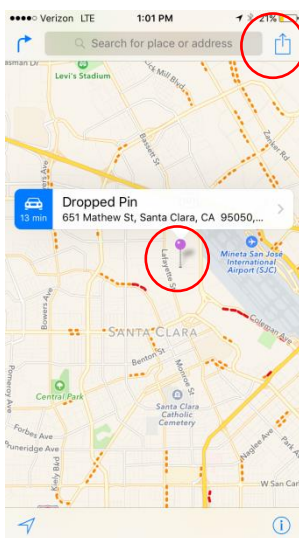
PERSONA CHECK-IN: In context of Elizabeth frequently using this application, the UI may contain less irrelevant stimuli. Because of this, Elizabeth finds the UI to be more visually appealing. In addition, she is able to drive without overloading herself.



Bad Qualities

Pin Drop

The user has to hold a spot for a while so that a pin is dropped in order to specify a location. There is a lack of perceived affordance of how a user is able to actually drop a pin. It is not intuitive and a new user may not realize such functionality exists and how to use it. User can share the location at which pin is dropped by SMS, email, Whatsapp, Facebook etc. The share button is at the top right and easy to find. But things like how to open the map from the email are tricky due to a lack of affordance (van Vugt et al., 2006). They also need more number of clicks or steps.

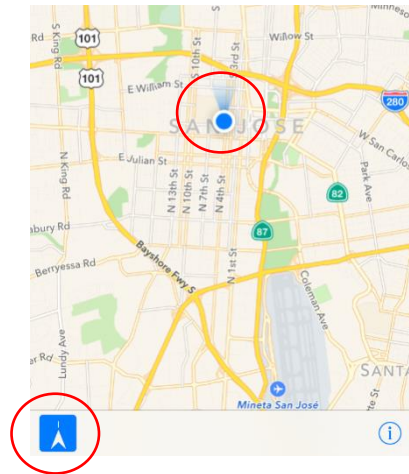
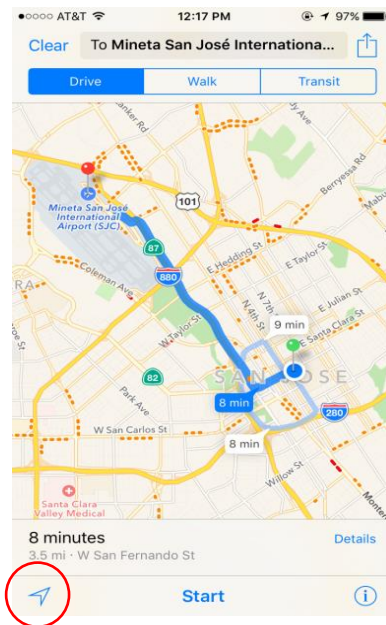


Self-Orientation

When walking, Apple Maps does not tell you which direction you are facing when you start navigating. In order for the user to determine which way they are facing, they must keep pacing back and forth. However, there is a function for this, which is activated by a non intuitive icon. New users may overlook this feature.

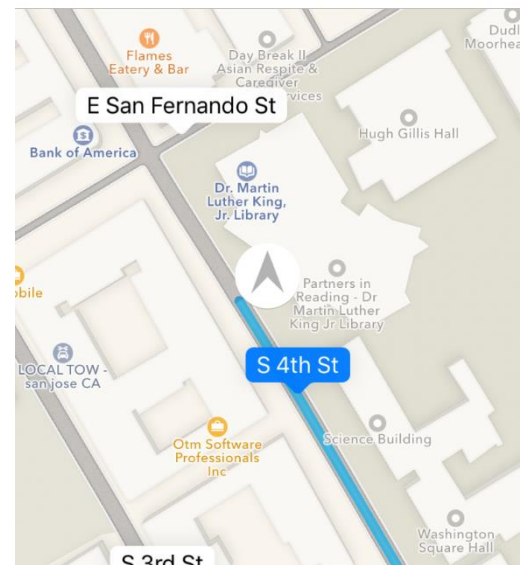
Design of the vector is ambiguous as to what its function is. Design should be easily recognizable. In addition, the design should afford the user to click the icon.

Affordance of the vector being clickable not only once, but multiple times (van Vugt et al., 2006).



Traffic on Route

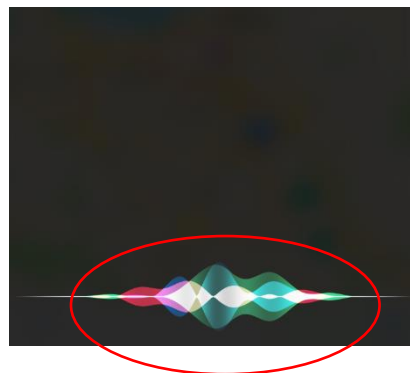
When a user starts navigation from the current position to the destination address, live traffic is not continuously updated using different colors (e.g., green, yellow, red) along the way. However, when the user checks the route by explicitly entering start address, the traffic is displayed on the route. This behavior is inconsistent and causes confusion in the user (Prece et al., 2015).



Vocal Direction Input

You must use Siri to verbally ask for directions if you are in the map app., but it may not always work properly. In order for Siri to work properly with maps, you have to use it outside of the application.

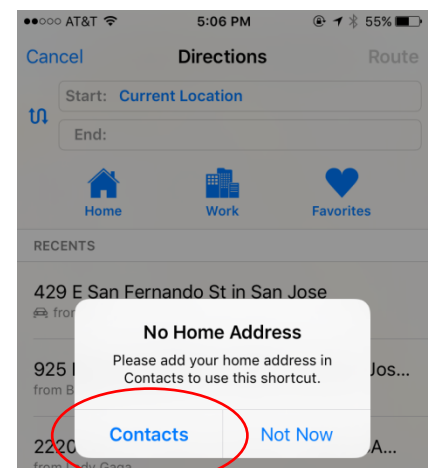
Conceptual Model: Does not match our expectation of finding the functionality of voice assistance within the interface of Apple Maps itself. Instead, the function is outside of the interface where the user is forced to push a physical button (home button) to access the function. In addition, a new user may not realize that Apple Maps registers voice input (Prece et al., 2015).



Inputting Home Address

When attempting to input a home or work address, it is confusing that a dialogue box is prompted asking the user to go into their contacts. Options presented are not intuitive. Due to this issue, users are more likely to make errors such as a slip or not complete the task itself.

Conceptual Model: The prompt that Apple Maps gives to the user after attempting to input a home or work address does not match what they expect. Instead, they may be expecting to be able to input their address directly. There is also a potential for slips once accessing the contacts page where users may unintentionally select a contact, setting it as their home or work address (Prece et al., 2015).

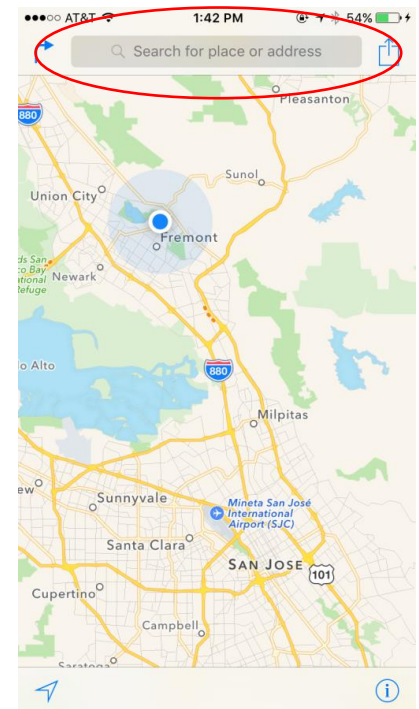


Location of Search Bar

When the Apple Maps application is started, the search box at the top is small in size compared to the map which takes up most of the page.

Fitt's Law violation: The text box is too small for older people and kids to easily access it without making slips. Since the whole screen is touchable, mistakenly touching the map instead of text box is a possibility for a busy, old-aged, or child user. Home page real estate can be used in a better way (Roberts et al., 2016).

PERSONA CHECK-IN: If Elroy were to use Apple Maps, he may consider this to be hindrance to his performance, especially when he is inputting multiple stops and multiple locations. If he were able to access it with quicker and with more accuracy, he may be more inclined to continue using the application in the future.

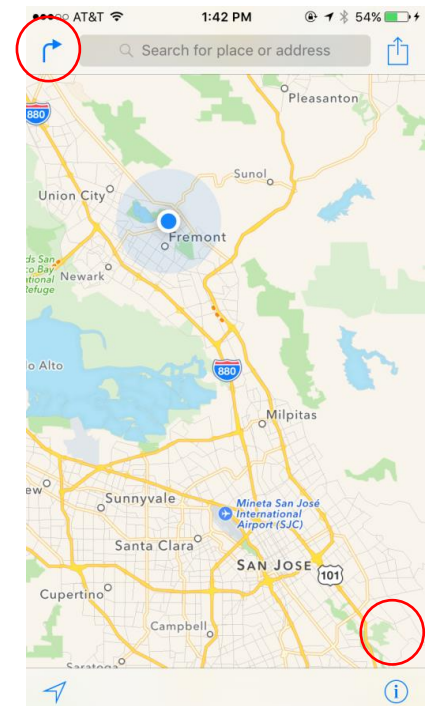


Ambiguous Icons

"Right Arrow" Icon

The right arrow on the top left of the display looks like a "turn right" directional arrow. Due to the ambiguity, the users may be more prone to slips. The icon itself is confusing because the arrow appears as if it is indicating an upcoming right turn. Instead, it is actually indicating the user to set a destination location. A less confusing icon would be more appropriate.

Iconic Representation: The top left icon's meaning is not easily recognized. In addition, its placement appears to be directing the user's attention to select the search address bar. For these reasons, users may not understand the function of the right arrow being next to address bar (Prece et al., 2015).



"i" icon

When "i" button at right bottom corner is pressed, the page title is displayed as "Maps".



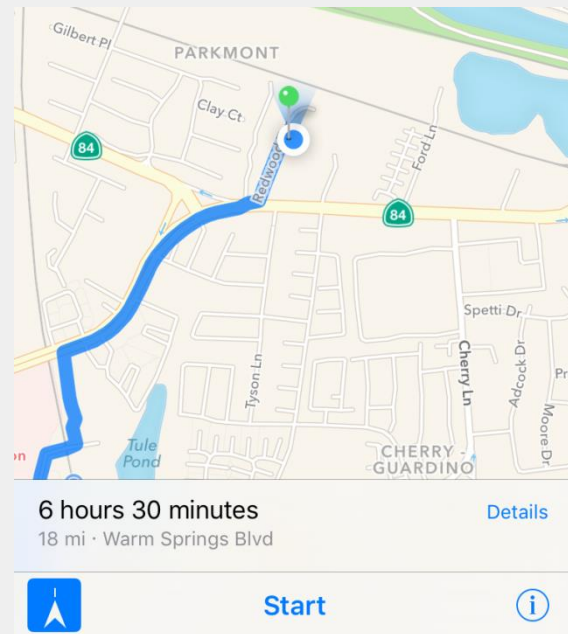
Consistency: The details contained in the "i" icon (information) is inconsistent under various circumstances. For example, in the home screen, it opens the menu, but in the detailed navigation page, it opens details about current location and destination. The information being displayed to users is inconsistent, meaning users will not typically understand what the "i" symbol will entail each time. Another issue appears to be that the presence of "i" is inconsistent. Despite accessing the same type of information, the "i" may not always be present unless under certain circumstances.

Tasks (TEAM)

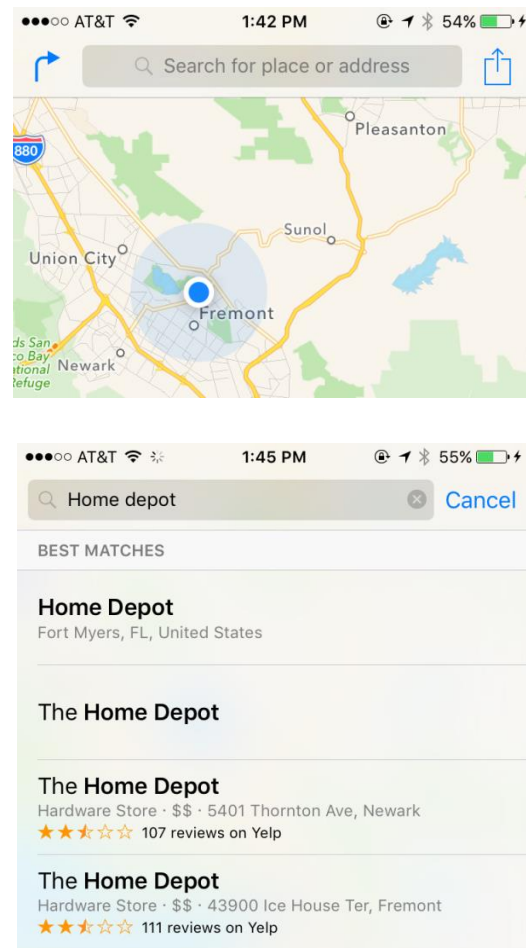
There are a range of tasks that users of Apple maps may engage in, but the main goal of Apple Maps is to provide directions from one point to another. With this main function of Apple maps in mind, the following chart shows the main tasks that users engage with most frequently.

Top 5 Tasks of Apple Maps	Image of the Task
<p>1. Location or address can be saved for quick and easy access. This is under the "Favorites" section of Apple Maps. In order for an address to be stored, one would first have to enter the exact location and for a "pin" to drop on the map. After the pin drops, you would have to click the name of the location to a separate page to favorite and save it for quick access.</p>	

2. Once traveling with the navigation begins, orientation of the user may be a concern, especially when the user is walking. By selecting the arrow icon on the bottom left of the screen (on home page) three consecutive times, you are able to perceive which direction you are facing relative to the position of the map.

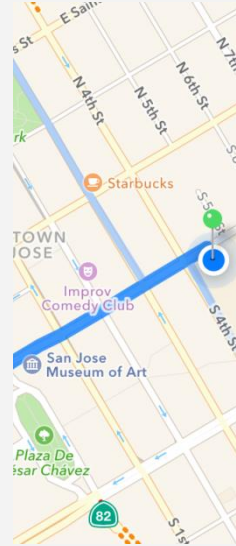
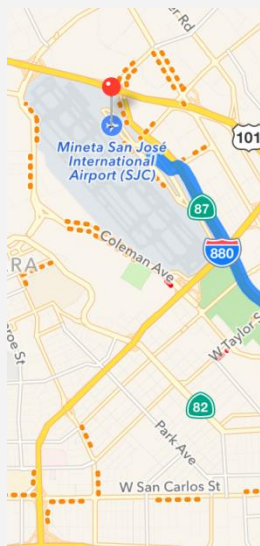


3. While using Apple Maps, one of the most frequently done tasks is inputting or searching for an address or location. This can be done by tapping on the top search bar and entering relevant data into the field. The search bar will also attempt to find your desired location by providing you with a list of possible locations when you just enter the establishment's name. For example, if you just searched for Home Depot, a list of nearby locations of the store will be provided for you to select from.

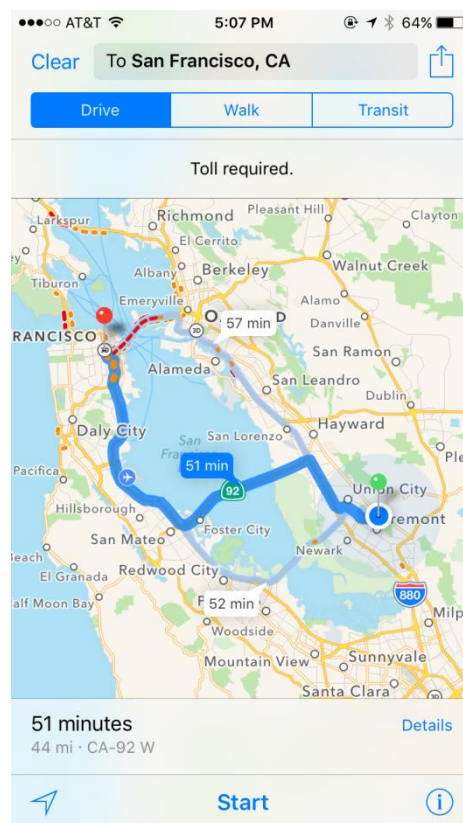


4. For this task users typically engage in is with regards to the degree of magnification. In order to understand the overall distance and path of the navigation route, users may zoom in or out depending on their needs. Zooming out would provide a broader view with a better sense of overall direction while zooming in provides greater turn-by-turn detail. In addition, users may move around the map by scanning over relevant areas.

Zoomed out vs. Zoomed In



5. Another frequently completed task is gathering time pertinent information after inputting a destination. This includes visual features such as traffic density being displayed, time stamps of alternative routes being faster or slower by a certain amount of time, and the overall travel time.




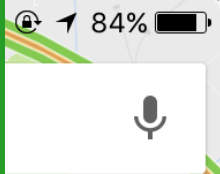
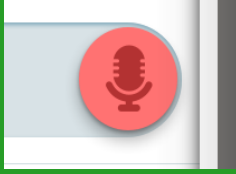

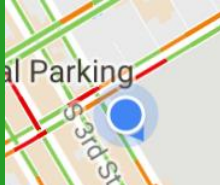
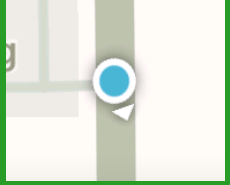


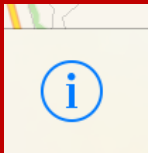
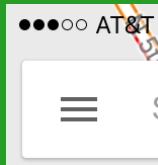

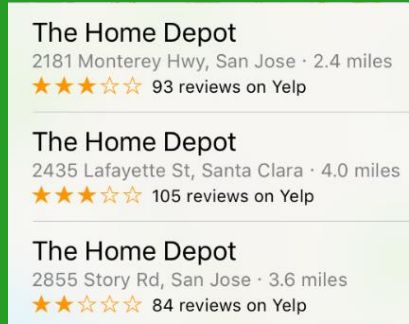
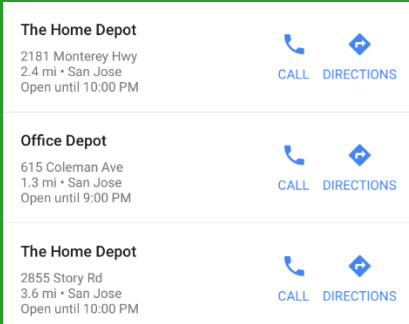
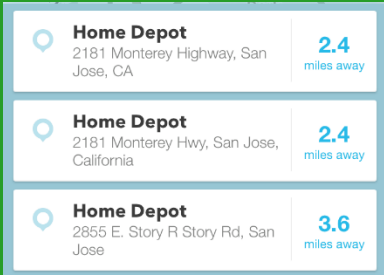
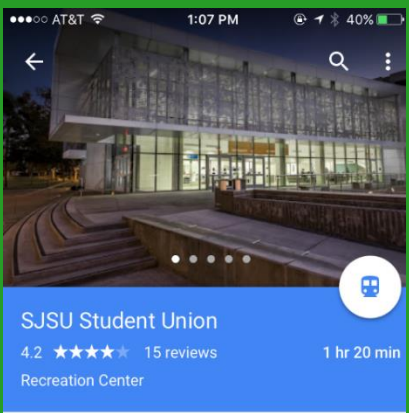
Comparative Study (TEAM)

In order to evaluate Apple Maps more objectively, Spartan Consulting will be comparing the application to two other existing mobile software. Google Maps and Waze provide a similar service as Apple Maps; to act as a global positioning system. For this analysis, however, we will focus more of our comparisons between the Apple and Google Maps.

Although Apple Maps does provide a variety of well developed features and interfaces, there are still a number of interactions and features of the system that could be optimized for users. To encourage a direction of focusing on the user, issues of usability concerning tasks centered on user goals will be examined.

SUMMARY OF FINDINGS TABLE

Feature/Function/Issue	Apple Maps 	Google Maps 	Waze 
Voice Activation	NONE		
The Apple Maps interface does not provide the user with an intuitive icon for voice input. Google Maps and Waze both provide users with a microphone icon. Therefore, this microphone icon is in alignment with users' mental model of selecting the microphone feature in order to deliver voice commands.			
Easy Access to Orientation			
Apple Maps represents the user's location with a "circle" icon placed on the map. However, the default setting does not provide the user with information in regards to which way they are facing. Google Maps and Waze also represents the user's location on the map with a "circle" icon. However, there is an arrow pointing away from the circle that indicates to the user which way they are facing. This arrow serves to orient the user when looking at the map.			

	Apple Maps	Google Maps	Waze
Intuitive Menu Icon	NO 	YES 	NO 
<p>Apple Maps uses an “i” icon to represent the menu. Traditionally, an icon of a hamburger menu, as used by Google Maps, is used as the icon for menus. The ambiguity of the “i” icon in Apple Maps may go against the mental model established by users, making it difficult to find the menu. Waze uses a “magnify glass” icon, which is especially confusing being that the magnify glass icon typically represents a search feature.</p>			
Distance Estimates			
<p>Across all three platforms, when searching for a store, results will present items ordered from nearest to furthest. These distance estimates provide users with information to determine which location they choose to visit.</p>			
Shows Image of Destination	NONE		NONE
<p>Apple Maps does not show the user an image of their destination. Google Maps does provide users with an image of their destination, which could reduce the chances of error occurring.</p>			

	Apple Maps	Google Maps	Waze
Shows Traffic Flow During Navigation	<p>NONE</p> 		
As users begin navigation, Apple Maps takes away relevant information such as traffic flow. Google Maps and Waze, however, retain the information to allow users to view traffic density around them as they are progressing through their route.			
Specified Lane Placement			
Apple Maps and Waze does not provide a UI element that Google Maps does. It specifies with visual and auditory signals which lane to be in if there are multiple lanes presented.			
Inputting Home Address	<p>NONE</p> 		
When a user attempts to input their home or work address into Apple's system, a prompt to redirect them to their contacts appears. This method of inputting an address can be counterintuitive and may cause slips. Google Maps and Waze allows the user to search and input their desired address directly.			
<p>PERSONA CHECK-IN: If the user persona of George were to encounter this issue, and considering he is an infrequent user, he may opt to not use Apple Maps as much. This issue may lead to George abandoning Apple Maps in lieu of Google Maps.</p>			

Usability Metrics (TEAM)

1. **Success or Failure:** This form of measurement will assist in determining how well a participant is able to fully complete a task. Based on the failure and success rates of certain tasks, we can further disseminate the reasons behind why certain tasks are more difficult than others.
2. **Number of Clicks:** The number of clicks can inform the researchers as to the number of attempts taken in order to accomplish a goal. This measurement can also supplement other metrics of the study to either support or refute conclusions.
3. **Errors:** By examining errors, we can determine the patterns of user behavior. This includes trial and error methods of participants attempting to complete a goal. By accounting for the errors, the researchers will be able to understand where errors occur and why.
4. **Behavioral Measures:** Including behavioral measures in the metrics of the research methods will allow for increased support for findings drawn from the quantitative metrics. Presentation of behavioral measures will provide greater insight as to the pain points users and participants experience.
5. **Completion Time:** Recording completion time will assist in creating a baseline an appropriate baseline measurement for comparison. In addition, completion time may uncover areas where improvements need to be optimized. If certain goals exceed a reasonable amount of time to complete, those related areas may become points of focus for the researchers.

PERSONA CHECK-IN: In order to determine if our user goals are met, we devised a study that examines each of the five points mentioned above. If success rate is low, users may be frustrated. Novice users like George may not want to continue using the application. If the number of clicks is high, advanced users like Elizabeth may try to find a more efficient alternative. If errors are high, users may not feel empowered, and may quit using the application. If behavioral data indicate that users like Elroy are not enjoying their use of the application, they will not use it (especially when on vacation). Completion time must be low for users like Elizabeth, who is constantly in a hurry. Our tests cover all of these points.

Materials & Techniques (TEAM)

Materials

The materials for our study include an iPhone, screen recording device (iPhone will be connected to a laptop with a cable, and the participant's screen will be recorded), a timer, a stop-timer button, a 72" flat screen television (image of traffic light will be projected), and a questionnaire form.

Test 1: Task Completion

For Test 1, participants will complete a number of specified tasks in Apple Maps. Each participant will be alerted by a signal to indicate start of performing task. For example, one of the tasks will be to enter an address and start the navigation. When the task starts, the participant will pick up their iPhone, unlock it, open maps application and enter destination address. Then they will select a route and start navigation. Once that's done participant has to press a button to indicate the end of the task. The whole procedure will be video recorded to see the participants' emotions like tension, panic, anxiety etc. A recoding system will record the screen that the user is interacting with. This information will serve to document the number of clicks, route chosen, and errors.

Test 2: Traffic Light Simulation

For Test 2, the participant will be put in a realistic scenario while completing tasks in Apple Maps. Specifically, a simulation experiment will be conducted. An environment simulating the situation at a traffic light will be created using a screen showing traffic lights (Yellow, Green and Red; Appendix 1). The tasks will be the similar in nature to Test 1, but this time, the participant must monitor the traffic light to ensure that they press the completion button when it turns green. They will have 3 seconds to press the button once it turns green, if they fail to press the button, they will hear a honking sound.

When the light turns red, participant has to pick up their iPhone, unlock it, open maps and perform a task. Once that's done participant has to press the button indicating the task completion. The whole procedure will be video recorded and screen recording of the iPhone will also be done.

Test 3: Post-Test Questionnaire

After completing the above mentioned two tests, the participants will be given a questionnaire about their experience with and opinions about Apple Maps (Appendix 2). The questionnaire will have some open ended and some closed questions.

Suggested Usability Enhancement from previous design (TEAM)

The following are the most important improvements that can be made to the Apple Maps interface to better help users accomplish their goals:

Based on Spartan Consulting's evaluation, one of the suggested usability enhancements include showing more pertinent information during navigation mode. This can be done by including traffic flow information during navigation to provide necessary information and functionality to help users achieve one of their main goals - to arrive to their destination in a timely and efficient manner. This also would preserve consistency as map shows traffic density in every other view except for in navigation setting. Furthermore, including lane guides during confusing freeway merges would help ensure that users do not mistakenly take the wrong route and add precious time to their navigation. Google provides a great example of preserving and enhancing their UI by containing these assistive features.

Redesign interface icons to ensure intuitiveness and prevent confusion, potential future slips and mistakes, and to allow the user ease of use. If redesigned, the user can arrive at their destination without experience as many pain points or frustration. This can be done specifically by ensuring that UI elements, such as the menu icons, are intuitive.

In addition, the voice activation icon should be included in the interface. Another suggestion could also be altering the location icon to be more representative of mental models within users. This will allow for a more pleasant use of function. Furthermore, the right arrow icon being used to lead to the "directions" feature should also be more intuitive and less ambiguous. Currently, it leads users to mistakenly believe it as a directional "right turn" icon. Google provides great examples of how these icons can be chosen to be more intuitive with their user's mental models.

By including these changes, usability of the Apple Maps system would be further optimized than how it currently functions. By improving its usability, we also improve its interaction with users. If both aspects of a product are improved upon, users would be more likely to continue using the application as loyal users. If none of the suggested changes are included, current and potential users may be more prone to abandoning the application in lieu of competitor products.

What did you learn from this project (TEAM)

The following examines what we learned through our evaluation of Apple Maps and a reflection of our experience.

- Devising techniques to evaluate a product - While writing the techniques section we had to think about various methods that can be implemented to assess Apple Maps. We finalized on simulation experimentation as it seemed more appropriate to evaluate various aspects of this application. Then we devised a detailed simulation test for the participants. We also decided a questionnaire will be useful for gathering data and wrote a sample questionnaire for Apple Maps. This whole experience made us study and understand techniques used for assessing end users' reactions to a product.
- Assessing good aspects of a product - While working on Apple Maps, we realized that it has many positive aspects and useful features which set it apart from its competitors. There are other equally good or in some aspects even better products in the market. But the product which we evaluated (Apple Maps) is a good product which can be further improved. We learned that a less popular or a seemingly less attractive product may have some very good features and with little more application of HCI principles can be turned into a very user friendly, useful and successful product.
- Specific concepts learned from lectures can be directly applied towards improving the interaction and usability of a product. For example, creating better affordances to lessen trial and error behavior of users can increase user performance.
- In order for collaborative teamwork to occur, having consistent meeting times outside of class helped improve progress. In addition, the meetings improved overall group communication between all members.
- Through a comparative analysis between different applications, you can easily discover criticisms for multiple UI features, design elements and even the functionalities of the applications. When you see an example of something being done better, it's clear which is more intuitive and which is a better design.
- The same laws and concepts can be applied repeatedly across vastly different UI features. For example, if designers don't take appropriate mental models under consideration, there will repeatedly be unintuitive features ranging from difficult-to-interpret icons and hidden functionalities.

References (TEAM)

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Appendix 1

In this mock-up of the lab simulation, the circled items represent the traffic light simulator, the iPhone with apple maps, and the mouse represents the time-stopper (which measures completion time).



Appendix 2

For this part of the study, we would like you to respond to the following questions. Please be open and honest about your experiences today. We want to emphasize that we are not the creators of Apple Maps; we are a consulting firm researching the strengths and weaknesses of the application.

If you need clarification about any of the items, please feel free to ask.

Open ended questions:

1. What have you tried using apple maps for in the past?

2. What did you find most appealing about the app? What did you find least appealing about the app?

3. Were you satisfied with the information apple maps provided you?

4. Do you find the icons in apple maps easy to understand? Why or why not?

5. Can you sum up how you feel about your overall experience using apple maps today?

Circle your response:

1. When you were looking at the map, did you know which way you were facing?

Yes
No

2. Based on your experience today, will you use apple maps in the future?

Yes
No

3. Based on your experience today, will you recommend apple maps to a friend?

Yes
No