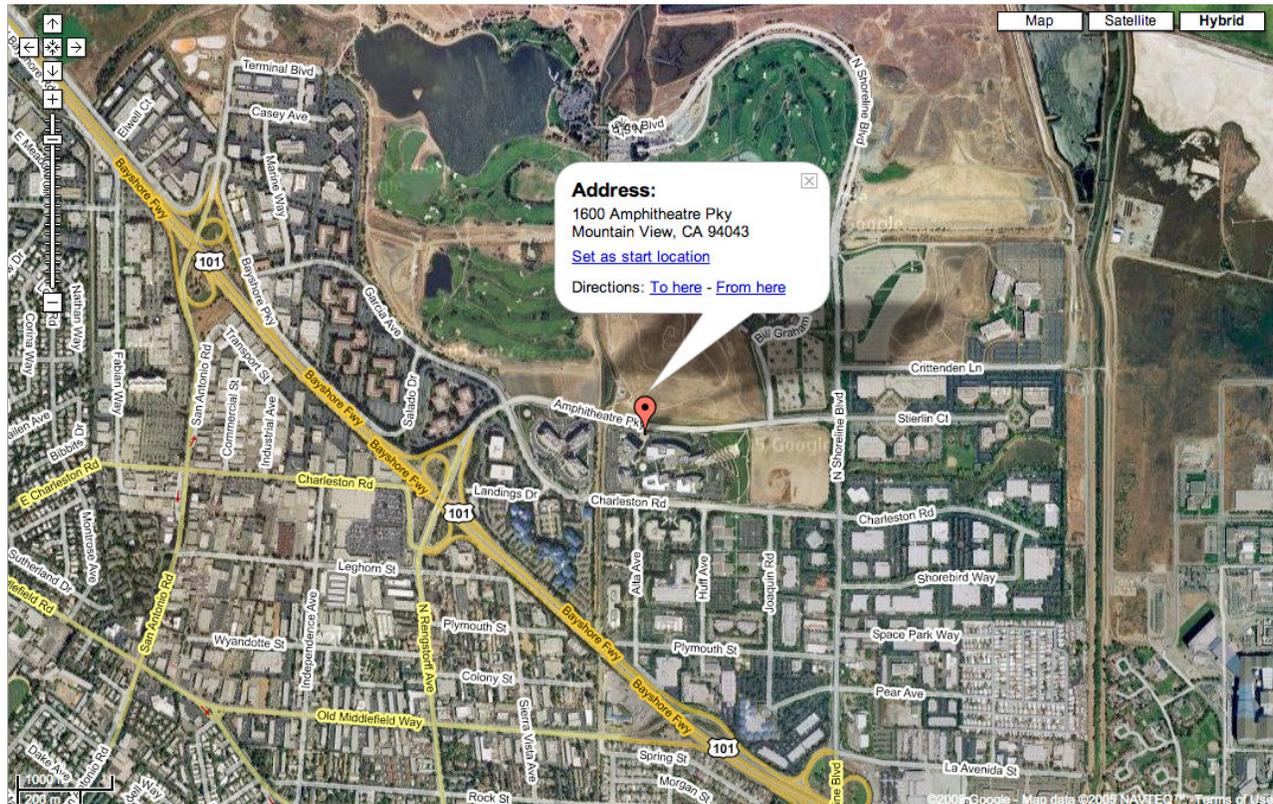


Google Maps Local Comparison Study



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Executive Summary

Project

To help the client meet their stated goals, a comparative usability study was conducted between Google Maps and MapQuest. In addition, to evaluate general usability of Google Maps, a comparative analysis was conducted between two levels of web users using Google Maps. Measures used for analysis covered participant performance, behavior and feedback.

Six participants were recruited for this test, four experienced web users, and two novice web users. Three scenarios were used for comparative analysis in this study covering typical goals and tasks of a map service, with a fourth scenario dedicated specifically to analysis of Google Maps. Participants were guided through the scenarios, with specific questions asked before and after completing each scenario. Surveys were administered prior to and following the sessions on each web service.

Results

Google Maps outperformed MapQuest for every measure analyzed, as indicated by overall mean scores for these measures. Although, within these measures, there are some areas where MapQuest outperformed Google, but overall mean scores do favor Google.

Our results indicate considerable differences in performance between novice and experienced users, with experienced users outperforming novice users. Our results also show a similar trend in user feedback, with more positive results from the experienced users, but not nearly as dramatic a difference as in performance. This indicates that even though their performance was much lower, novice users appeared to have perceived their performance and the site similar to experienced users.

Google maps can be regarded as maintaining the Google “Look and Feel,” as indicated by a rating of 4 out of 5. This is a good and positive score, with most participants agreeing, but as a score below 5, this also indicates some room for improvement.

Key Areas of Concern

While most users were able to complete the tasks we gave them, they still encountered problems along the way. The following is a list of issues which are pervasive throughout the interface. Explanations of each of these issues, along with issues specific to details in the interface can be found in section 5.

1. Users had difficulty locating and using various map controls.
2. Users are unaware of what mode they are in while performing a task.
3. Users are not provided with appropriate error messages to facilitate error recovery.
4. The labeling, or lack of labeling, of text entry fields confused users.
5. Users were frustrated when required to enter their addresses multiple times.

1. Introduction

Google Local, or Google Maps is a recent addition to the set of services provided by Google, primarily known for their search services. As a new feature, the client is requesting a usability study to help meet their following goals:

1. To be as good or better than their competition, MapQuest
2. To be easy to use, especially for less experienced web users
3. Maintain the Google “Look & Feel”
4. Assure user’s expectations are met
5. Improve the site design

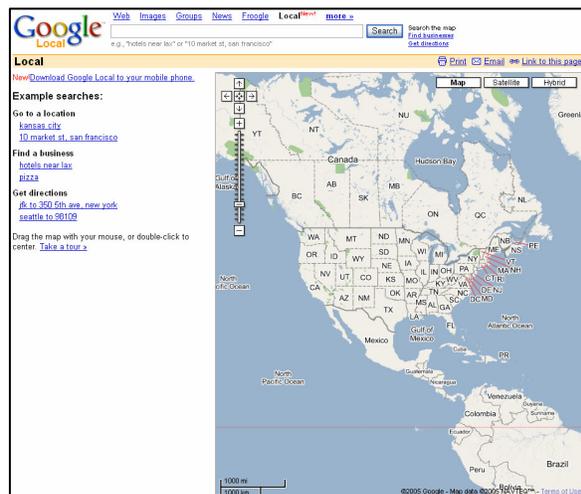
1.1 Purpose of Study

Following the client’s requests and to assist them in meeting their goals, this study was developed to conduct a comparative usability analysis between Google Maps and MapQuest on-line map services. Information was collected on the performance and behavior of users while they were interacting with the products. General ease-of-use of the product was evaluated, along with identifying areas within the defined tasks where users experienced difficulties. In addition, data on user expectations in using map services as well as user’s preferences for either Google Maps or MapQuest, the competition, was collected.

1.2 Product Description

The main focus of this study, Google Maps, is an international, on-line map service that allows users to perform various tasks using a map, satellite image or a hybrid of the two. Some of the more common functions performed are:

- a. Viewing a map of a user specified location
- b. Getting driving directions between two locations
- c. Finding a business near a user specified location
- d. Viewing a satellite image of a user specified location



2. Objectives and Measures

2.1 Study Objectives

1. Evaluate performance and usability of Google Maps in relation to MapQuest.

In order to increase their market share, Google Maps must be at least as easy to use as MapQuest. How does Google Maps compare with MapQuest?

2. Determine performance and usability of Google Maps for both experienced and novice web users.

Google is a popular search engine, visited by all levels of web users. In order to capitalize on this advantage, Google Maps must be easy for everyone to use. How easy is it for users to complete their tasks on Google Maps?

3. Determine if user's expectations are met.

Users come to a website for a reason. Does Google Maps provide the functionality they expect? Are the results what they were looking for?

4. Assess the perception of Google Maps to determine if the interface is consistent with other Google interfaces.

Google is well known for having a clean, uncluttered, and minimalistic interface. Does Google Maps live up to the Google name?

5. Provide data to assist in re-design decisions.

This test will help the designers to focus on problem areas during the re-design process. It will:

- Identify areas that are points of confusion to the users
- Provide feedback on missing or desired functionality
- Provide user's ratings on usefulness of key features

2.2 Study Measures

The following measures were used to support the above objectives. Data was collected using *Camtasia* screen capture software, survey results and observations.

Performance Measures

Measure	Method of Collection	Purpose
Time on Task	<i>Camtasia</i>	To compare the time it takes the user to complete a task using each service.
Navigation Steps	<i>Camtasia</i>	The number of steps and the path users take can help access efficiency of use.
Success Rate	Observation	If users can not successfully complete their goals, then it points to a serious problem in the interface

Behavior Measures

Measure	Method of Collection	Purpose
User Frustration	Observation	When the user is frustrated, it hints at an area of the interface which can be improved
User Comments	Observations and Surveys	Documentation of solicited and unsolicited comments and their positive or negative trend will help evaluate user's reaction as a measure of ease of use.

Feedback Measures

Measure	Method of Collection	Purpose
User Preference	Survey	To establish the overall preferred map service.
User Satisfaction	Survey	To compare user satisfaction ratings between the two map services.
Ease of Use	Survey	To determine and compare ease-of-use between the two map services.
User Expectations	Survey	To determine and compare if user's expectations are met,
Visual Perception	Survey	To see whether users think Google Maps has the "look & feel" of Google

3. Study Design

This is a comparative usability study, collecting data using both Google Maps and MapQuest to be used in a comparative analysis between sites, and a comparative analysis of Google Maps between differing levels of web users.

3.1 User Goals & Tasks

Users come to a website with high level goals, for example, they may want to get directions from one address to another. In order to fulfill these goals, they must complete a number of tasks. For example, they may need to use the zoom control to see details of a requested route. In this section we list the main goals and tasks for interacting with map websites.

Main User Goals

1. Find a location on the map
2. Get directions from one point to another
3. Locate a business (possibly near a user specified location)
4. Get return directions
5. Use a previously mapped destination as a starting address for a new set of directions.
6. Get a copy of directions/map to use later
7. Get directions with multiple starting/ending points
8. Viewing a satellite map of a location

Other Possible User Goals

1. Find reviews on a business the user located.
2. Find out when a business the user located is open.
3. Find hotels and airports near a user specified location.
4. Find out how long it takes to get from point A to point B
5. Customize map to start where user wants it to
6. Determine what is needed, technically, to use Google Maps
7. Save this map to access later
8. Get directions that exclude highways
9. Save multiple addresses for use at a later time

Main User Tasks

1. Pan left, right, top and/or bottom
2. Zoom in and out
3. Email a map
4. Print a map
5. View the satellite map
6. View the hybrid map
7. Bookmark the map

Other Possible User Tasks

1. Send a map/directions to a cell phone
2. Send a map/directions to a PDA
3. View the map in a customized language
4. View the map for low bandwidth

3.2 Scenarios

Four scenarios were used in this study, representing typical goals a user may have while using an on-line map service. These goals are representative of the main goals listed above, and have been designed to provide measurements to help meet the test objectives.

In each of the following scenarios, the participant was given a set of goals, and the information required to complete those goals. The scenarios are typically presented as a small story, so that the participant understood their motivation for using the product.

Scenario 1 - Picnic

Part I

You've been invited to a picnic! You and Joe are carpooling and have decided to meet at your house. Joe doesn't know how to get to your house from his house, or back. You'll need to look up the directions to and from your house and send them to Joe. Joe doesn't like driving on highways, so you may want to take that into account when giving him directions.

Information:

Your home address: 730 E. Evelyn Ave, Sunnyvale, CA

Joe's home address: 300 E. Tasman, 95134

Joe's email: joeyboy@email.com

Part II

You'll also need to get directions from your house to the picnic at San Jose State University (1 Washington Square, San Jose, CA) to take in the car with you. You need to make sure you know about how long it will take as well so that you can tell Joe when he needs to be at your house.

Goals and Tasks Tested

Goals	Tasks
1. Get directions from one point to another	1. Get directions to your house
2. Get return directions	2. Email a map
3. Get a copy of directions/map to use later	3. Get reverse directions
4. Get directions that exclude highways	4. Print a map

Scenario 2 - Find the Pizza

You just got off the phone with Joe. You've decided to study for your PSYC 135 midterm (at San Jose State University) after the picnic and you need to find a nearby coffee shop. You're going to study until 7:30, after which you'll need to grab a bite to eat as well. You know Joe prefers pizza.

Goals and Tasks Tested

Goals	Tasks
1. Find business nearby a given location	1. Find Coffee shop near San Jose State University 2. Find Pizza place near San Jose State University

Scenario 3 - Road Trip

Your family is going on a road trip. You are starting at your house (730 E. Evelyn Ave, Sunnyvale, CA) and would like to visit Las Vegas (Nevada). You will be staying in the Luxor Resort and Casino. You must plan the route which your family will take.

You heard on the news that they are doing construction on I-15 (within the Vegas city limits) north of Hwy 160, so you will have to find an alternate route from the intersection of I-15 and Hwy 160 to your hotel.

Goals and Tasks Tested

Goals	Tasks
1. Find a business 2. Find directions from one point to another 3. Find alternate directions (detour)	1. Find address for Luxor Resort and Casino 2. Get directions 3. Find intersection of I-15 and Hwy 160 4. Use zoom & pan to find alternate route

Scenario 4 - Property (Google Only)

You are thinking of buying a property in Union City, Indiana. You want to make sure the property (907 N. Plum St.) is worth looking at before you fly all the way to Indiana. In particular, you are interested to know how crowded the neighborhood is and whether there are a lot of trees in the area.

Goals and Tasks Tested

Goals	Tasks
1. Viewing a satellite map of a location	1. Activate satellite mode 2. Find location & view on satellite map

3.3 Participants

3.3.1 Participant Profiles

24 participants were originally planned for this study (4 for each matrix cell below), but being a class project only 6 participants were recruited. These 6 participants ranged in age from 24-40 and were composed of three men and three women. All participants have experience in using paper street maps.

Participants 1 and 5 have approximately 2 years of internet experience, with a frequency of use of no more than once per week, identifying them as “novice” users. In addition, these two participants have no on-line map experience.

All other participants have more than 2 years of internet experience, with a frequency of more than once per week, meeting the requirements for experienced web users. All the experienced web users have used on-line maps on more than 4 occasions, using 3 or more functions, meeting the requirements for having on-line map experience.

No participant had experience using Google on-line map service. Participants 2 and 4 have experience using MapQuest on-line map service; participants 3 and 6 have experience using Yahoo on-line map service. Participants 2, 4 and 5 use Google as their primary search engine.

The following is a table displaying where the participants fall into the pre-determined participant groups:

	On-Line Map Experience		
	<i>Google</i>	<i>Other</i>	<i>None</i>
Intermediate/Expert Web User	0	4	0
Novice Web User	0	0	2

A matrix of the participants and their qualifying data can be found in Appendix A.

3.3.2 Recruiting

Participants were recruited via the on-line classifieds service Craig’s List. They were compensated \$100 for about 1 1/2 hours of participation in the study.

3.3.3 Participant Screening

A screening survey was used during initial contact with the participants ensuring qualifying participants were recruited and properly classified for this study (see Appendix B – Screening Survey).

3.4 Study Procedure

This study was conducted at Interface Analysis in Cupertino, CA. The study took approximately 1 ½ hours for each participant.

Before beginning the actual study, each participant filled out a pre-study survey. Compiled results of the pre-study surveys can be found in Appendix C and D.

Each participant then ran through the scenarios on one web service, then the other web service. Half the participants began the study using Google; the other half began the study using MapQuest. Scenario four is only possible with Google, so that was only presented on the Google session.

A study protocol was created to help the facilitator guide the participant through the scenarios, with questions to ask and cues to assist in data collection while observing the session. Compiled results of the session protocols can be found in Appendix H.

After completing the scenarios on each of the web service, a post-interaction survey was administered. Compiled results of the post-study surveys can be found in Appendix E and F.

After completing the scenarios on both web services, a comparison survey was administered. Compiled results of the comparison surveys can be found in Appendix G.

4. Results

The results of this study are presented by test objective, which correlate directly to the client's goals. Details of measures used for each objective are provided. These results are summaries of protocols, surveys and test observations. Compiled results of the surveys can be seen in Appendices E, F and G, and compiled results of the protocols can be found in Appendix H.

4.1 Objective 1 - Evaluate Performance and Usability of Google Maps in relation to MapQuest

The objective to evaluate the performance and usability of Google Maps in comparison to MapQuest was derived from the client's goal of being as good as or better than their competitor, MapQuest.

Measures used in this comparative evaluation are presented in three categories:

- 1) User Performance
 - a) Time on Task
 - b) Number of Navigation Steps
 - c) Success Rates
- 2) User Behavior
 - a) Frustration Levels
 - b) Negative Comments
- 3) User Feedback
 - a) Preference
 - b) Satisfaction
 - c) Ease-of-Use
 - d) Expectations Met
 - e) Visual Perception

Summary

This comparative evaluation found that Google has met their desired goal. Google Maps outperformed MapQuest for every measure analyzed, as indicated by overall mean scores for these measures. Although, within these measures, there are some areas where MapQuest outperformed Google, but overall mean scores do favor Google.

NOTE: The following results which are presented by scenario include data from the Google-only scenario #4 (using the satellite function), but this data was not included in the actual comparative analysis. For efficiency in displaying information, Scenario 1 Part 1 and Scenario 1 Part 2 are presented as Scenario 1a and 1b respectively.

1. User Performance

a) Time on Task

Time on task was analyzed comparing overall mean times, and mean times for each scenario between performance on Google and MapQuest. Unsuccessful tasks that would have affected time were removed from the analysis (for example, if one could not locate the time displayed along with driving directions in scenario 1b, that scenario was not successful, but the time spent was still used for analysis). Recorded times for each participant and scenario for each map service are displayed in Table 4.1.

Participant	Google					MapQuest			
	Scenario 1a	Scenario 1b	Scenario 2	Scenario 3	Scenario 4	Scenario 1a	Scenario 1b	Scenario 2	Scenario 3
1	7:18	5:15	3:50	*	4:18	11:03	4:40	9:22	*
2	1:48	0:59	1:43	*	1:09	2:08	1:06	2:30	*
3	1:25	0:41	2:14	1:43	0:55	2:00	1:19	3:30	6:00
4	2:00	1:07	1:27	5:33	1:26	2:34	1:48	2:10	2:19
5	4:49	3:35	5:06	9:57	3:08	6:38	3:49	5:50	7:55
6	3:28	1:10	4:10	2:08	0:45	3:42	9:45	2:19	3:15

Table 4.1 Time on task. *Did not complete.

For analysis purposes, times were converted to seconds, with means, minimum, maximum and standard deviation values displayed in Table 4.2. A fair amount of variability is visible in this analysis, reflecting the variation in performance between novice and experienced users.

	Google				MapQuest			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	199	41	597	141.65	262	66	663	172.27
Scenario 1a	201	64	438	143.40	281	120	663	213.80
Scenario 1b	128	41	315	111.31	225	66	585	196.43
Scenario 2	185	87	306	89.24	257	130	562	170.52
Scenario 3	296	103	597	198.76	292	139	475	133.17
Scenario 4	117	45	258	86.27				

Table 4.2 Mean Time on task in seconds

Overall mean time on task was faster on Google than on MapQuest. Participants were able to complete all but scenario 3 faster on Google, than on MapQuest. The time on task for scenario 3 was only slightly faster on MapQuest than on Google (see Figure 4.1).

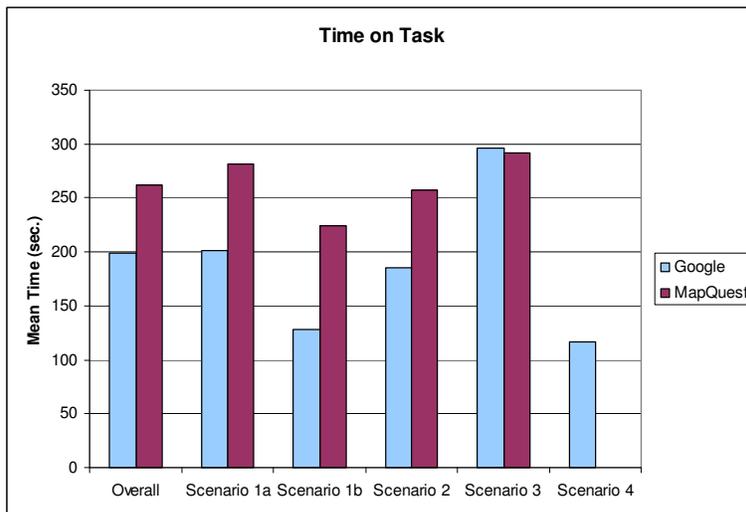


Figure 4.1 Mean time on tasks for each scenario.

b) Number of Navigational Steps

The navigation path each participant took for each scenario was documented, providing a count of the navigational steps for each scenario. This allows for a quantitative comparative analysis of navigational paths used between Google and MapQuest. The mean number of steps for each scenario along with minimum, maximum and standard deviation values are displayed in Table 4.3.

	Google				MapQuest			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	9.3	4	20	3.77	11.0	7	20	3.02
Scenario 1a	9.6	9	10	0.55	10.2	8	12	1.47
Scenario 1b	4.7	4	5	0.52	9.5	7	13	2.95
Scenario 2	12.0	12	12	0.00	12.7	12	15	1.21
Scenario 3	12.0	10	20	4.47	11.8	8	20	5.02
Scenario 4	5.0	5	5	0.00				

Table 4.3 Number of navigation steps.

Overall, Google outperformed MapQuest, with the fewer average number of navigational steps. On all but scenario 3, fewer navigational steps were required on Google than on MapQuest. The difference in navigational steps for scenario 3 is negligible, only a difference in means of 0.4 steps (see Figure 4.2).

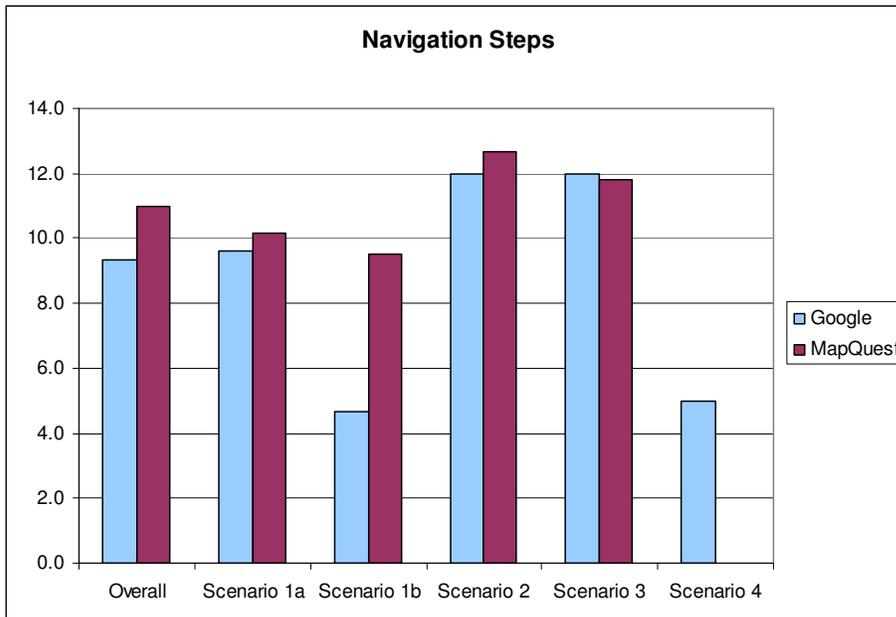


Figure 4.2 Number of navigation steps participants took.

c) Success Rate

Success rates for task completion were recorded for each participant performing each scenario. If a particular task within a scenario was not successfully accomplished, the scenario was deemed unsuccessful (although most were still included in all analysis). Overall success rates along with rates for each scenario are displayed as exact counts and as a percentage in Table 4.4. For more details of which particular tasks were unsuccessful, see Appendix G.

	Google		MapQuest	
	<i>Successful</i>	<i>Percent</i>	<i>Successful</i>	<i>Percent</i>
Overall	19	79%	17	71%
Scenario 1a	5	83%	4	67%
Scenario 1b	5	83%	5	83%
Scenario 2	4	67%	4	67%
Scenario 3	5	83%	4	67%
Scenario 4	5	83%		

Table 4.4 Number and percent of successfully completed scenarios.

Overall, more scenarios were successfully completed on Google than on MapQuest. Google outperformed MapQuest on scenarios 1a and 3, while scenarios 1b and 2 were equal. Performance on scenario 3 was the overall least successful on both map sites (see Figure 4.3).

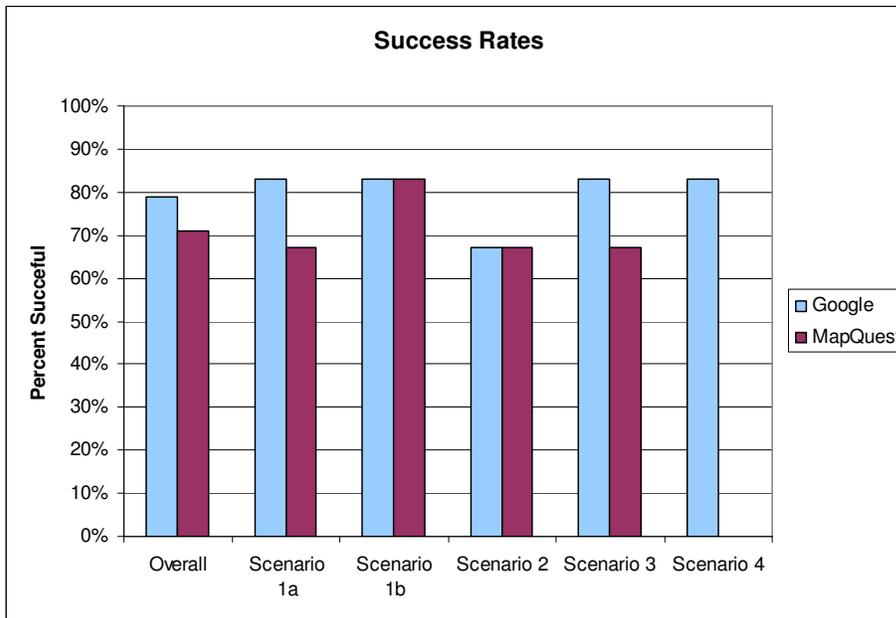


Figure 4.3 Percentage of successfully completed scenarios.

B. User Behavior

a) Frustration Levels

Frustration levels were collected as observations of the participants making noises or gestures (sighs, grunts) indicating dissatisfaction while interacting with the map site. Overall counts of observations along with counts for each scenario are displayed in Table 4.5.

	Google	MapQuest
Overall	29	38
Scenario 1a	3	5
Scenario 1b	3	9
Scenario 2	10	11
Scenario 3	13	13
Scenario 4	0	

Table 4.5 Number of observed frustrations.

Overall, more observations were documented while participants were interacting with MapQuest than with Google map site. This was true for scenarios 1a and 1b, but scenarios 2 and 3, were virtually equal for each map site. No observations were documented for participants performing scenario 4 on Google (see Figure 4.4).

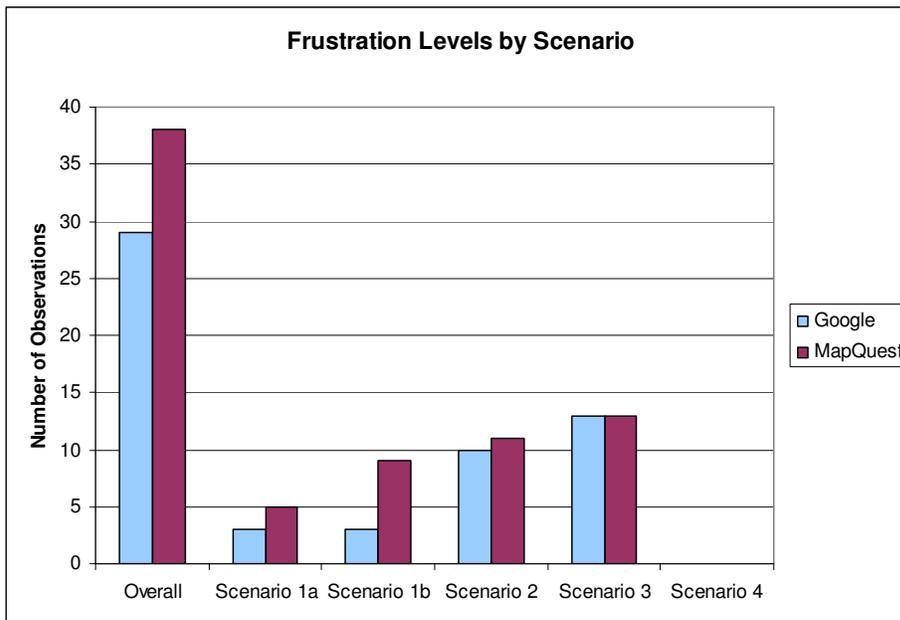


Figure 4.4 Number of frustration gestures made by participants.

b) Negative Comments

Throughout the test sessions, considerably more negative comments and responses to protocol questions were made by participants than favorable comments, so a second behavioral measure analyzed was the count of negative comments. The cumulative overall count of negative comments, along with the count for each scenario is displayed in Table 4.6.

	Google	MapQuest
Overall	17	22
Scenario 1a	4	4
Scenario 1b	2	3
Scenario 2	3	10
Scenario 3	6	5
Scenario 4	2	0

Table 4.6 Count of negative comments made by participants.

Overall, more negative comments were made by participants while interacting with MapQuest than with Google map site. This was true for scenario 1b and 2, while scenario 1a accumulated equal counts, and scenario 3 accumulated more counts for Google map site (see Figure 4.5).

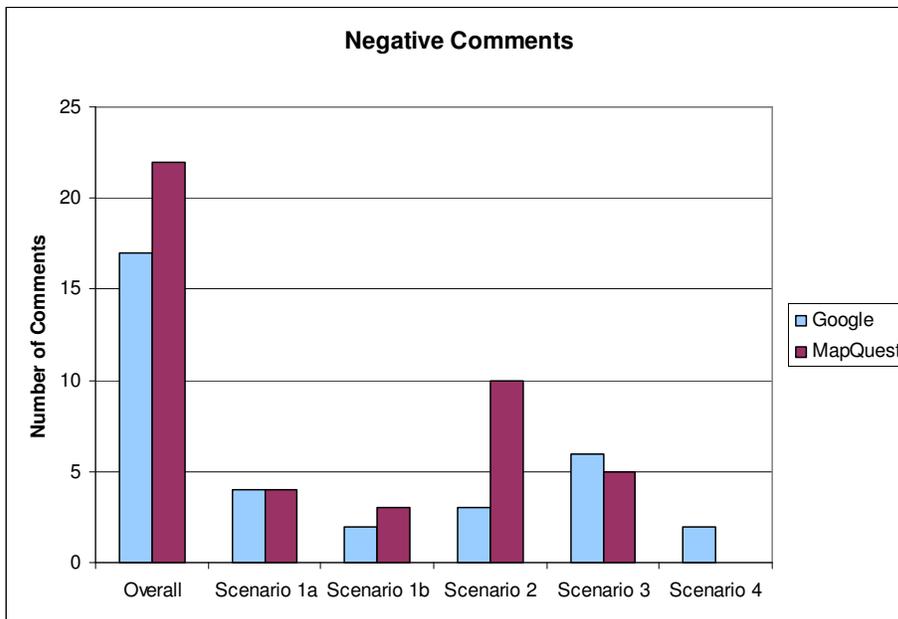


Figure 4.5 Counts of negative comments made by participants.

C) User Feedback

a) Preference

Preference data was collected at the end of the protocol and from the comparative survey, administered after the participants finished performing the scenarios on both map sites.

Preference survey questions were asked pertaining to specific topics: 1) which site they preferred and were likely to use again; 2) which site they preferred performing the various tasks on; 3) which site they preferred using the particular functions on; and 4) which site was generally easier to use. Options for answers were Google, MapQuest and Same.

	Google		MapQuest		Same	
	# Votes	Percent	# Votes	Percent	# Votes	Percent
Overall	89	51%	39	22%	46	26%
Prefer and likely to use again	9	75%	2	17%	1	8%
Performing Task	12	67%	3	17%	3	17%
Using Functions	30	46%	19	29%	17	26%
Easier to Use	38	49%	15	19%	25	32%

Table 4.7 Cumulative counts and percentages of preference results.

Overall cumulative counts (votes) and counts for each topic are displayed in Table 4.7, along with the respective percentage of preference votes. Overall, Google was the preferred map site and was the preferred site for all the topics considered. The highest percentage of votes for Google was in the topic “Prefer and likely to use again,” and the lowest percentage of votes for Google was in the topic “Using Functions” (see Figure 4.6).

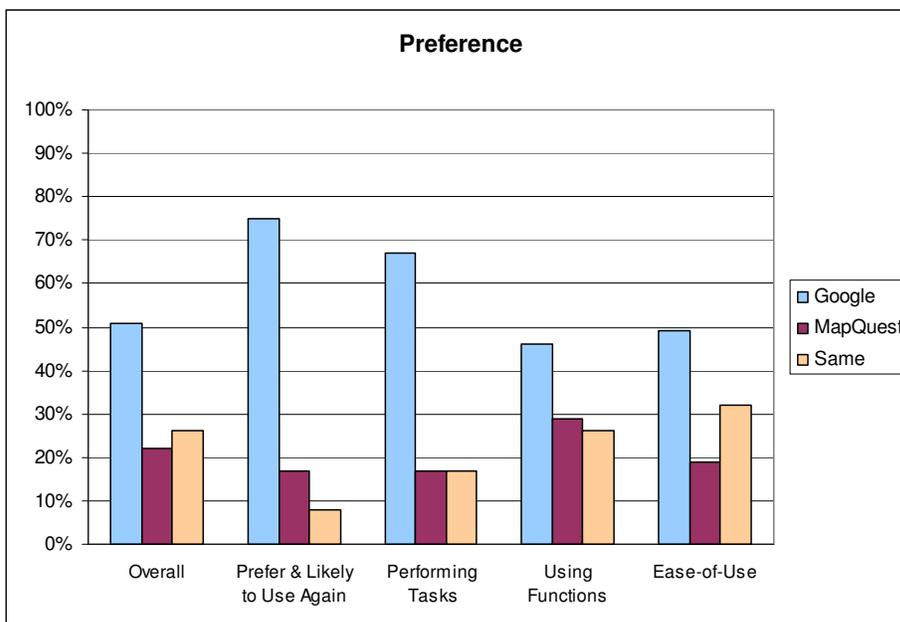


Figure 4.6 Percentage of participants preference ratings.

b) Satisfaction

Satisfaction ratings were collected during the protocol after the completion of each scenario and in the post-interaction surveys after the completion of all the scenarios on each map site. These ratings were based on a 1-5 scale, with 1 being “very dissatisfied” and 5 being “very satisfied.”

Mean overall ratings, and mean ratings for each scenario with minimum, maximum and standard deviation values are displayed in Table 4.8.

	Google				Mast			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.9	1	5	1.15	3.1	1	5	1.55
Scenario 1	4.3	3	5	0.82	4.0	1	5	1.55
Scenario 2	3.8	1	5	1.60	3.7	2	5	1.21
Scenario 3	3.5	2	5	1.38	1.8	1	4	1.17
Scenario 4	4.5	3	5	0.84				

Table 4.8 Mean satisfaction ratings based on a scale from 1-5.

On each of the scenarios, more participants were more satisfied with using Google map site than using MapQuest. The highest satisfaction rating for Google was received on scenario 1, the lowest on scenario 3. The greatest spread of satisfaction ratings between Google and MapQuest was in scenario 2, with the spread in scenarios 1 and 2 being much closer (see Figure 4.7).

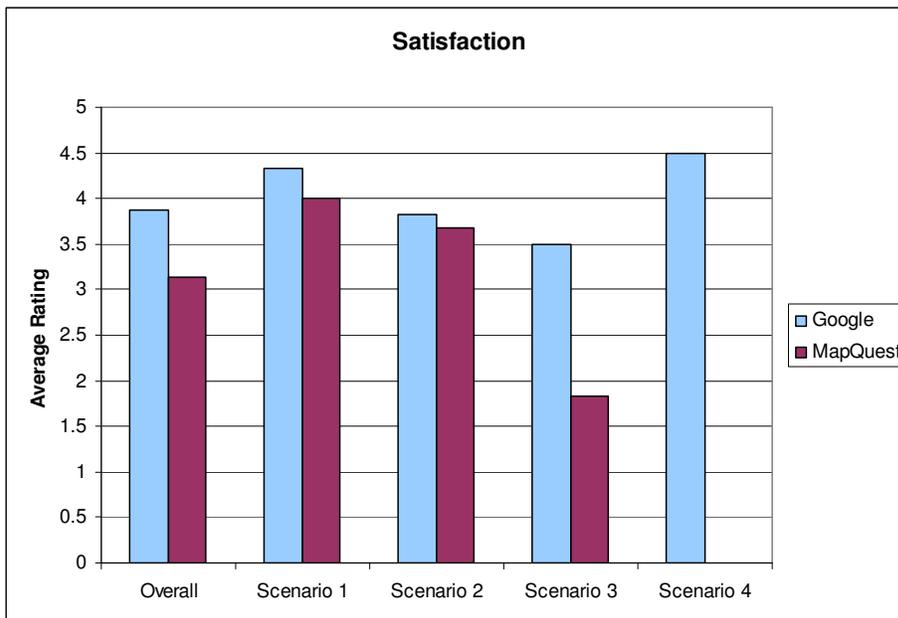


Figure 4.7 Mean satisfaction ratings based on a scale from 1-5.

c) Ease of Use

Ease of use ratings were collected during the protocol after the completion of each scenario and in the post-interaction surveys after the completion of all the scenarios on each map site. These ratings were based on a 1-5 scale, with 1 being “very difficult” and 5 being “very easy.”

Ease of use questions were asked specifically pertaining to: 1) general ease of use; 2) how easy was it to perform various tasks; 3) how easy was it to use particular functions; and 4) how easy it was to interpret the results.

Mean overall ratings, and mean ratings for each topic with minimum, maximum and standard deviation values are displayed in Table 4.9.

	Google				MapQuest			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.9	1	5	1.07	3.7	1	5	1.23
General	3.7	1	5	1.18	3.7	1	5	1.23
Completing Tasks	3.9	1	5	1.25	3.3	1	5	1.45
Using Functions	3.9	1	5	1.05	3.9	1	5	1.15
Interpreting Results	4.3	3	5	0.59	3.9	2	5	0.94

Table 4.9 Ease of use ratings based on a scale from 1-5.

Overall, participants found Google only slightly easier to use than MapQuest, with an overall Google mean score of 3.9 and a MapQuest mean score of 3.7. The highest ease of use rating for Google was received in the topic “Interpreting the Results.” The greatest spread of ease of use ratings was in the topic “Completing Tasks.” Each other topic resulted in equivalent ease of use ratings (see Figure 4.8).

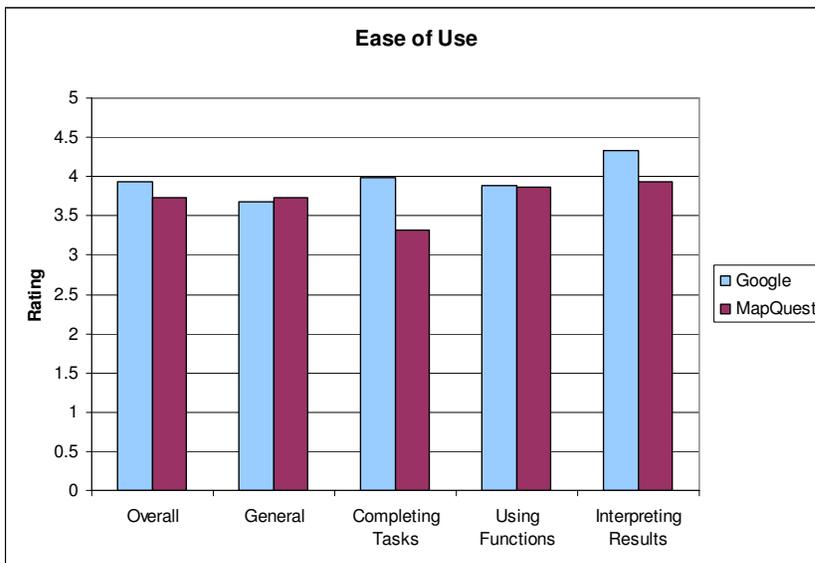


Figure 4.8 Ease of use ratings based on a scale from 1-5.

d) Expectations

Expectation ratings were collected in the post-interaction surveys after the completion of all the scenarios on each map site.

Expectation questions were asked pertaining to the following specific topics: 1) if the site was as easy to use as expected; 2) if the functionality one expected was available; 3) if the results were as expected; and 4) if the graphics/look of site was as expected. Responses to these questions were a simple “yes” or “no.”

Overall cumulative counts of yes and no responses and responses for each topic are displayed in Table 4.10, along with the respective percentage of yes responses.

	Google			Map		
	Yes	No	%Yes	Yes	No	%Yes
Overall	17	7	71%	15	9	63%
Expected Ease of Use	3	3	50%	3	3	50%
Functionality Expected	5	1	83%	5	5	83%
Results Expected	5	1	83%	3	3	50%
Graphics Met Expectations	4	2	67%	4	2	67%

Table 4.10 Counts of responses and percent of yes answers to expectations being met.

On the overall analysis, Google did a better job of meeting the participant’s expectations than MapQuest, but that actually only holds true for the one topic, “Results Expected.” All other topics considered resulted in equal responses, with the highest ratings for Google in “Result Expected” and “Functionality Expected,” and the lowest rating in “Expected Ease of Use” (see Figure 4.9).

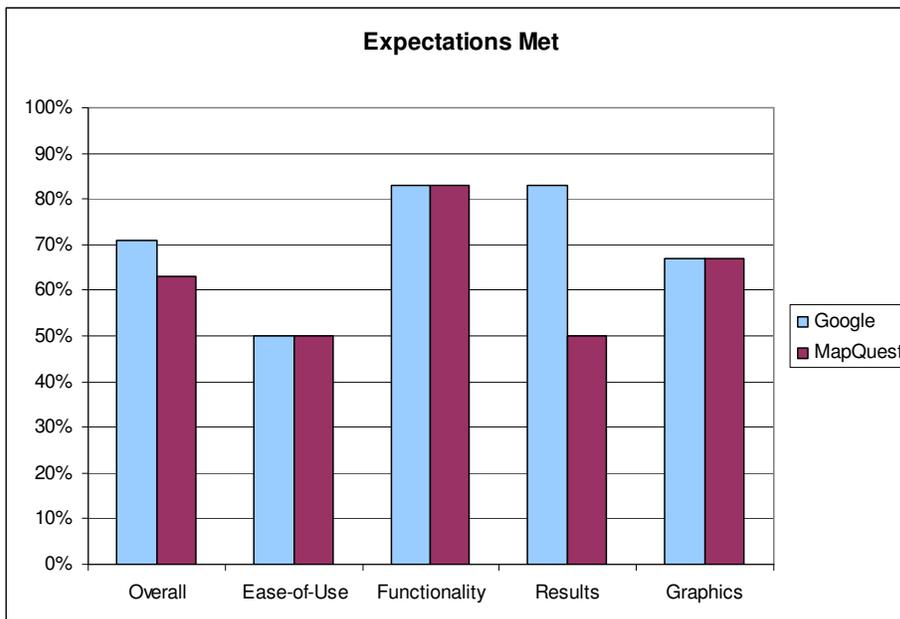


Figure 4.9 Percent of yes answers to expectations being met.

e) Visual Perception

Visual perception ratings were collected in the post-interaction surveys after the completion of all the scenarios on each map site. These ratings were based on a 1-5 scale, with 1 being “strongly disagree” and 5 being “strongly agree.”

Visual perception questions were asked pertaining to the following specific topics: 1) was the site visually appealing; 2) were the functions easy to locate; 3) was the appropriate amount of information displayed; 4) was the site well organized; and 5) (Google only) the site maintained the Google “look and feel.”

Mean overall ratings, and mean ratings for each topic with minimum, maximum and standard deviation values are displayed in Table 4.11.

	Google				MapQuest			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.6	2	5	1.07	3.4	1	5	1.25
Visually Appealing	3.8	2	5	1.17	4.0	2	5	0.89
Locating Functions	3.0	2	5	1.26	3.2	2	5	1.33
Amount of Info	4.0	3	5	0.89	3.2	1	5	1.72
Organization	3.6	2	5	1.00	3.3	2	5	1.15
Look and Feel	4.0	3	5	0.89				

Table 4.11 Visual Perception ratings based on a scale of 1-5.

Overall, participants gave Google only a slightly better visual perception rating than MapQuest, with an overall Google mean score of 3.6 and a MapQuest mean score of 3.4. MapQuest received slightly higher scores than Google for the topics “Visually Appealing” and “Locating Functions.” The highest rating for Google and greatest spread between the two map sites was in the topic “Amount of Information.” The lowest rating for Google was in the topic “Locating Functions” (see Figure 4.10).

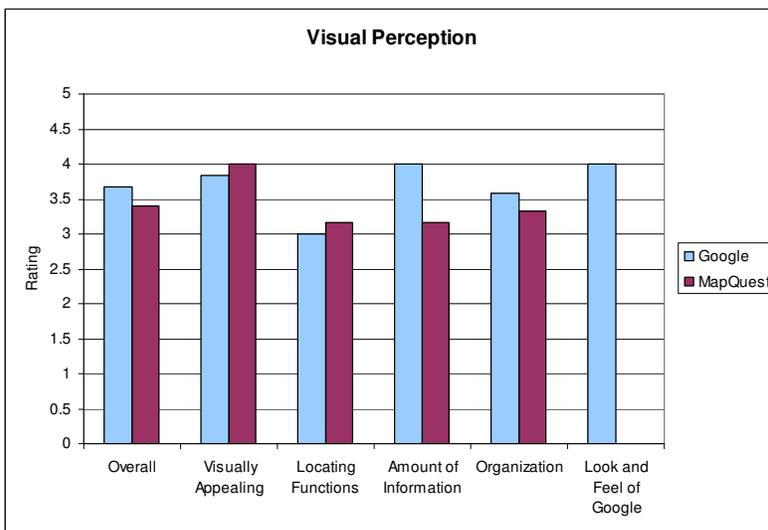


Figure 4.10 Visual Perception ratings based on a scale of 1-5.

4.2 Objective 2 - Determine Performance and Usability of Google Maps for both experienced and novice web users.

The objective to evaluate the performance and usability of Google Maps for different levels of web users was derived from the client's goal of being easy to use, especially for less experienced (novice) web users. Measures used in this evaluation are also presented in the same three categories as Section 4.1:

- 1) User Performance
 - a) Time on Task
 - b) Number of Navigation Steps
 - c) Success Rates
- 2) User Behavior
 - a) Frustration Levels
 - b) Negative Comments
- 3) User Feedback
 - a) Satisfaction
 - b) Ease-of-Use
 - c) Expectations Met
 - d) Visual Perception

Because all these measures and their data collection methods were described in the previous sections, those details will not be repeated for this section.

Summary

Our results indicate considerable differences in performance between novice and experienced users, with experienced users outperforming novice users. Our results also show a similar trend in user feedback, with more positive results from the experienced users, but not nearly as dramatic a difference as in performance. This indicates that even though their performance was much lower, novice users appeared to have perceived their performance and the site similar to experienced users.

A. Performance Measures

a) Time on Task

Time on task was analyzed comparing overall mean times, and mean times for each scenario between novice and experienced web users. Again, unsuccessful tasks that would have affected time were removed from the analysis. Recorded times for each participant and scenario are displayed in Table 4.12.

	Novice		Experienced			
Participant No.	1	5	2	3	4	6
Scenario 1a	7:18	4:49	1:48	1:25	2:00	3:28
Scenario 1b	5:15	3:35	0:59	0:41	1:07	1:10
Scenario 2	3:50	5:06	1:43	2:14	1:27	4:10
Scenario 3	*	9:57	*	1:43	5:33	2:08
Scenario 4	4:18	3:08	1:09	0:55	1:26	0:45

Table 4.12 Time on task. *Task not completed.

For analysis purposes, times were converted to seconds, with means, minimum, maximum and standard deviation values displayed in Table 4.13.

	Novice				Experienced			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	315	188	597	128.46	111	41	333	76.16
Scenario 1a	364	289	438	105.36	120	64	212	65.38
Scenario 1b	265	215	315	70.71	59	41	70	13.02
Scenario 2	268	230	306	53.74	144	87	250	73.63
Scenario 3	597	597	597	0.00	188	103	333	126.19
Scenario 4	223	188	258	49.50	64	45	86	17.80

Table 4.13 Mean Time of task in seconds.

Experienced web users were able to complete all tasks considerably faster than novice web users. The slowest task for both novice and experienced users was scenario 3. The fastest task for novice users was scenario 4, and for experienced users, scenario 1b.

It should be pointed out, that with participant 1 not completing scenario 3, the novice rating for scenario 3 is based solely on one participant's data, and may or may not accurately represent the actual novice population's rating (see Figure 4.11).

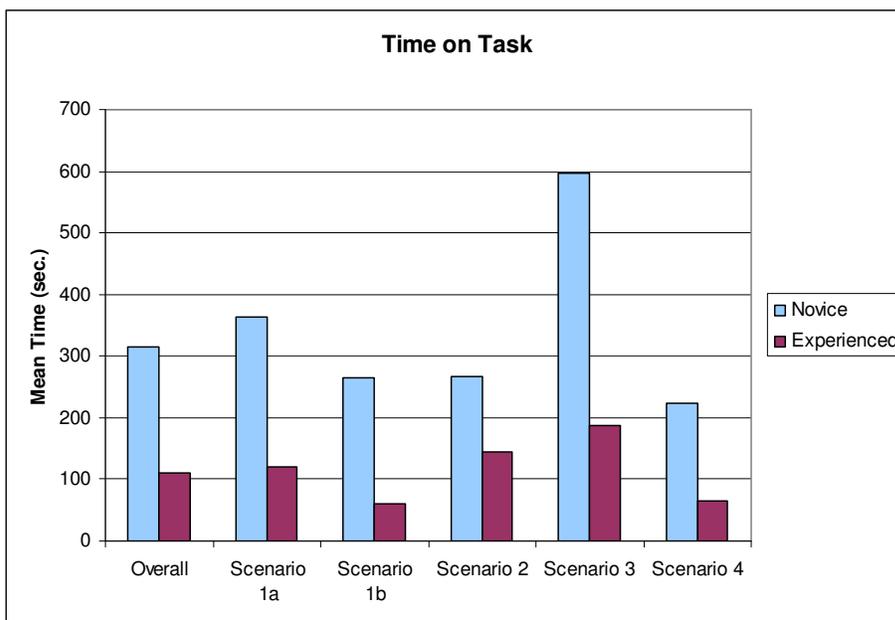


Figure 4.11 Mean Time of task in seconds.

b) Number of Navigational Steps

The mean number of steps for each scenario along with minimum, maximum and standard deviation values are displayed in Table 4.14.

	Novice				Experienced			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	9.1	5	20	5.81	7.89	4	12	3.03
Scenario 1a	10.0	10	10	0.00	9.5	9	10	0.58
Scenario 1b	5.0	5	5	0.00	4.5	4	5	0.58
Scenario 2	12.0	12	12	0.00	12.0	12	12	0.00
Scenario 3	20.0	20	20	0.00	10.0	10	10	0.00
Scenario 4	5.0	5	5	0.00	5.0	5	5	0.00

Table 4.14 Mean number of navigation steps.

Overall, experienced users outperformed novice users, with the fewer average number of navigational steps. The main source of this difference comes from the dramatic difference in number of steps for scenario 3. Among all other scenarios, the difference between experience and novice performance is negligible (see Figure 4.12).

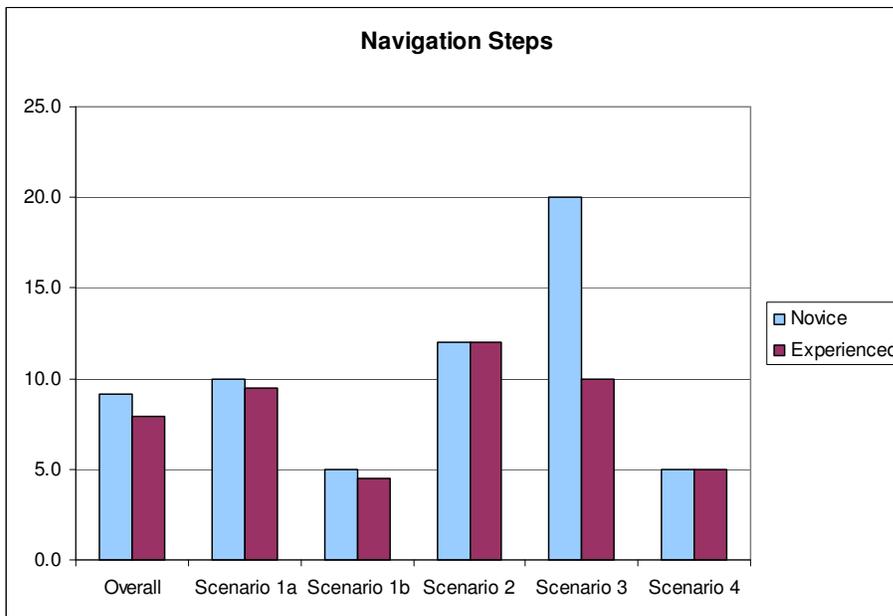


Figure 4.12 Mean number of navigation steps.

c) Success Rates

Overall success rates along with rates for each scenario are displayed as percentages in Table 4.15. Because of the uneven distribution of participants in the novice and experienced groups, exact counts were omitted from this table. For more details of what particular tasks were unsuccessful, see Appendix G.

	Novice	Experienced
Overall	50%	95%
Scenario 1a	50%	100%
Scenario 1b	50%	100%
Scenario 2	50%	75%
Scenario 3	50%	100%
Scenario 4	50%	100%

Table 4.15 Percentages of successfully completed scenarios.

Experienced users were more successful in completing all scenarios than novice users. Only half the novice users were able to successfully complete each task. Most experienced users were able to successfully complete all scenarios except for scenario 2 (see Figure 4.13).

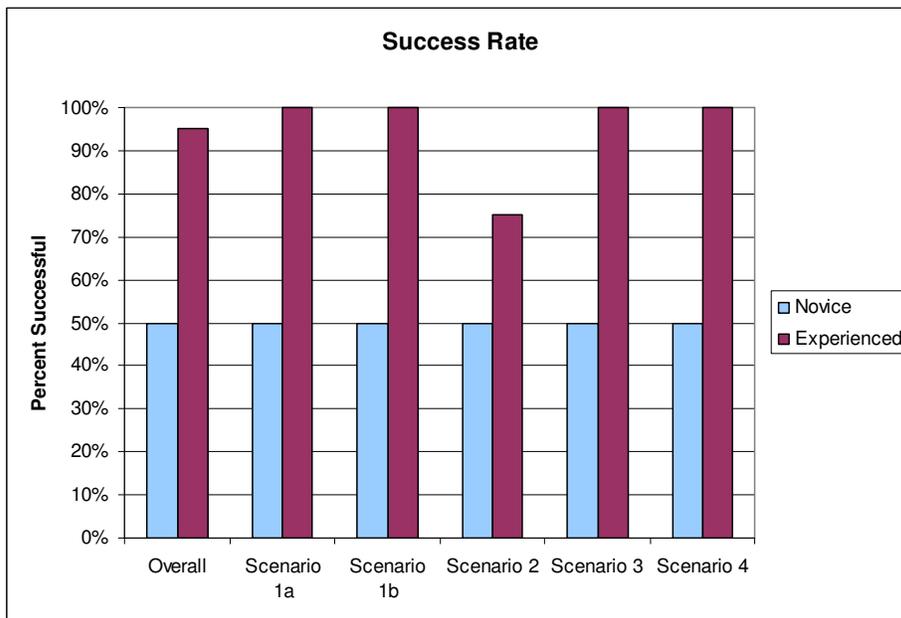


Figure 4.13 Percentages of successfully completed scenarios.

B. User Behavior

a) Frustration Levels

Overall counts of observed frustration behaviors along with counts for each scenario are displayed in Table 4.16

	Novice	Experienced
Overall	21	8
Scenario 1a	2	1
Scenario 1b	3	0
Scenario 2	7	3
Scenario 3	9	4
Scenario 4	0	0

Table 4.16 Counts of observed frustration behaviors.

Overall, more observations were documented among novice users than experienced users. This occurred across all scenarios, except for scenario 4, which had no observations. In addition, no signs of frustrations were observed for experienced users during scenario 1b. (see Figure 4.14).

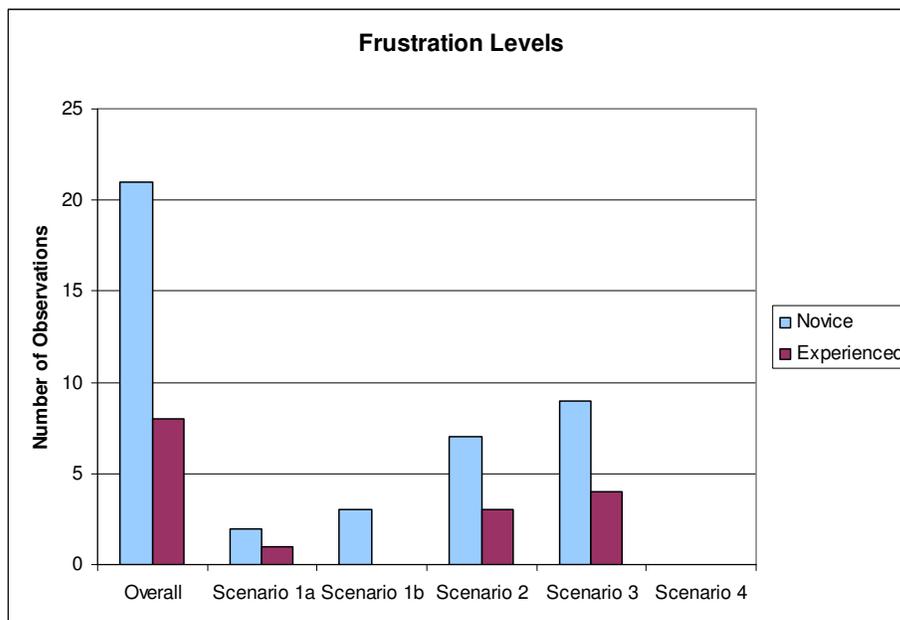


Figure 4.14 Counts of observed frustration behaviors.

b) Negative Comments

The overall count of negative comments, along with the count for each scenario is displayed in Table 4.17.

	Novice	Experienced
Overall	9	8
Scenario 1a	2	2
Scenario 1b	1	1
Scenario 2	2	1
Scenario 3	3	3
Scenario 4	1	1

Table 4.17 Count of negative comments made by participants.

The number of negative comments made by participants in each group was equal, except during scenario 2, which resulted in 1 additional comment by a novice user. Scenario 3 produced the highest number of negative comments (see Figure 4.15).

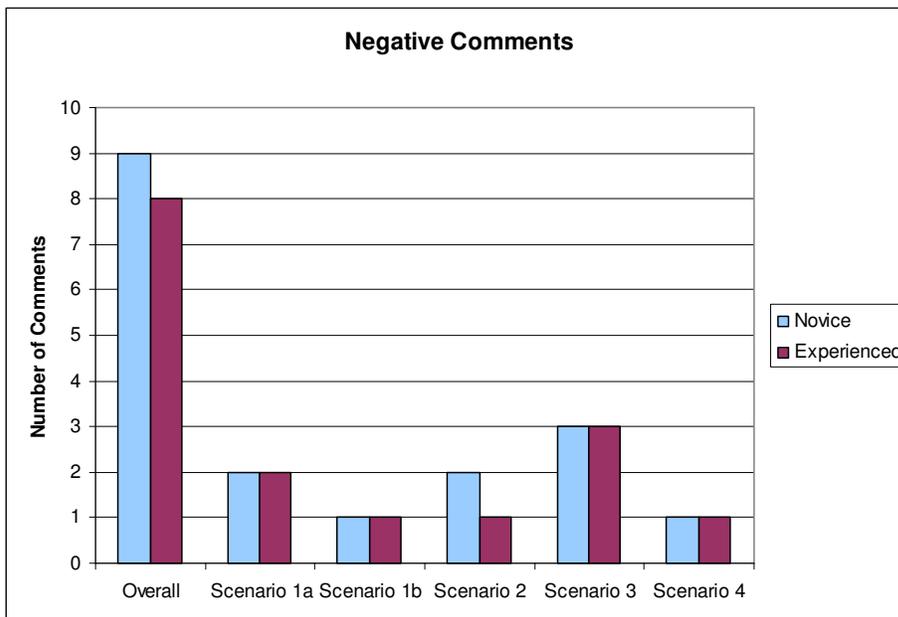


Figure 4.15 Count of negative comments made by participants.

C) User Feedback

a) Satisfaction

Mean overall satisfaction ratings, and mean ratings for each scenario with minimum, maximum and standard deviation values are displayed in Table 4.18

	Novice				Experienced			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.5	1	5	1.18	4.3	2	5	1.02
Scenario 1	4.5	4	5	0.71	4.3	3	5	0.96
Scenario 2	2.5	1	4	2.12	4.5	3	5	1.00
Scenario 3	3.0	2	4	1.41	3.8	2	5	1.50
Scenario 4	3.5	3	4	0.71	5.0	5	5	0

Table 4.18 Mean Satisfaction ratings based on a scale from 1-5.

Overall, experienced users were more satisfied in using Google Maps than novice users. This was true for all but scenario 1, where novice users rated their level of satisfaction higher than experienced users did. The highest level of satisfaction rating for experienced users came from scenario 4, and the lowest from scenario 3. The highest level of satisfaction rating for novice users came from scenario 1, and the lowest from scenario 2. The greatest spread in ratings between experienced and novice users occurred in scenario 2 (see Figure 4.16).

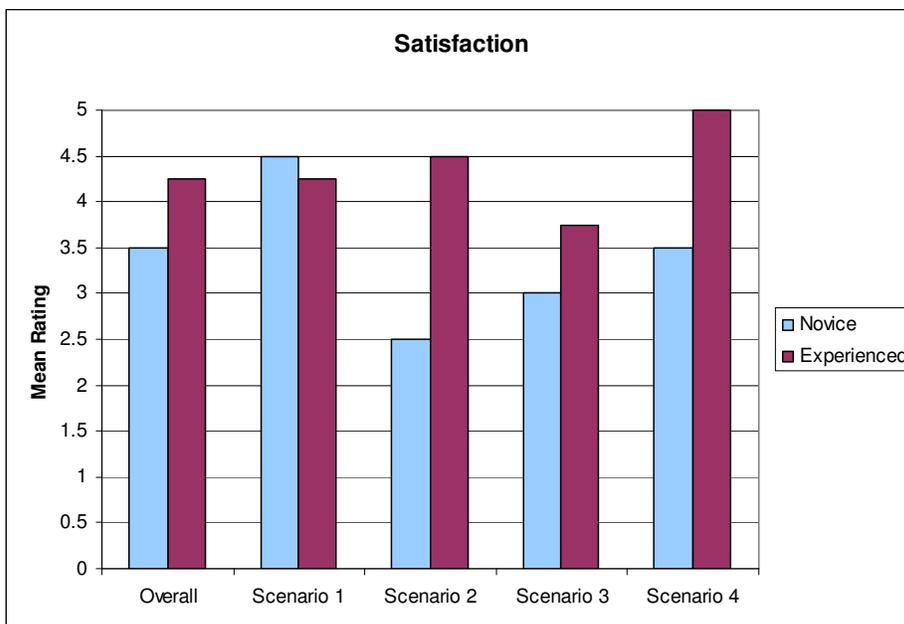


Figure 4.16 Mean Satisfaction ratings based on a scale from 1-5.

b) Ease of Use

Mean overall Ease of Use ratings, and mean ratings for each topic covered with minimum, maximum and standard deviation values are displayed in Table 4.19.

	Novice				Experienced			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.6	1	5	1.21	4.1	1	5	0.96
General	3.4	2	4	0.84	3.8	1	5	1.32
Completing Tasks	3.5	1	5	1.46	4.3	2	5	0.86
Using Functions	3.6	1	5	1.26	4.0	2	5	0.90
Interpreting Results	4.2	3	5	0.75	4.4	4	5	0.51

Table 4.19 Mean Ease of Use ratings based on a scale from 1-5.

Within every topic analyzed, experienced users rated Google Maps easier to use than novice users. The topic “Interpreting Results” received the highest rating from both experienced and novice users with mean ratings of 4.4 and 4.2 respectively, while “General Ease of Use” received the lowest ratings from both groups, with ratings of 3.8 and 3.4 (see Figure 4.17).

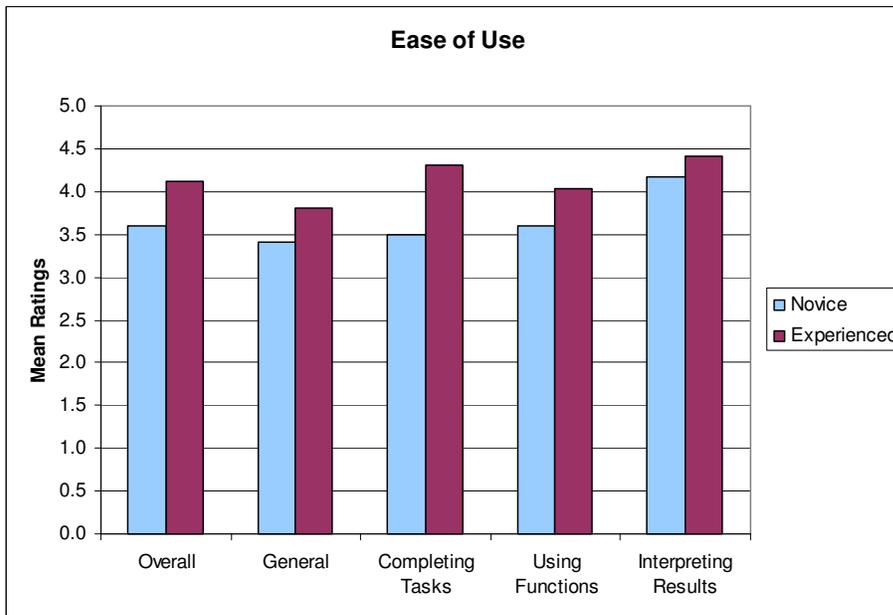


Figure 4.17 Mean Ease of Use ratings based on a scale from 1-5.

d) Expectations

Overall cumulative responses to meeting expectations and responses for each topic covered are displayed in Table 4.20, along with the respective percentage of “yes” responses.

	Novice			Experienced		
	Yes	No	%Yes	Yes	No	% Yes
Overall	6	2	75%	11	5	69%
Expected Ease of Use	1	1	50%	2	2	50%
Functionality Expected	2	0	100%	3	1	75%
Results Expected	1	1	50%	4	0	100%
Graphics Met Expectations	2	0	100%	2	2	50%

Table 4.20 Cumulative responses (yes/no) to meeting participant’s expectations, along with percentage of “yes” responses.

On the overall analysis, novice user’s expectations were better met than experienced users, although these results varied considerably by the topic covered. Ease of use had low but equal expectancy ratings from each group. “Results” received 100% ratings from experienced users and 50% rating from novice users, while “Graphics” received the opposite, 50% ratings from experienced users and 100% ratings from novice users (see Figure 4.18).

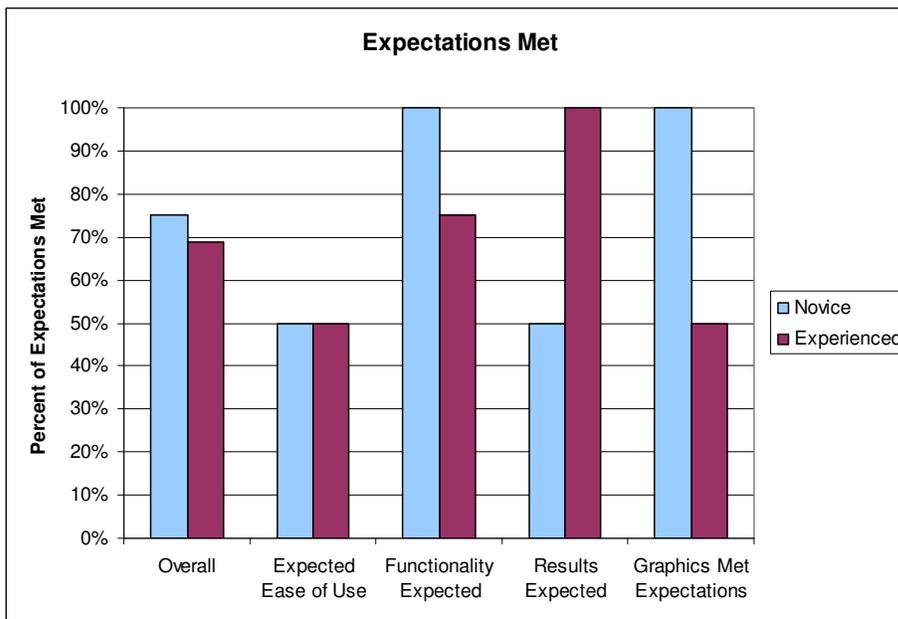


Figure 4.18 Percentage of “yes” responses to meeting participant’s expectations.

e) Visual Perception

Mean overall Visual Perception ratings, and mean ratings for each topic with minimum, maximum and standard deviation values are displayed in Table 4.21.

	Novice				Experienced			
	Mean	Min	Max	SD	Mean	Min	Max	SD
Overall	3.7	2	5	1.07	3.7	2	5	1.05
Visually Appealing	4.5	4	5	0.71	3.5	2	5	1.29
Locating Functions	2.5	2	3	0.71	3.3	2	5	1.50
Amount of Information	3.5	3	4	0.71	4.3	3	5	0.96
Organization	3.5	2	5	1.29	3.6	2	5	0.92
Look and Feel of Google	4.5	4	5	0.71	3.8	3	5	0.96

Table 4.21 Mean Visual Perception ratings based on a scale from 1-5.

Overall ratings of Visual Perception from experienced and novice users were equal. The lowest rating from experienced and novice groups was in “Locating Functions” at 3.3 and 2.5 respectively. For the novice group, “Visually Appealing” and “Look and Feel” of Google received the highest ratings at 4.5, while “Amount of Information” received the highest ratings from the experienced group at 4.3 (see Figure 4.19).

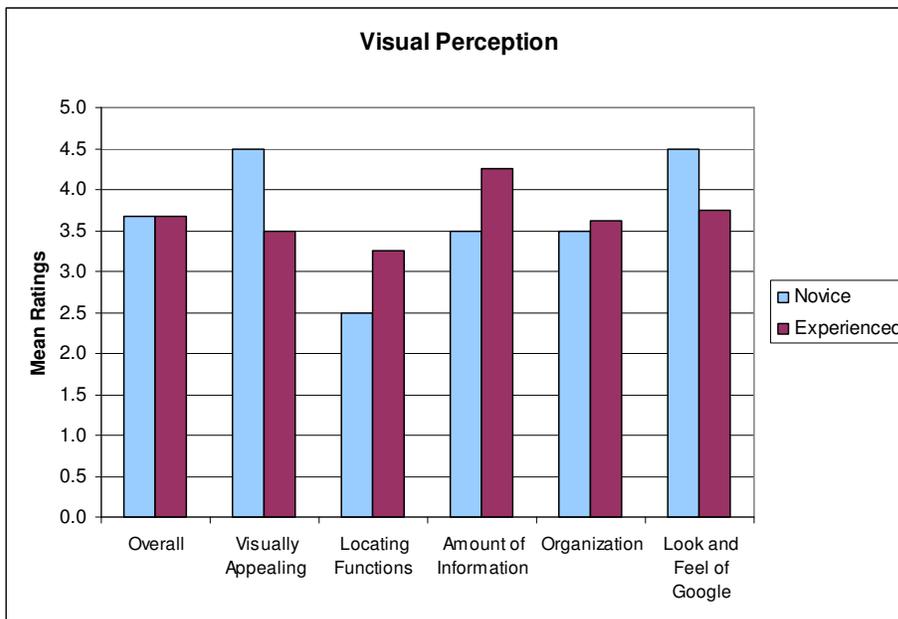


Figure 4.19 Mean Visual Perception ratings based on a scale from 1-5.

4.3 Objective 3 - Determine if User's Expectations are Met

The objective to determine if user's expectations are met was derived from the client's goal of meeting user's expectations. To evaluate this objective, Expectation ratings were collected in the post-interaction survey after the completion of all the scenarios on the Google map site.

The following questions were asked to measure user's expectations:

- 1) Was this map service more difficult to use than expected?
- 2) All the functionality I expected from an on-line map service was available.
- 3) The results met my expectations.
- 4) The graphic display of the web site met my expectations.

Responses to these questions were a simple "yes" or "no."

Summary

Results for this objective are not as clear as previous measures. Overall, only 71% of user's expectations were met. The varying results indicate there are some areas of the site better meeting user's expectations than others. There is room for improvement, particularly in the expected ease of use of the map site.

Results by Question

Overall cumulative counts of "yes" and "no" responses and responses for each topic are displayed in Table 4.22, along with the respective percentage of yes responses.

	Yes	No	% Yes
Overall	17	7	71%
1) Expected Ease of Use	3	3	50%
2) Functionality Expected	5	1	83%
3) Results Expected	5	1	83%
4) Graphics Met Expectations	4	2	67%

Table 4.22 Cumulative responses (yes/no) to meeting participant's expectations, along with percentage of "yes" responses.

Overall, a mean of 71% of participant's expectations were met within these topics on Google Maps. No individual topic covered in this analysis received a rating of 100%. The topics with the highest ratings were "Functionality" and "Results", with 83% of the participants indicated that the provided functionality and results met their expectations. "Ease of Use" received the lowest rating, with only 50% of the participants indicated that Google Maps was as easy to use as expected, meaning half of the participants expected Google Maps to be easier to use (see Figure 4.20).

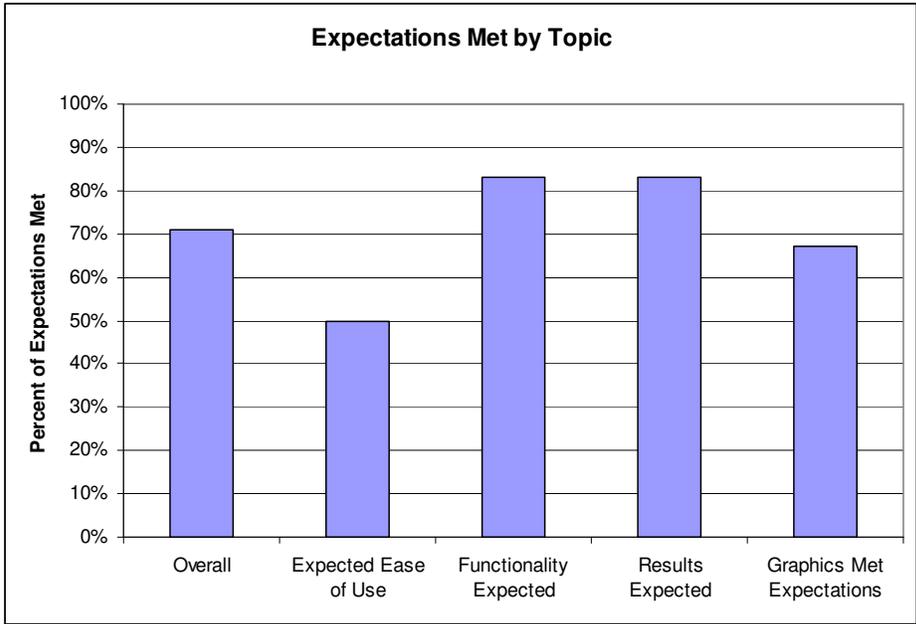


Figure 4.20 Percentage of “yes” responses to meeting participant’s expectations.

Results by Participant

Responses by each participant for each Expectation question, with the respective percentage of yes responses are displayed in Table 4.23.

Participant	Expected Ease of Use	Functionality Expected	Results Expected	Graphics Met Expectations	Percent Yes
1*	No	Yes	Yes	Yes	75%
2**	No	Yes	Yes	No	50%
3***	Yes	Yes	Yes	Yes	100%
4**	Yes	Yes	Yes	Yes	100%
5*	Yes	Yes	No	Yes	75%
6***	No	No	Yes	No	25%

Table 4.23 Responses to Expectation questions by participant, with respective percent of “yes” responses.

* Novice users; ** MapQuest Users; *** Yahoo Users

Participants 3 and 4 indicated that Google Maps met their expectations in all topics considered. Participant 6 indicated that Google maps met their expectations on only 25% of the topics considered. The two novice users, (participants 1 and 5) each rated their expectations at 75%, although they answered 2 of the questions differently (see Table 4.23 and Figure 4.21).

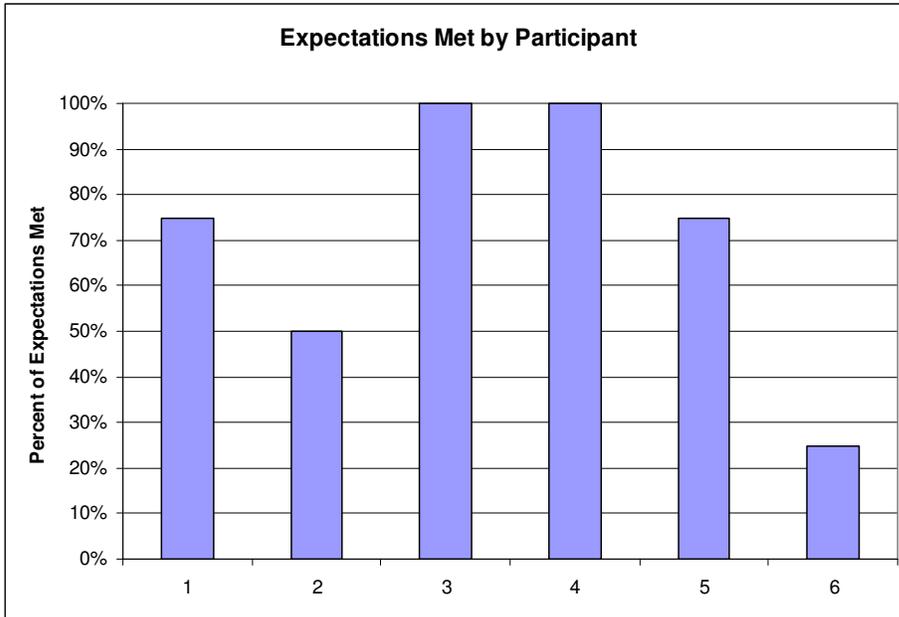


Figure 4.21 Percentage of “yes” responses to meeting expectations by participant.

User Comments

The following comments were provided by the participants when rating each topic of the measure expectations:

Ease of Use:

Lack of labels hurt the experience. (#6)

Providing a tutorial would be nice. (#6)

It was difficult out find where to start – once started, it got easier. (#2)

Functionality:

I was not able to do a couple of functions due to lack of labels. (#6)

Results:

(No comments)

Visual Display:

The zooming scale: lack of color hinders my ability to zoom. (#6)

The beginning page with the U.S. map was intimidating and confusing. (#2)

4.4 Objective 4 - Assess the Perception of Google Maps to determine if the interface is consistent with other Google interfaces

The objective to determine if the Google Maps interface is consistent with other Google interfaces was derived from the client’s goal of maintaining the Google “Look and Feel.” In addition to the look and feel of Google Maps, all aspects of the visual perception of Google Maps collected in this study will be discussed here.

To evaluate this objective, visual perception ratings were collected in the post-interaction survey after the completion of performing all the scenarios on the Google map site. The following statements were presented:

- 1) The map service was visually appealing.
- 2) It was easy to find the functions you needed.
- 3) There was too much information displayed on the page.
- 4) The map service was well organized.
- 5) The design of the map service interfered with the information presents.
- 6) The look of Google Maps reminded me of Google Search.

Responses to these questions were based on a 1-5 scale, where 1 indicated “strongly disagree” and 5 indicated “strongly agree.” Results of statements 4 and 5 were combined into one topic, “Organization.”

Summary

Google maps can be regarded as maintaining the Google “Look and Feel,” as indicated by a rating of 4 out of 5. This is a good and positive score, with most participants agreeing, but as a score below 5, this also indicates some room for improvement.

Results by Topic

Mean overall Visual Perception ratings, and mean ratings for each topic with minimum, maximum and standard deviation values are displayed in Table 4.24.

	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>SD</i>
Overall	3.6	2	5	1.07
Visually Appealing	3.8	2	5	1.17
Locating Functions	3.0	2	5	1.26
Amount of Information	4.0	3	5	0.89
Organization	3.6	2	5	1.00
Look and Feel of Google	4.0	3	5	0.89

Table 4.24 Mean Visual Perception ratings based on a scale of 1-5.

The mean overall rating of visual perception was a 3.6 (out of 5). The topics “Amount of Information” and “Look and Feel of Google” each received the highest rating of 4. The topic “Locating Functions” received the lowest rating of 3 (see Figure 4.22).

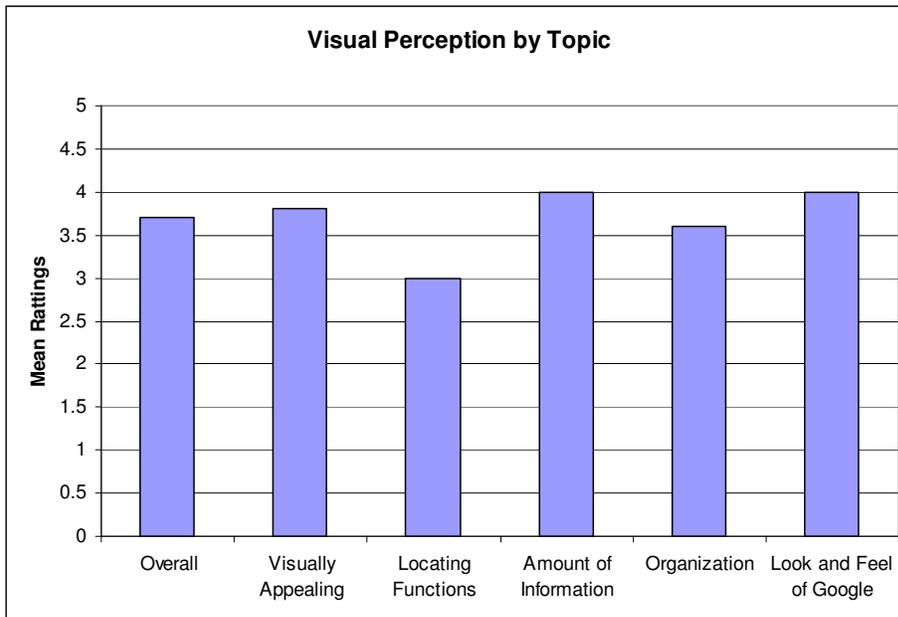


Figure 4.22 Mean Visual Perception ratings based on a scale of 1-5.

Results by Participant

Visual Perception responses by each participant for each topic are displayed in Table 4.25.

Participant	Overall	Visually Appealing	Locating Functions	Amount of Information	Organization	Look and Feel of Google
1*	4.2	5	2	4	4.5	5
2**	2.8	2	2	3	3.5	3
3***	4.7	5	5	5	4	5
4**	4	4	4	4	4	4
5*	3.2	4	3	3	2.5	4
6***	3.2	3	2	5	3	3

Table 4.25 Responses to Visual Perception questions by participant, based on a scale of 1-5.

* Novice users; ** MapQuest Users; *** Yahoo Users

Participant 3 gave Google Maps the highest overall score in Visual Perception with a mean rating or 4.7 (out of 5). The next highest rating was by participant 1 (a novice user), and the lowest rating was by participant 2 (MapQuest user). There does not appear to be any relation between participant’s internet or map service experience and their rating of this measure (see Figure 4.23).

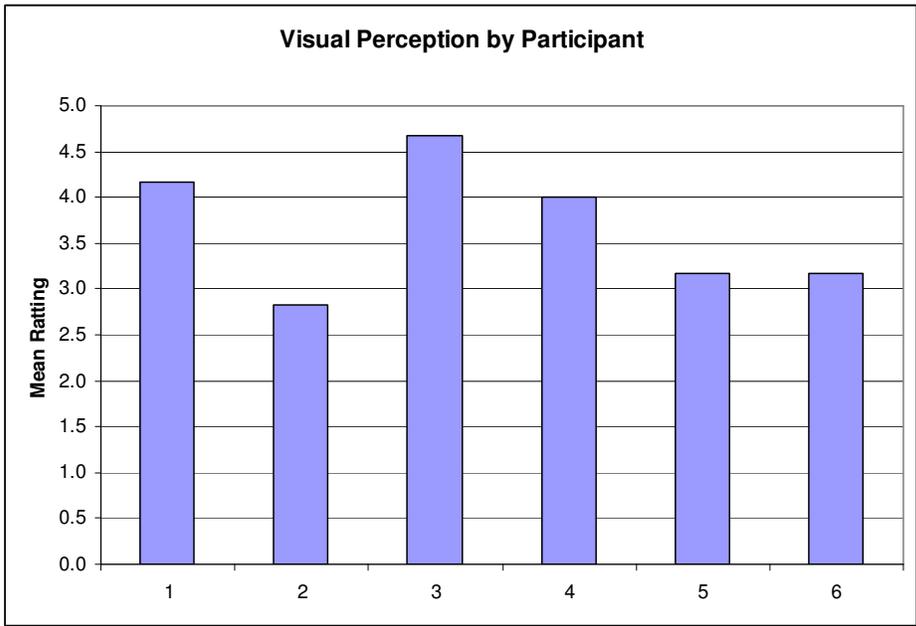


Figure 4.23 Mean Visual Perception ratings by participant, based on a scale of 1-4.

User Comments

The following comments were provided by the participants when rating the measure Visual Perception:

Q: Can you mention anything you particularly liked about the design of this map service:

The simplicity (#4)

Navigating maps and satellite photos were very interesting. (#3)

The Satellite (#2)

Zoom / pan (#2)

Q: Can you mention anything you particularly disliked or would change in the design of this map service:

The U.S. map (#2)

Make where to start clearer. (#2)

Improve the zoom function with cues (#5)

5. Highlighted Issues and Recommendations

5.1 Objective 5 – Provide data to assist in re-design decisions

The objective to provide data to assist in re-design decisions was derived from the client's goal to improve the site design of Google Maps. In this section we explore the specific issues found during the usability studies. These issues will help address the lower overall ease-of-use ratings found in the Results section (see Figures 4.9, 4.18 and 4.20).

Two categories of issues are described, global and local. Global issues are identified by and are based on established usability principles or heuristics. These apply broadly and affect the underlying structure or organization of the site, or are persistent throughout the site affecting the user at several stages of accomplishing their tasks. Local issues are more common lower level issues and apply directly to the interface or design of the site.

The global issues are presented by explaining the issue, the principle or heuristic violated, supporting data with examples, and lastly providing recommendation(s) for improvement. Local issues are presented by explaining the issue, supporting data with observations and comments, and also providing recommendation(s) for improvement.

5.1.1 Severity Ranking Scale

Both global and local issues will be presenting with a severity rating, which will assist the client in setting priorities in addressing the issues.



High Severity Ranking

High severity ranking issues should be given priority attention. These are issues that prevent the user from completing a task or goal, or require unnecessary strain on the user in completing a task or goal. To provide best possible experience for all users, it is imperative to change these issues.



Medium Severity Ranking

Medium severity ranking issues should be looked at after all high severity issues have been addressed. These issues do not necessarily prevent users from completing a task but do affect general ease of use while performing tasks. It is highly recommended to change these issues.



Low Severity Ranking

Low severity ranking issues provide recommendations that would enhance the user experience making it more enjoyable for all users. These are issue we suggest you change towards the end of your interface redesign process.

5.1.2 Usability Principles (Heuristics)

The Google Maps website was evaluated based on the following usability principles. Conforming to these guidelines will increase general ease of use of a website. These heuristics can also be found at: http://www.useit.com/papers/heuristic/heuristic_list.html

1. Visibility of system status

The system should always inform the user about what's happening through visual feedback within the interface. This visual feedback needs to appear in a timely manner and should always reinforce the recognition rather than recall heuristic.

2. Match between system and the real world

The system should always use terms and language that will be familiar to the user. It should avoid jargon, abbreviations, acronyms, etc. and opt for language used in real world or natural settings that are similar to the system's "world."

3. User control and freedom

Users need the ability to undo and redo. This also ties in with the error prevention and recovery heuristics. If users are given the ability to undo their mistakes they are less likely to encounter errors.

4. Consistency and standards

The system should try and follow any conventions or standards that are preset by their industry or platform. Users should never be presented with two different words or symbols that perform the same action. Be consistent across all parts of the interface.

5. Error prevention

A system should never design with reliance upon error messages. It is better to design in such a way that will prevent users from receiving errors messages. To do so, eliminate error-causing situations; perform validation checks and present users with confirmations to prevent accidents.

6. Recognition rather than recall

Users should not have to remember data transferred across the system; the system should not impose memory effort upon the user. Information that is vital to any decision should always be easy to retrieve.

7. Flexibility and efficiency of use

The system should provide acceleration options for more experienced users, accommodating all user groups. Alternate methods of accessing frequently used actions will improve efficiency of usage.

8. Aesthetic and minimalist design

The interface should focus on items that are only relevant in supporting the user in accomplishing their tasks. Information in error messages, dialogue boxes and instructions should not contain irrelevant or rarely needed information.

9. Help users recognize, diagnose and recover from errors

Error message should be easy to read and interpret. They should provide a user with options or suggestions on how they can recover from this error message and continue their task.

5.2 Global Issues

Priority	Issue #	Issue
	Issue 1	Users had difficulty locating and using various map controls.
	Issue 2	Users are unaware of what mode they are in while performing a task.
	Issue 3	Users are not provided with appropriate error messages to facilitate error recovery.
	Issue 4	Poor labeling of text entry fields confused users.
	Issue 5	Users were frustrated when required to enter their addresses multiple times.



Issue 1

Users had difficulty locating and using the map functions or controls. The functions on Google had a low preference rating, only 46% of the users preferred Google (see Figure 4.6). The “Locating Functions” category was also given the lowest rating within visual preference (see Figure 4.10). As Table 4.21 shows, the ease of which users could find functions was only given a 2.5 out of 5.

Heuristic Conflicts

H4. Consistency and standards

Google has chosen to display map controls differently than an established industry standard. It is not recommended to break from standards so drastically. It will confuse users who are “trained” on current interface standards.

User Observations

- User 1: Doesn't understand what the Google pan/zoom "tools" are and pointed out that they are in the way.

Example

- Users 2, 4, 5 and 6 did not realize that they could click on the map and “drag” it around instead of just using the arrows.
- User 1 didn't know understand what the arrows or zoom “slider” meant.
- User 2 did not understand the functionality of the “Map” button (see Figure 5.1).

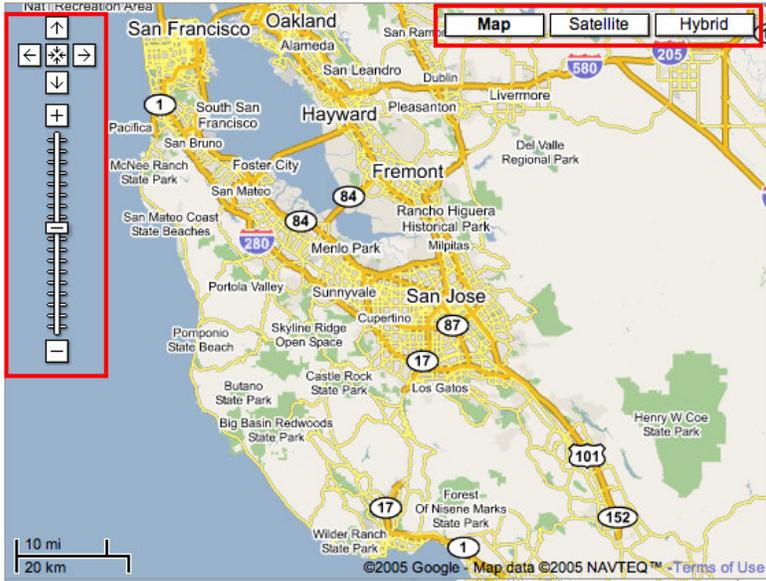


Figure 5.1

Functionality Usefulness Ratings

To help prioritize addressing controls or functions, results of how useful participants thought various functions are displayed in Figure 5.2.

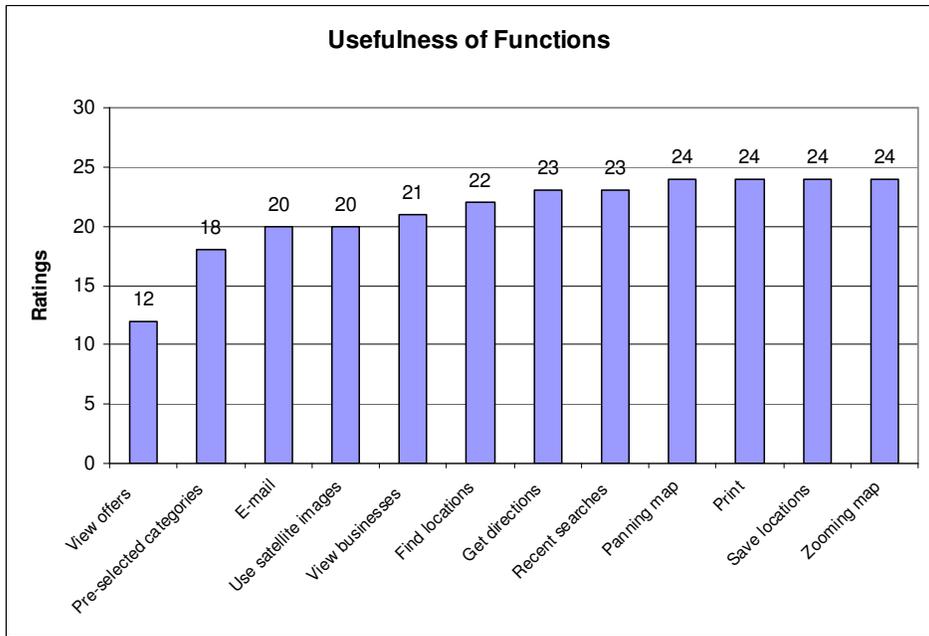


Figure 5.2

Recommendation

It is recommended that these controls be labeled correctly or follow industry standards set by other map services such as MapQuest and Yahoo. MapQuest and Yahoo have specific buttons for zooming, panning and other map manipulation actions.



Issue 2

Users are unaware of what mode they are in while performing a task.

Heuristic Conflicts

H1. Visibility of system status

Users are unaware of the system status, or mode, and therefore get confused and misuse the text fields and other map controls.

H6. Recognition rather than recall

The system requires the user to remember what mode they are in. The only references the user has are the links next to Search. There are no visible reminders of the mode the user is in.

Examples

- When trying to map a route from “home” to the Luxor hotel users often misused the text entry fields because they were unaware of the mode they were in, and were unaware of the entry field limitations and requirements.

Recommendation

The interface needs to explicitly tell the user which mode they are in so there is little or no confusion. Making “Find Business” and “Get Directions” options more salient can help alleviate this issue. Grouping content, highlighting with color, using icons or even size differentiations can also help identify the mode and functionality within a mode.



Issue 3

Users are not provided with appropriate error messages to facilitate error recovery.

Heuristic Conflicts

H9. Help users recognize, diagnose and recover from errors

Google Maps currently provides users with error messages but the error messages are hard to recognize as errors and do not provide users with context specific information to help them recover. They only provide very general information that suggests the user try other words.

Example

- User 3 entered “907 N. Plum St. Indiana” during scenario four. The user neglected to enter the city, so Google could not locate the address as entered. Google provides suggestions on how to recover; however, they are not applicable suggestions for this situation. It also took the user several seconds to recognize that the text on the left hand side was in fact an error message (see Figure 5.3).

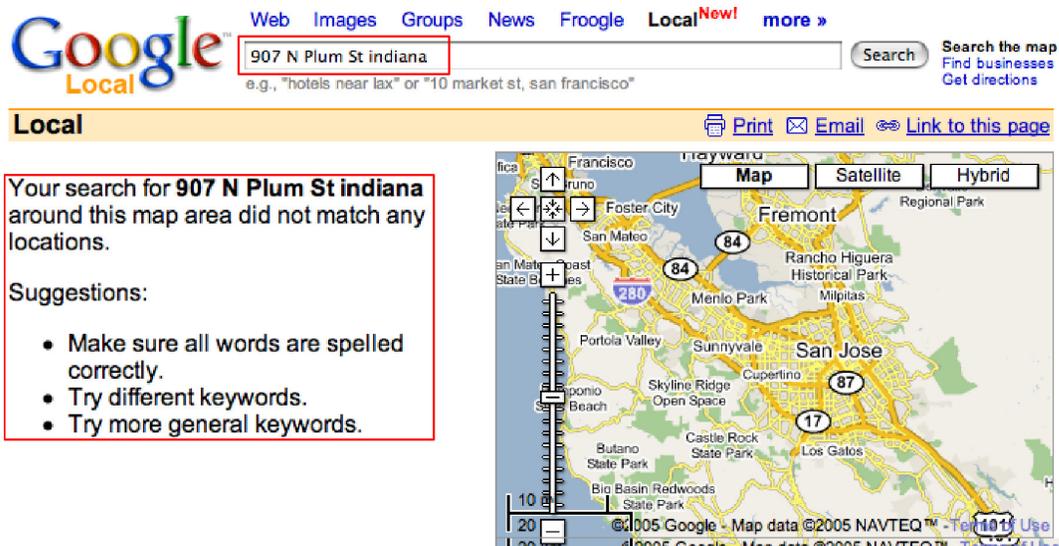


Figure 5.3

Recommendation

It is suggested that all error messages be given a visual redesign to highlight the change from informational text to error text for the user.



Issue 4

Poor labeling of text entry fields confused users.

Heuristic Conflicts

H1. Visibility of system status

The lack of system status requires users to rely on the labels that are not clearly noticeable by users.

H4. Consistency and standards

Industry and applications have set forth standards on how to label fields, specifically how to label text entry fields. Google Maps does not follow these standards.

H5. Error prevention

Poor labeling of text entry fields resulted in errors. Users were entering data into the text entry fields in a trail-and-error method until they got the results they were looking for.

H6. Recognition rather than recall

The lack of labeling required users to remember what various text fields were for and what type of data was required.

User Observations:

- User 1: Could not tell that they were first entering info in a "business" field. They thought it was the address field.
- User 5: Tried entering pizza and coffee into the "What" text field when they can only search one item at a time.

User Comments

- User 3: "MapQuest had boxes that were already available that made it pretty apparent to me what services they offered. On Google it's fine print on the side that I can find businesses and get directions."
- User 5: "I Thought 'Search the Map' was a label"
- User 6: "Where to put stuff (yahoo has boxes to put city/state etc...)"

Example

- Users 2 and 4 both had a hard time starting out in scenario one when they need to find directions. It was not clear to everyone what type of information was required for the text fields (see Figure 5.4).

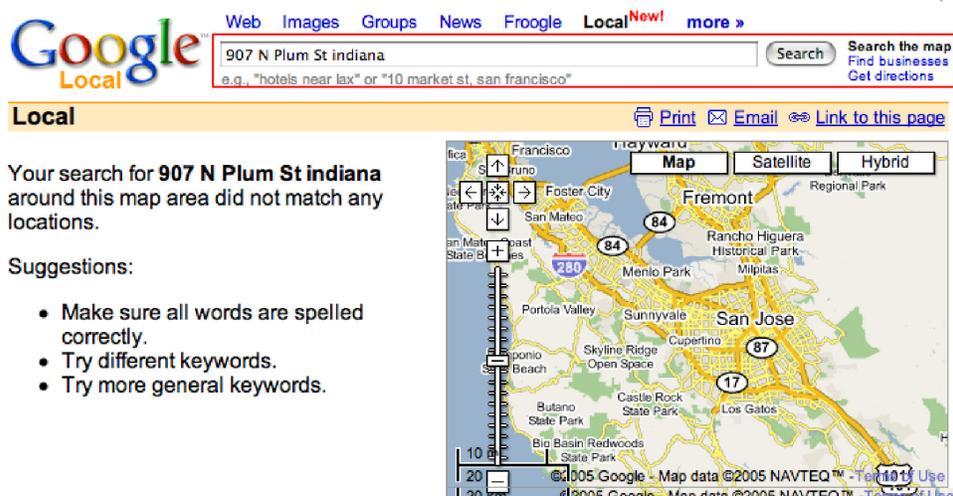


Figure 5.4

Recommendation

In order to prevent any confusion it is recommended that the text entry fields be better labeled as to what type of information is required.

Issue 5

Users were frustrated when required to enter their addresses multiple times.

Heuristic Conflicts

H4. Consistency and standards

Industry standards and many applications using forms have made it common practice to give the user the ability to quickly select previously entered data to prevent repeated text entry that could lead to data entry error.

H6. Recognition rather than recall

Users were required to recall the addresses they had previously entered instead of having it provided to them, so that they could select the one they needed.

H7. Flexibility and efficiency of use

Google Maps requires users to perform a repeated action that could be simplified by providing users with a way to select past entered data.

Example

- All users had to repeatedly enter the addresses they were using throughout the scenarios.
- Users 3 and 5 specifically commented on how they did not like having to re-enter. Other users made data entry error after “tiring” from entering addresses over and over again (see Figure 5.5).

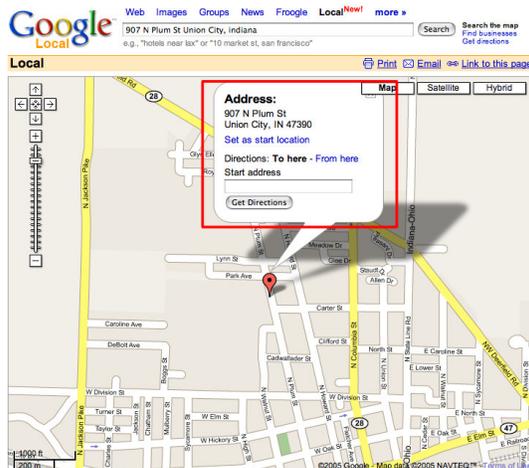


Figure 5.5

Recommendation

It is recommended that Google Maps provide users with an easy and quick way to select previously entered data. The standard method for map services is a drop down menu containing past entered addresses.

5.3 Local Issues

Local issues are those that affect a specific design element on the page.

Priority	Issue #	Issue
	Issue 1	Users get disorientated when zooming.
	Issue 2	Users were unaware of the ability to see the details of each step of the directions.
	Issue 3	Users complained that the details of the step by step directions were too “zoomed” in and not very useful.
	Issue 4	Users were unaware of the “drag” function of Google Maps.
	Issue 5	Users expressed frustration when required to use external email client to send emails.
	Issue 6	Users did not know what the functionality of the center box of the map manipulation controls is.
	Issue 7	Users did not understand why the map service began with a view of the entire U.S.
	Issue 8	Users do not understand what “Link to this page” does.



Issue 1

Users get disorientated when zooming. Users complained about not knowing where they were when zooming in and looking for intersections on the map containing their route. After several minutes of looking around they became lost and adopted the strategy of zooming in to look at something, zooming out, then moving around and zooming back in (see Figure 5.6).

User Comments

- User 1: “[I was confused by] Getting directions for a business, panning and zooming”
- User 4: “Where am I?”
- User 5: “Zoom control sucks”
- User 6: “Zooming was difficult.”

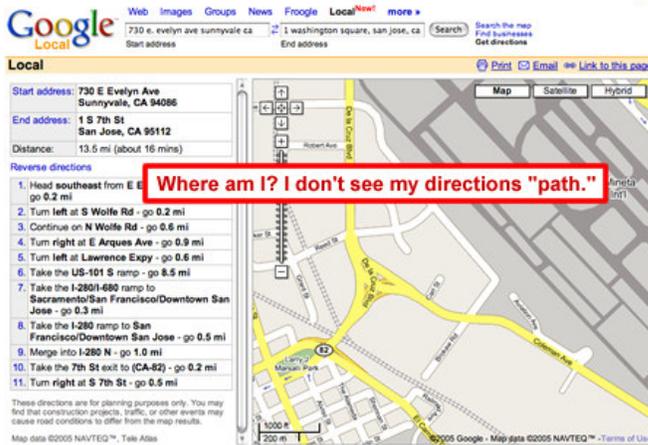


Figure 5.6

Recommendations

It is recommended that users be given some sort of context as to where they are zoomed into in relationship to the overall map.



Issue 2

Users were unaware of the ability to see the details of each step of the directions by clicking on the linked step number or the row of the table. None of the users noticed the fact that they could view the details of each step in this fashion (see Figure 5.7).

User Comments

- “I didn't notice it at first. I was looking at the map more than the directions.”
- “It's not too specific on saying that is the detail. It has just the number and the directions of that step. It doesn't really say these are the details of that intersection.”

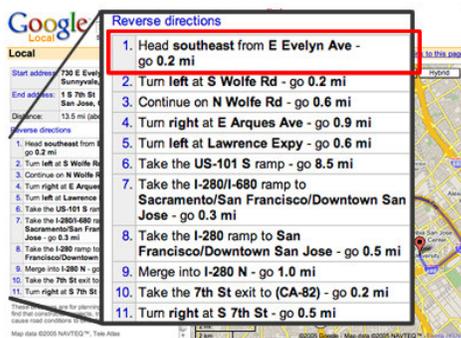


Figure 5.7

Recommendation

It is recommended that this functionality be highlighted in some fashion to alert the user to its presence.

Issue 3

Users complained that the details of the step by step directions were too “zoomed” in and not useful that way. When the users were asked to provide feedback on the details given at each step of the direction, they commented on how neat the feature was but that the details were too zoomed in to be helpful. In addition, none of the users noticed the ability to zoom out in the details bubble (see Figure 5.8).

User Comments

- User 2: *“Does not seem helpful. It's too close.”*
- User 3: *“Very useful for strange intersections but I can't see the street names.”*
- User 4: *“Neat concept. It's nice that it points it out on the map and shows the close-up. It's almost too close though.”*
- User 5: *“Cool, if needed but there's not enough context. Too much detail.”*
- User 6: *“Yes it's neat. It's too zoomed to be useful.”*

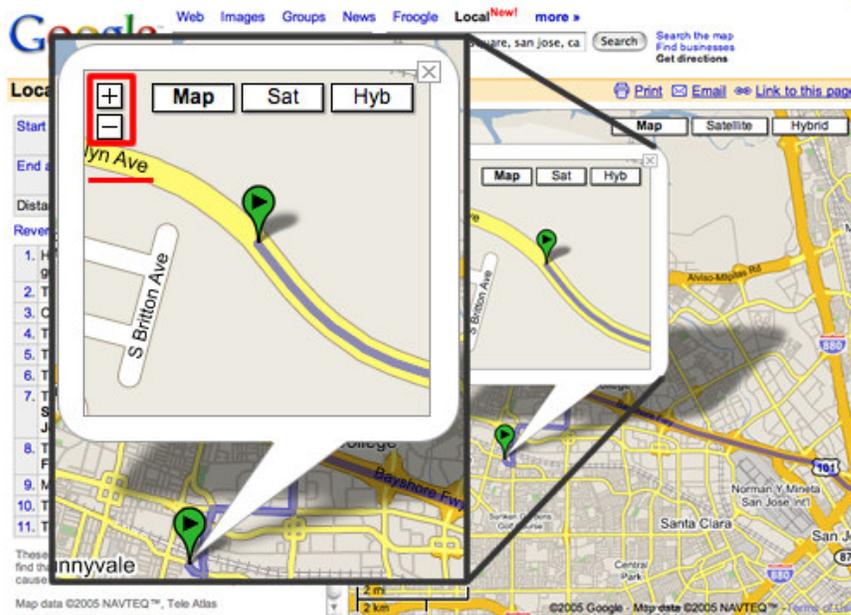


Figure 5.8

Recommendation

The details bubble that appears should be displayed to a less “zoomed” in state. The zoom controls should also be highlighted so that users realize they can manipulate the map within the “pop-up.”

Issue 4

Users were unaware of the “drag” function of Google Maps. 5 out of 6 users manipulated the map using only the arrows to pan, or move, the map around they were completely unaware that you could click and drag the map around (see Figure 5.9).

User Observation

- User 6: Double clicked to re-center map (doesn't realize you could drag).

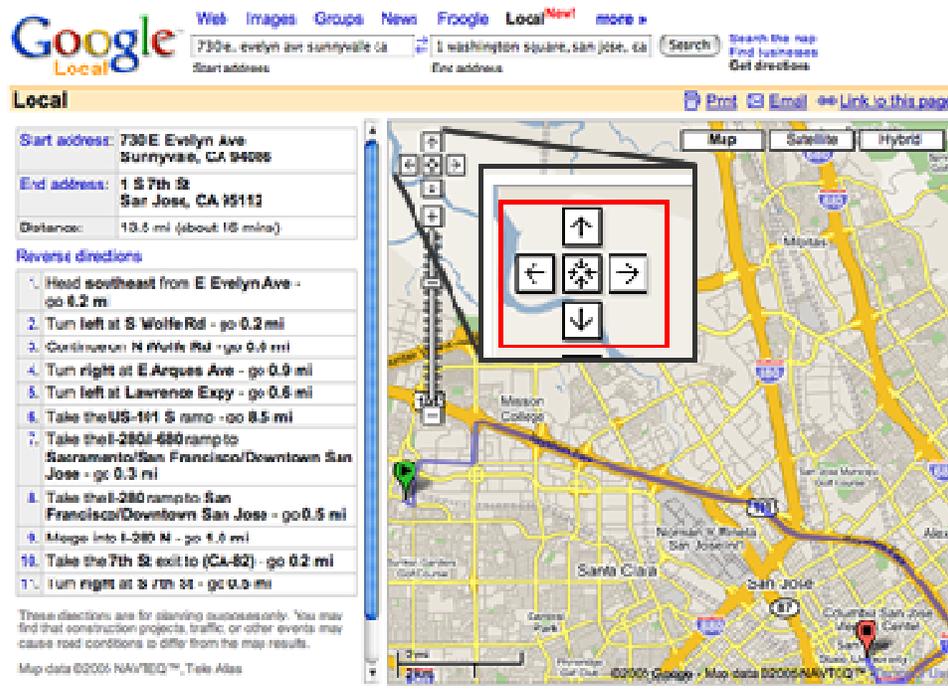


Figure 5.9

Recommendation

It is recommended that the interface indicate to the user through labeling, help, instruction text or icons, that this functionality exists. Currently users only have a change in the cursor icon after holding down the mouse.

Issue 5

Users expressed frustration when required to use external email client to send emails. Users should not be expected to provide any extra computer software to support a web service. Many users use web services, including Google Maps, when they are away from their home computer at internet cafes, libraries and other locations (see Figure 5.10).

User Observations

- User 5: Upset that it opens email client after clicking on “Email.”

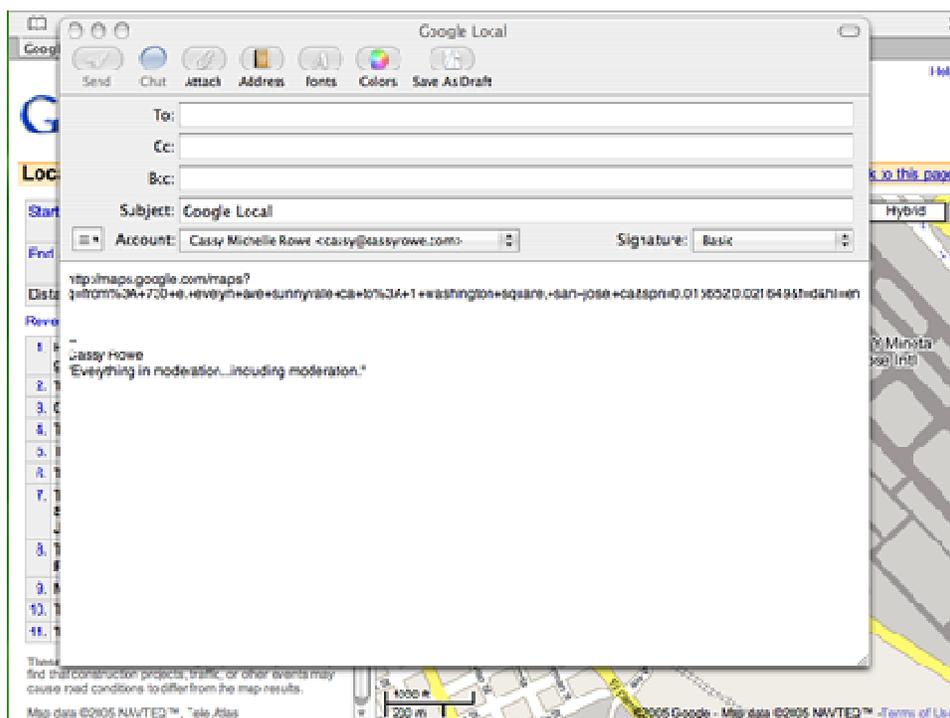


Figure 5.10

Recommendation

We recommend that any functionality provided by the Google Maps service be supported and performed solely by Google Maps.

Issue 6

Users did not know what the functionality of the center box of the map manipulation controls is. When users got lost while zooming and panning, they commented that they had no way to get back to the start like they do in MapQuest. What they were looking for was a way to re-center the map like it was when they started. The box in the center of the pan controls performs this function in Google, but users were unaware of that functionality (see Figure 5.11).

User Comments

- User 1: “How do I re-center?”
- User 4: “I feel lost. I want to start over.”
- User 6: “Centering the map was weird.”

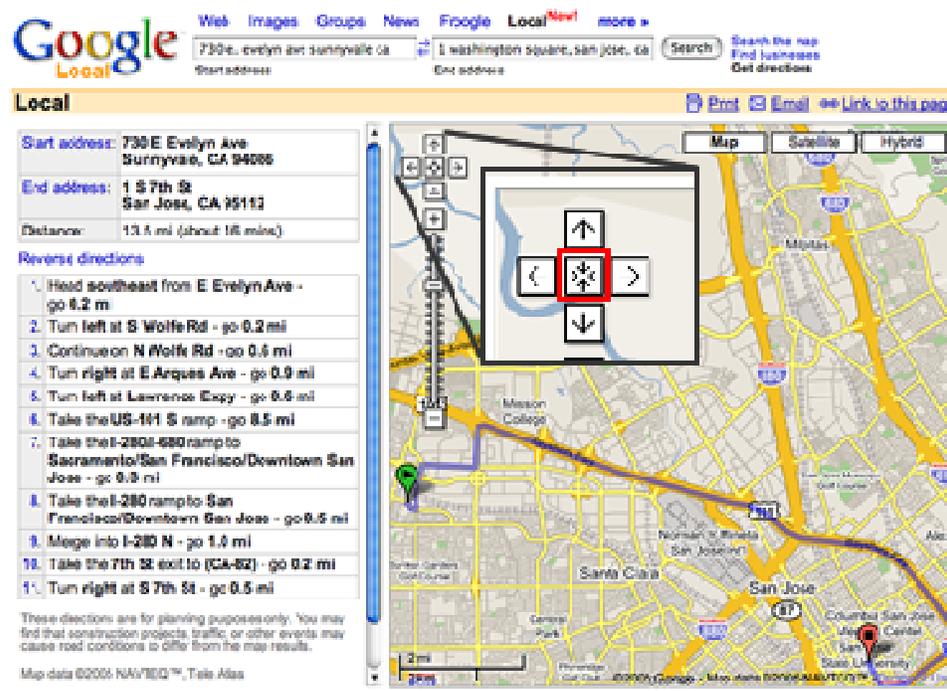


Figure 5.11

Recommendations

The functionality of this control needs to be made clear to the user. This can be done with text, labeling, or following the map manipulation standards set forth by competitors such as MapQuest or Yahoo.

Issue 7

Users did not understand why the map service began with a view of the entire U.S. When asked what confused them about the home page, two users commented that they didn't understand why they were looking at the entire U.S. (see Figure 5.12).

User Comments

- User 2: "It has a map of the whole United States on it."
- User 4: "Why are we looking at ALL of the U.S.?"

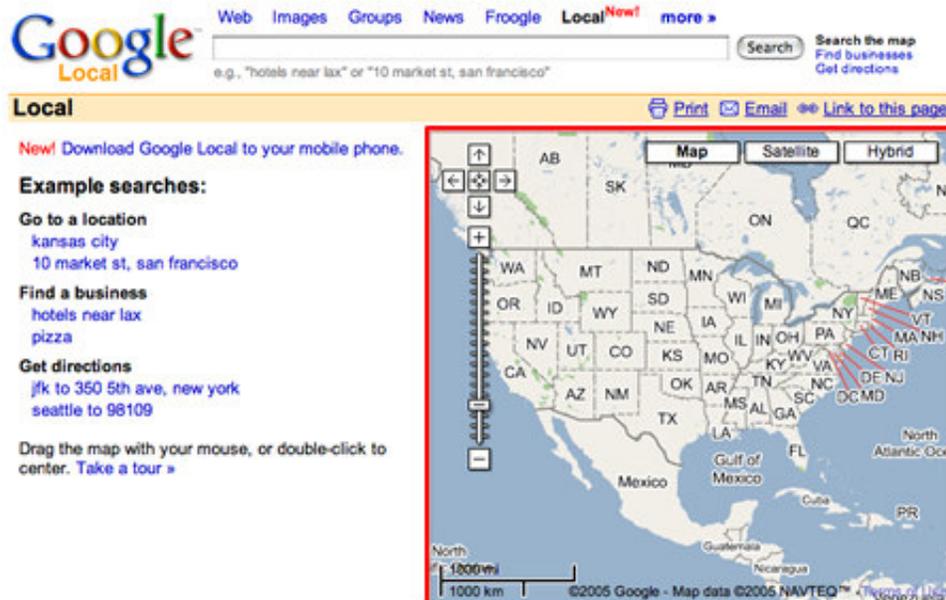


Figure 5.12

Recommendations

Users have the ability to set the starting point of the map and it is recommended that this feature be highlighted so that they can utilize it to help address this issue. Another way to combat this issue is to set the starting location of the map the user's physical location when browsing or the last mapped location.

Issue 8

Users do not understand what “Link to this page” does (see Figure 5.13).

User Comments/Observations

- User 5: “What does ‘Link to this page’ do?”

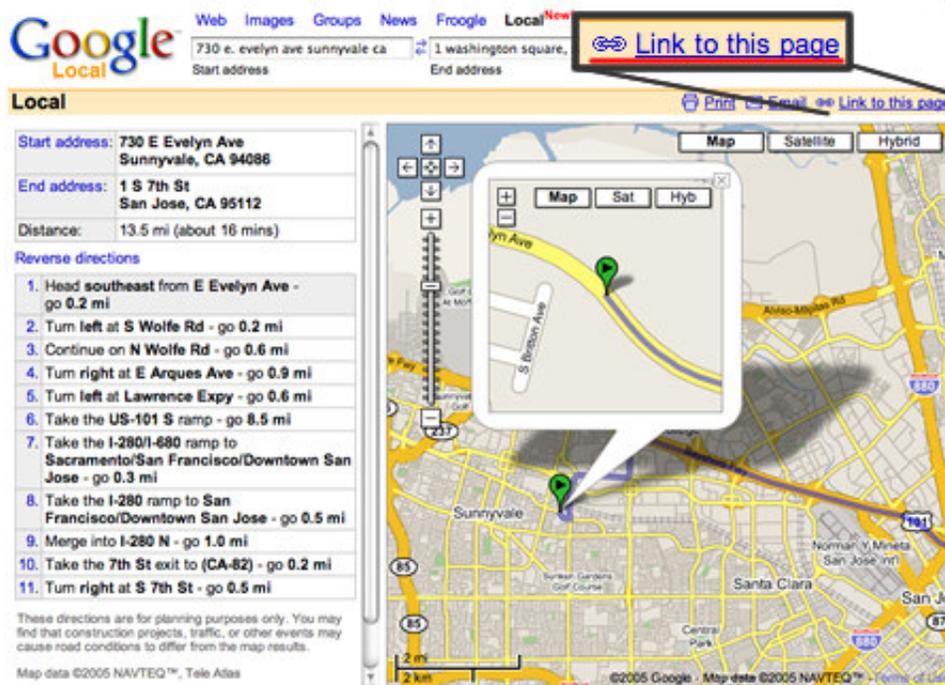


Figure 5.13

Recommendations

Typically, anything that refers to linking to a page creates a bookmark for the user. This link creates a URL to the page for the user to copy and paste. It is recommended that this link be relabeled to more clearly reflect its functionality.

Appendix A

Participant Data

No.	Age	Gender	Years of Internet Experience	Frequency	Search Engine	On-Line map use?	Map Service	Purposes for using on-line maps
1*	33	F	2	1 / week	Yahoo	No		
2	40	F	2+	1+ / week	Google	Yes	MapQuest	Ease of use Functionality Convenience
3	33	M	2+	1+ / week	Yahoo	Yes	Yahoo	Ease of use Functionality
4	26	F	2+	1+ / week	Google	Yes	MapQuest	Ease of use Functionality
5*	32	M	2	1 / week	Google	No		
6	24	M	2+	1+ / week	Hotbot	Yes	Yahoo	Ease of use Functionality Convenience Mileage

* Identified as Novice Users

Appendix B

Screening Survey

1. Age: 24-40
2. Gender: F M
3. Is English your primary language?
 Yes
 No – *Does not qualify*
4. Are you familiar with Windows desktop computer?
 Yes
 No – *Does not qualify*
5. Are you familiar with using standard street maps?
 Yes
 No – *Does not qualify*
6. How much experience do you have on the internet?
 2 or more years
 About 1 year
 About 6 months
 Less than 6 months – *Does not qualify*
7. How frequently do you use the internet?
 More than once a week
 About once a week
 About twice a month
 Less than twice a month
8. What search engine(s) do you most frequently use?

Google (x3); Yahoo (x2), Hotbot (x1)
9. Do you use any on-line map service's website – not just a site that provides a directional map to print, but an actual map service?
 Yes – *continue to Map-Users Group questions*
 No – *finish - tag for Non-Map-User Group*

Map-Users Group

10. What on-line map service do you most frequently use?

- [2] Mapquest
 [] Google
 [2] Yahoo
 [] Other: _____

11. How many times have you used on-line map services?

- [6] 4 or more – *continue*
 [] Less than 4 – *does not qualify - tag for possible Non-Map-User Group*

12. For what purposes?

	1-2 times	3-4 times	5+ times
Viewing a street map	1x		2x
Getting driving directions		1x	3x
Finding a business		1x	3x
E-mail a map			
Printing a map	2x		3x
Other: _____			

If Google was NOT selected above:

(In case there are no or few Google preferred users)

13. Have you ever used Google Maps?

- [1] Yes
 [] No

If Yes:

14. How many times?

- [1] 1-3
 [] 4 or more

Contact Information:

Name: _____

Phone: _____

E-mail: _____

Appendix C

Pre-Study Survey: Online Map Users

User ID: _____

You indicated in the initial survey that you most frequently use _____'s on-line map service.

1. Why do you usually use this on-line map service? (*select any that apply*)

- Easy to use
- Functionality I need
- Look of site
- Convenience
- Other:

Mileage info (#2)

Travel time (#2)

2. What do you like about on-line maps?

Ability to zoom in/out (x2) (#2) (#5)

Convenience (#6)

Driving directions (x2) (#6) (#4)

Estimate time (x2) (#6) (#4)

Estimate distance (#4)

3. Is there anything you dislike about on-line maps?

Inability to map alternate routes (#2)

Lack of number of lanes of road displayed (#6)

They don't always pick the best route (#4)

4. What are the 1-2 main reasons you use on-line maps for?

Find an address (x2) (#2) (#5)

Driving directions (x3) (#2) (#4) (#5)

Ease of use (#6)

5. What do you expect from an on-line map service?

Directions that are clear and easy to follow (#2)

Directions to replace printed maps (x2) (#6) (#5)

Accuracy (#4)

Ease of use (#4)

Knowledge of nearby services (#5)

Appendix D

Pre-Study Survey: Paper Map Users

User ID: _____

You indicated in the initial survey that you do not frequently use on-line maps.

1. Have you ever tried an on-line map service?

Yes

No

If no, why not? (select any that apply)

Haven't gotten around to it

Difficult to use

Don't like the internet

Paper maps provide everything I need

Paper maps are easier

Paper maps take less time

I don't use maps

Other:

3. What do you like about paper maps?

4. What are the 2 or 3 most common reasons why you typically use a map?

Basic Directions (#1)

5. What do you expect from an on-line map service?

Appendix E

Post-Interaction Survey - Google

User ID: _____

Overall Experience

1. What was your overall **level of satisfaction** with your experience in using this map service?

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
		x2	x3	x1

2. Please rank your **agreement or disagreement** with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. Overall I found this map service easy to use		x1	x2	x1	x2
b. The terminology was easy to understand		x2		x2	x2
c. This map service was too complicated	x2	X2	x1	x1	
d. I found this map service easy to learn	x1	x1		x3	x1
e. I was able to complete my tasks in a timely fashion		x1		x4	x1

3. Was this map service more difficult to use than **expected**?

[] Yes (x3) [] No (x3)

If yes, can you explain?

Lack of labels hurt the experience. (#6)

Providing a tutorial would be nice (#6)

It was difficult o find where to start – once started, it got easier. (#2)

4. Please rate how **easy or difficult** was it to accomplish the following tasks:

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Get directions for the picnic				x3	x3
b. Find the pizza shop		x1	x1		x4
c. Plan the road trip		x2		x3	x1
d. Find your property			x1	x2	x3

Usage

5. All the functionality I **expected** from an on-line map service was available.

Yes (x5) No (x1)

If no, can you explain?

I was not able to do a couple of functions due to lack of labels (#6)

6. Please rate how **easy or difficult** it was to use the following functions (those that were used):

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Enter a location			x2	x1	x3
b. Enter a business		x2	x1	x1	x2
c. Enter a starting point for direction			x2	x3	x1
d. Enter an ending point for directions			x1	x4	x1
e. Find locations				x5	x1
f. View businesses		x1	x1	x2	x2
g. Get directions				x5	x1
h. Panning the map	x1		x2		x3
i. Zooming the map	x1	x1	x2		x2
j. E-mail		x1	x1	x2	x2
k. Print			x1	x2	x3

7. Can you mention anything you particularly liked or disliked about the functionality of this map service:

I liked the satellite function, it is nice to view a location from above. (#4)

The directions were easy to find and view. (#4)

Need Labels (#6)

Providing links to what people would like to do next would have been great. (#6)

Panning (#5)

Results

8. The results met my **expectations**.

Yes (x5) No (x1)

If no, can you explain?

9. How **easy or difficult** was it to:

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Read the map				x4	x2
b. Understand the travel directions				x3	x3
c. Read information about your found businesses?			x1	x3	x2

10. Are there any changes you would recommend to make the results more useful or easier to understand?

Make the To & From Directions link larger and easier to find (#4)

Make overlapping highlighted businesses on map easier to click on. (#1)

The pop-up maps need to be bigger, not useful at current size. (#6)

Make business matches more relevant (#5)

Visual Display

11. Please rank your **agreement or disagreement** with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. The map service was visually appealing		x1	x1	x2	x2
b. It was easy to find the functions you needed		x3	x1	x1	x1
c. There was too much information displayed on the page	x2	x2	x2		
d. The map service was well organized		x2	x1	x2	x1
e. The design of the map service interfered with the information presented	x1	x3	x2		
f. The look of Google Maps reminded me of Google Search			x2	x2	x2

12. The graphic display of the web site met my **expectations**.

Yes (x4) No (x2)

If no, can you explain?

The zooming scale: lack of color hinders my ability to zoom (#6)

Lack of center button hurts. (#6)

The beginning page with the U.S. map was intimidating and confusing (#2)

13. Can you mention anything you particularly liked about the design of this map service:

The simplicity (#4)

Navigating maps and satellite photos were very interesting. (#3)

The Satellite (#2)

Zoom / pan (#2)

14. Can you mention anything you particularly disliked or would change in the design of this map service:

The U.S. map (#2)

Make where to start clearer. (#2)

Improve the zoom function with cues (#5)

Overall

15. Is there anything else in you would change about this map service?:

Allow the user to choose the freeway or specific streets they would like to travel on (#4)

Add more functionality like weather report. (#6)

Add traffic info. (#3)

Appendix F

Post-Interaction Survey - MapQuest

User ID: _____

Overall Experience

1. What was your overall **level of satisfaction** with your experience in using this map service?

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
x1	x1	x1	x1	x1

2. Please rank your **agreement or disagreement** with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. Overall I found this map service easy to use		x2	x1	x1	x2
b. The terminology was easy to understand			x1	x3	x2
c. This map service was too complicated	x2	x2	x1	x1	
d. I found this map service easy to learn			x2	x2	x2
e. I was able to complete my tasks in a timely fashion	x2		x1	x1	x2

3. Was this map service more difficult to use than **expected**?
 Yes (x3) No (x3)

4. Please rate how **easy or difficult** was it to accomplish the following tasks:

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Get directions for the picnic		x1		x2	x3
b. Find the pizza shop		x3	x1	x2	x1
c. Plan the road trip	x3	x2		x1	

Usage

5. All the functionality I **expected** from an on-line map service was available.

Yes (x5) No (x1)

6. Please rate how **easy or difficult** it was to use the following functions (those that were used):

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Enter a location				x3	x3
b. Enter a business			x1	x3	x2
c. Enter a starting point for direction		x1		x2	x3
d. Enter an ending point for directions		x2		x1	x3
e. Find locations				x5	x1
f. View businesses		x3	x1	x1	x1
g. Get directions				x4	x2
h. Panning the map	x2		x1	x3	
i. Zooming the map	x2		x1	x2	x1
j. E-mail			x1	x3	x2
k. Print			x1	x2	x3

Results

8. The results met my **expectations**.

Yes (x3) No (x3)

9. How **easy or difficult** was it to:

	Very Difficult	Difficult	Neutral	Easy	Very Easy
a. Read the map		x2		x3	x1
b. Understand the travel directions				x4	x2
c. Read information about your found businesses?			x2	x2	x2

Visual Display

11. Please rank your **agreement or disagreement** with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. The map service was visually appealing			x2	x2	x2
b. It was easy to find the functions you needed		x3		x2	x1
c. There was too much information displayed on the page	x2	x1		x2	x1
d. The map service was well organized		x2	x1	x2	x1
e. The design of the map service interfered with the information presented	x1	x2	x1	x2	

12. The graphic display of the web site met my **expectations**.

Yes (x3) No (x3)

Appendix G

Comparison Survey

User ID: _____

In the following survey, you will be asked to judge your preference between the on-line map services you used, while considering the various topics described.

1. Overall, which on-line map service do you **prefer**?

Google (x5)

MapQuest (x1)

Why?

G: I would choose MapQuest if the information were complete (#6)

G: I like Google's information, but MapQuest's interface (#6)

G: Ease of use (#3)

G: Entertainment value (#3)

G: Google provides more information and is easier to use (#4)

G: Easier to use for directions (#5)

MQ: MapQuest is more intuitive, easier to use overall (#2)

2. Which on-line map service did a better job of **helping you accomplish** the following tasks to **your satisfaction**?

	Google	MapQuest	Same
Get directions for the picnic	x3	x1	x2
Find the pizza shop	x3	x2	x1
Plan the road trip	x6		

3. In which on-line map service was it **easier** to use the following functions

	Google	MapQuest	Same
Enter a location	x4	x1	x1
Enter a business	x2		x4
Enter a starting point for driving direction	x3	x3	
Enter an ending point for driving directions	x3	x3	
Find locations	x3	x2	x1
View businesses	x3	x1	x2
Get directions	x1	x2	x3
Panning the map	x4	x2	
Zooming the map	x3	x3	
E-mail	x2	x2	x2
Print	x2		x4

4. Were any of the previous functions at a less-than-acceptable level?
(i.e. a function may have been easier on one particular map service, but it was still difficult to perform)

How to use Panning & Zooming (#1)

Finding alternate routes (#2)

5. Which map service:

	Google	MapQuest	Same
Was visually more appealing	x3	x3	
Had easier to read maps	x4		x2
Had easier to locate functions	x3	x2	x1
Was easier to use	x4	x2	
Was better organized	x3	x3	
Was easier to learn	x3	x2	x1
Had easier to understand results	x3		x3
Had results that better met my needs	x3	x1	x2
Had more accurate results	x3		x3
Had easier to understand driving directions	x1	x1	x4
Had easier to read information about businesses	x1	x1	x4
Allowed me to complete my tasks faster	x3		x3
Better met my expectations	x4		x2

6. Were any of the previous topics at a less-than-acceptable level?
(i.e. a topic may have rated better on one particular map service, but it was still poorly represented)

7. Can you describe any advantages or disadvantages to using one map service over the other?

Google did a much better job of interpreting addresses (#1)

MapQuest uses most recent locations drop downs – easier than entering again. (#4)

MapQuest is easier to learn (#2)

MapQuest remembers most recent searches (#3)

Google has satellite images (#3)

MapQuest was better for business information (#5)

8. Can you describe any additional likes or dislikes between the map service?

(Google) Displaying the navigatable map along with the directions is good (#1)

MapQuest navigation was slow and clunky (#3)

9. How **useful** are the following on-line map functions:

	Not at all Useful	Not Very Useful	Neutral	Somewhat Useful	Extremely Useful
Find locations				x2	x4
Get directions				x1	x5
View businesses				x3	x3
Panning map					x6
Zooming map					x6
Use satellite images				x4	x2
Save locations					x6
Make recent searches available				x1	x5
Pre-selected categories to locate			x1	x4	x1
E-mail			x1	x2	x3
Print					x6
View offers or advertisements related to your locations		x1	x4	x1	

10. Are there any additional functions or features you would like to see in on-line maps that you are presently unaware of?

Be able to choose the freeway or streets (#4)

Add Weather (#6)

Add traffic conditions (#3)

Point and click directions (#3)

11. In the future which on-line map service would you most likely use?

Google (x4)

MapQuest (x1)

Neither (x1)

Appendix H

Study Protocol

User ID: _____

Map Service: _____

Map Service Home Page

Task	Notes/Answer
<p>You are at home and need to get directions for a picnic you've been invited to. Open up Internet Explorer. To get started go to MapQuest/Google home page. (http://www.mapquest.com) (http://maps.google.com/)</p>	
<p><i>Q: Do you think this page is aesthetically pleasing?</i></p>	<p>Google: Yes: (x3) #1 #3 #4 No: (x3) #2 #5 #6 "Has Stripped down feeling" (#6)</p> <p>MapQuest: Yes: (x6) No: (x0)</p>
<p><i>Q: Does it appear well organized?</i></p>	<p>Google: Yes: (x3) #1 #3 #4 No: (x3) #2 #5 #6 "Would be nice to have the 'get directions' easy to type in first thing" (#4) "It's Google Organized, but no" (#5) "Where do I put the city, state, etc..." (#6)</p> <p>MapQuest: Yes: (x6) No: (x0) "It is all where I would expect it to be" (#3) "Get rid of the commercial" (#4)</p>

<p><i>Q: What actions do you think you can perform from this page?</i></p>	<p>Google: Find a location on map (x3) Get Directions (x6) Find a business (x4) Print a map (x1) Email (x1) Put on telephone (x1)</p> <p>MapQuest: Find a location on map (x5) Get Directions (x6) Find a business (x2) Find phone numbers (x2) Arrange Travel (x1)</p>
<p><i>Q. What, if anything, confuses you on this page?</i></p>	<p>Google: “I don’t know what these are, they are in the way” (while pointing to zoom & pan tools) #1 “Why are we looking at ALL of the US?” (x2) #2 #4 “Where to put stuff, Yahoo has boxes to put the city and state in” #6 Nothing (x2) #3 #5</p> <p>MapQuest: “The zoom is much better [than google]” #6</p>

Scenario 1 - Picnic

Part I

Task	Notes
<p>You've been invited to a picnic! You and Joe are carpooling and have decided to meet at your house. Joe doesn't know how to get to your house from his or back. You'll need to look up the directions to and from your house and send them to Joe.</p> <p>Information: Your home address: 730 E. Evelyn Ave, Sunnyvale, CA Joe's home address: 300 E. Tasman, 95134 Joe's email: joeyboy@email.com</p> <p>Focus Pts: - Not specifying DR. in Tasman will pop-up the E or W option in Google - How easy and visually intuitive is it for users to get return directions? - Google requires a client side email client</p>	<p>General Navigation Path (For this task there was no deviation from this path. For those users who only emailed one set of directions the stopping point was #5.)</p> <ol style="list-style-type: none"> 1. Clicked "Get Directions" 2. Typed starting address 3. Typed ending address 4. Clicked on "Search" or hit enter 5. Clicked on "Email" 6. Entered email information and sent 7. Clicked on "Reverse Directions" 8. Clicked on "Email" 9. Entered email information and sent
<p>Task I: Directions to your house</p> <p><i>1. Does user find one location and then get directions to/from it or use the directions function?</i></p> <p>Google: Clicks "Get directions" (x6)</p> <p>MapQuest: Directions function (x6)</p> <p><i>2. Does user have issues when choosing the correct Tasman address presented to them?</i> <i>3. What does the user look at on the page?</i> <i>4. Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: 1x – getting started on where to enter the addresses for directions</p> <p>MapQuest: Was the user successful? Yes(x6) No # of frustrations: 3x - entering address in incorrect boxes, resulting error messages</p>

<p>Task II: Get reverse directions</p> <p><i>1. Does user use the reverse directions function or do they re-enter the addresses?</i></p> <p>Google: Reverse Directions Function (x5)</p> <p>MapQuest: Reverse Directions Function (x4)</p> <p><i>2. What is the users first step for this?</i></p> <p>Google: Clicks "Reverse Directions" (x4) clicks arrow control (x1)</p> <p>MapQuest: Clicks "Reverse Route" (x4)</p> <p><i>3. Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: 2x – finding reverse directions</p> <p>MapQuest: Was the user successful? Yes(x4) No(x2) # of frustrations: 2x - getting reverse directions</p>
<p>Task III: Email the directions to Joe</p> <p><i>1. Does user email the directions using the email link or by getting the link and using their email (Yahoo, Google, etc)?</i></p> <p>Google: Using email link (x5)</p> <p>"This is the lame way to do email" (referring to use of separate email client) (#5)</p> <p>MapQuest: Using email link (x4)</p> <p><i>2. Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: x1 – opening an email client to email</p> <p>MapQuest: Was the user successful? Yes(x4) No(x2) # of frustrations: None</p>

Part II

Task	Notes
<p>You'll also need to get directions from your house to the picnic at San Jose University (1 Washington Square, San Jose, ca) to take in the car with you. You need to make sure you know about how long it will take as well so that you can tell Joe when he needs to be at your house.</p> <p>Focus pts: - MQ saves past searches, Google does not</p>	<p>General Navigation Path:</p> <ol style="list-style-type: none"> 1. Clicked "Get Directions" 2. Typed starting address 3. Typed ending address 4. Clicked on "Search" 5. Clicked on "Print" <p>OR</p> <ol style="list-style-type: none"> 1. Clicked "Reverse Directions" 2. Entered ending address 3. Clicked on "Search" 4. Clicked on "Print"
<p>Task I: Get directions</p> <p>1. <i>Does the user use the same method?</i></p> <p>Google: Typed both addresses (x3) Enters new destination only (x3)</p> <p>MapQuest: Types both addresses (x3) Uses "Revise" (x2) Selected start point from menu (x1)</p> <p>2. <i>Where does the user start this task in relation to the last task of part I?</i></p> <p>3. <i>Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x6) No # of frustrations: 3x – was difficult to find One Washington square</p> <p>MapQuest: Was the user successful? Yes(x5) No(x1) # of frustrations: 3x - as encountering error messages, trying to get information in correct boxes 1x - general error messages</p>
<p>Task II: Find out how long it will take</p> <p>1. <i>Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: 2x – couldn't find it</p> <p>MapQuest: Was the user successful? Yes(x5) No(x1) # of frustrations: None</p>
<p>Task III: Print the directions</p> <p>1. <i>Does the user use the browser function to print?</i></p> <p>Google: Yes(x6) No</p> <p>MapQuest: Yes(x6) No</p> <p>2. <i>Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x6) No # of frustrations: None</p> <p>MapQuest: Was the user successful? Yes(x5) No(x1) # of frustrations: None</p>

Scenario 1 - Overall

Task	Notes/Answer																		
<p><i>Q. What, if anything, confused you about these tasks?</i></p>	<p>Google: “Can’t find the time” (#1) “How to get the directions, how to start off” (#2) “I thought there might be separate boxes for street address, city, state, zip code, etc...” (#3) “The only difficult part was finding the ‘Get Directions’ at the very beginning” (#4)</p> <p>MapQuest: “ Too many messages about "correcting" address - it doesn't interpret addresses very well” (#1) “Reverse route is a great idea. I noticed they had an ‘Avoid Highways’ link. I like that idea as well” (#3) “Multiple addresses looks like an error” (#5) “Can’t locate 1 washington square” (#6)</p>																		
<p><i>Q. Do you have any questions?</i></p>	<p>Google: “What does “Link to Page’ do?” (#6)</p> <p>MapQuest: None</p>																		
<p><i>Q. Do you have any comments?</i></p>	<p>Google: “I like it’s simplicity” (#4)</p> <p>MapQuest: None</p>																		
<p><i>Q. Overall, how satisfied are you with this map service in performing these tasks?</i></p>	<table border="0"> <thead> <tr> <th colspan="3" data-bbox="812 1398 1024 1430">Very Unsatisfied</th> <th colspan="3" data-bbox="1192 1398 1370 1430">Very Satisfied</th> </tr> </thead> <tbody> <tr> <td data-bbox="812 1436 836 1467">G:</td> <td data-bbox="844 1436 868 1467">1</td> <td data-bbox="876 1436 901 1467">2</td> <td data-bbox="909 1436 998 1467">3(x1)</td> <td data-bbox="1006 1436 1096 1467">4(x2)</td> <td data-bbox="1112 1436 1201 1467">5(x3)</td> </tr> <tr> <td data-bbox="812 1474 836 1505">MQ:</td> <td data-bbox="844 1474 933 1505">1(x1)</td> <td data-bbox="950 1474 974 1505">2</td> <td data-bbox="998 1474 1023 1505">3</td> <td data-bbox="1039 1474 1128 1505">4 (x2)</td> <td data-bbox="1144 1474 1234 1505">5(x3)</td> </tr> </tbody> </table>	Very Unsatisfied			Very Satisfied			G:	1	2	3(x1)	4(x2)	5(x3)	MQ:	1(x1)	2	3	4 (x2)	5(x3)
Very Unsatisfied			Very Satisfied																
G:	1	2	3(x1)	4(x2)	5(x3)														
MQ:	1(x1)	2	3	4 (x2)	5(x3)														
<p><i>Q. Overall how easy was it to get the requested directions?</i></p>	<table border="0"> <thead> <tr> <th colspan="3" data-bbox="812 1524 982 1556">Very Difficult</th> <th colspan="3" data-bbox="1235 1524 1370 1556">Very Easy</th> </tr> </thead> <tbody> <tr> <td data-bbox="812 1562 836 1593">G:</td> <td data-bbox="844 1562 868 1593">1</td> <td data-bbox="876 1562 901 1593">2</td> <td data-bbox="909 1562 933 1593">3</td> <td data-bbox="958 1562 1047 1593">4(x5)</td> <td data-bbox="1063 1562 1153 1593">5(x1)</td> </tr> <tr> <td data-bbox="812 1600 836 1631">MQ:</td> <td data-bbox="844 1600 933 1631">1(x1)</td> <td data-bbox="950 1600 974 1631">2</td> <td data-bbox="998 1600 1023 1631">3</td> <td data-bbox="1039 1600 1128 1631">4(x2)</td> <td data-bbox="1144 1600 1234 1631">5(x3)</td> </tr> </tbody> </table>	Very Difficult			Very Easy			G:	1	2	3	4(x5)	5(x1)	MQ:	1(x1)	2	3	4(x2)	5(x3)
Very Difficult			Very Easy																
G:	1	2	3	4(x5)	5(x1)														
MQ:	1(x1)	2	3	4(x2)	5(x3)														

<p><i>Q. Did you notice that you could view the details of each step of the directions?</i></p>	<p>Google: Yes No (x6) Have the user look at it and get their feedback. “Does not seem helpful. It’s too close.” (#2) “Very useful for strange intersections but I can’t see the street names” (#3) “Neat concept. It’s nice that it points it out on the map and shows the close-up. It’s almost too close though” (#4) “Cool, if needed but there’s not enough context. Too much detail” (#5) “Yes it's neat. It’s too zoomed to be useful”(#6)</p> <p>MapQuest: Yes(x2) No(x2) “Not really that useful” (x2 #5 #6) “I liked that it told me to take a slight left not just left.” (#3) “It’s nice, it zooms in and gives you a clear picture” (#4) “I don't think it should be called map”(#5)</p>
<p><i>Q. Did you get the results you expected?</i></p>	<p>Google: Yes(x6) No What may be lacking?</p> <p>MapQuest: Yes(x4) No(x1) What may be lacking?</p>

Scenario 2 - Find the Pizza

Task	Notes
<p>You just got off the phone with Joe. You've decided to study for your PSYC 135 midterm after the picnic and you need to find a nearby coffee shop. You're going to study until 7:30, after which you'll need to grab a bite to eat as well. You know Joe prefers pizza.</p> <p>Focus Pts:</p> <ul style="list-style-type: none"> - Users can't find something near San Jose State University - Categories are not evident to the user <p><i>1. Does user search using the address or the university as a reference pt?</i></p> <p>Google: Using find Business Link (x5) Tried to use SJSU as reference pt (x1)</p> <p>MapQuest: Using "Find It" link (x3) Tried to use SJSU as reference pt (x3)</p> <p><i>2. What does the user look at in the search results?</i></p> <p><i>3. Where does the user hesitate?</i></p>	<p>General Navigation Path: (No deviation unless they couldn't complete the task.)</p> <ol style="list-style-type: none"> 1. Clicked "Find Businesses" 2. Types in business (coffee/pizza) 3. Clicked "Search" 4. Clicked on the marker on the Map 5. Clicked "To here" 6. Clicked "Get Directions" 7. Clicked "Find Businesses" 8. Typed in business 9. Clicked "Search" 10. Clicked on the first business listed 11. Clicked "To here" 12. Clicked "Get Directions" <p>Google: Was the user successful? Yes(x4) No(x2) # of frustrations: 10x</p> <p>MapQuest: Was the user successful? Yes(x4) No(x2) # of frustrations: 11x</p>

Scenario 2 - Overall

Task	Notes/Answer
<p><i>Q. What, if anything, confused you about this task?</i></p>	<p>Google: "I thought 'Search the map' was a label"</p> <p>MapQuest: "Everything" (#1) "Why do I have to put that in again?" (In reference to finding a coffee shop near SJSU, after finding one and clicking "Directions to" he had to re-enter the starting address). (#3) It showed the wrong address...couldn't find 1 Washington Square. (#3) "I wasn't sure if I had the right address." (#3) "I confused the ad for the feature" (#5) "Oh, I didn't even see those things (markers on the map)." (#3)</p>
<p><i>Q. Do you have any questions?</i></p>	
<p><i>Q. Do you have any comments?</i></p>	<p>Google: "Didn't like how I had to re-enter my address" (x2 #2 #3) "I liked how I didn't have to fill in my address when getting directions after clicking on a business in the results." (#2) "Did not click on letters (markers) on the map until prompted to. Had a hard time clicking as the markers were overlapping." (#1) "It's weird that it gave me a coffee shop far away from my search reference point and that it's listed as number one, the closest one." (x2 #3 #5)</p> <p>MapQuest: "I give up!" (x2 #1 #5) "I didn't like having to reinput starting address after finding business to get directions to." (#3) "[It should] Automatically fill in the location of to or from if your looking for a place." (#4) "It doesn't show you too well where your starting place is when it brings up all the locations." (#4)</p>

<p><i>Q. Overall, how satisfied are you with this map service in performing this task?</i></p>	<p>Very Unsatisfied Very Satisfied</p> <p>G: 1(x1) 2 3(x1) 4(x2) 5(x2)</p> <p>MQ: 1 2(x1) 3(x2) 4(x1) 5(x2)</p>
<p><i>Q. Overall how easy was it for you to find a pizza place nearby?</i></p>	<p>Very Difficult Very Easy</p> <p>G: 1(x1) 2 3 4(x2) 5(x3)</p> <p>MQ: 1 2(x2) 3(x1) 4(x1) 5(x2)</p>
<p><i>Did you get the results you expected?</i></p> <p>What may be lacking?</p>	<p>Google: Yes(x5) No(x1) "Better (than MapQuest). It gave more than I expected. It gave details of the business. The time the pizza place was open and reviews" (#4)</p> <p>MapQuest: Yes(x5) No(x1) "I got better results than I expected." (#2)</p>

Scenario 3 - Road Trip

Task	Notes
<p>Your family is going on a road trip. You are starting at your house (730 E. Evelyn Ave, Sunnyvale, CA) and would like to visit Las Vegas (Nevada). You will be staying in the Luxor Resort and Casino. You must plan the route which your family will take.</p> <p>You heard on the news that they are doing construction on I-15 (within the Vegas city limits) north of Hwy 160, so you will have to find an alternate route from the intersection of I-15 and Hwy 160 to your hotel.</p>	
<p>Task 1: Find general directions</p> <p>1. <i>Does user search using the address or the Hotel as a reference pt?</i></p> <p>Google: Used "Get directions" (x6)</p> <p>MapQuest: Used "Get Directions" (x4) Using hotel as reference point (x2)</p> <p>2. <i>How does the user find the hotel?</i></p> <p>Google: Using "Find Businesses" link (x4) Searched on Google for address (x2)</p> <p>MapQuest: Using "Find It" link (x3) Using "Find Nearby" link (x1) Searched on Google for address (x2)</p> <p>3. <i>What does the user look at in the search results?</i></p> <p>4. <i>Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: 5 – trying to find the address of Luxor</p> <p>MapQuest: Was the user successful? Yes(x5) No(x1) # of frustrations: 2x - trying to find address of Luxor</p>

<p>Task 2: Find alternate route</p> <p>1. <i>What strategy does the user have?</i></p> <p>Google: <i>Look though detail of each step (x2)</i> Tried searching for intersecation using "Search the map" (x1) Pans w/ arrows & zoom (x3) Pan w/ arrows (no zoom) (x1) Pans w/ drag & zoom (x1) Double clicks to recenter map (x1)</p> <p>MapQuest: Pan & Zoom (x4)</p> <p>2. <i>Does the user have trouble zooming and panning?</i></p> <p>Google: Zooming trouble (x5) Didn't realize could pan (double click to recenter map) (x1)</p> <p>MapQuest: No(x4)</p> <p>3. <i>Where does the user hesitate?</i></p>	<p>Google: Was the user successful? Yes(x5) No(x1) # of frustrations: 8 – trying to find the intersection, got lost zooming</p> <p>MapQuest: Was the user successful? Yes(x4) No(x2) # of frustrations: 11x - labeling issues with hwy 160</p>
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Scenario 3 - Overall

Task	Notes/Answer															
<p>Q. What, if anything, confused you about this task?</p>	<p>Google: “How do I re-center?” (#1) “How do I find an intersection?” (#2) “I feel lost. I want to start over” (#4) (when it didn't match Luxor) "That was lame" (#5) “Zooming was difficult. Centering map was weird” (#6) MapQuest: "I keep loosing [hwy] 160 when I zoom in" (x2 #5 #6)</p>															
<p>Q. Do you have any questions?</p>																
<p>Q. Do you have any comments?</p>	<p>Google: “Being able to drag the map around really helped since I had to visually find the alternate directions. Dragging it around was a lot better.” (#3) “Being able to drag the map around really helped since I had to visually find the alternate directions. Dragging it around was a lot better.” (#4) "Zoom control sucks" (#5) MapQuest: "Clicking and waiting for page to reload was a hassle. I'm used to dragging it around" (#3) “Got Directions OK” (#1)</p>															
<p>Q. Overall, how satisfied are you with this map service in performing this task?</p>	<table border="0"> <thead> <tr> <th colspan="3" data-bbox="855 1251 1154 1283">Very Unsatisfied</th> <th colspan="2" data-bbox="1235 1251 1417 1283">Very Satisfied</th> </tr> </thead> <tbody> <tr> <td data-bbox="855 1287 943 1318">G: 1</td> <td data-bbox="943 1287 1057 1318">2(x2)</td> <td data-bbox="1057 1287 1154 1318">3(x1)</td> <td data-bbox="1154 1287 1235 1318">4(x1)</td> <td data-bbox="1235 1287 1349 1318">5(x2)</td> </tr> <tr> <td data-bbox="855 1323 943 1354">MQ: 1(x3)</td> <td data-bbox="943 1323 1057 1354">2(x2)</td> <td data-bbox="1057 1323 1105 1354">3</td> <td data-bbox="1154 1323 1235 1354">4(x1)</td> <td data-bbox="1235 1323 1284 1354">5</td> </tr> </tbody> </table>	Very Unsatisfied			Very Satisfied		G: 1	2(x2)	3(x1)	4(x1)	5(x2)	MQ: 1(x3)	2(x2)	3	4(x1)	5
Very Unsatisfied			Very Satisfied													
G: 1	2(x2)	3(x1)	4(x1)	5(x2)												
MQ: 1(x3)	2(x2)	3	4(x1)	5												
<p>Q. How easy was it to manipulate the map? (zoom & pan)</p>	<table border="0"> <thead> <tr> <th colspan="3" data-bbox="855 1371 1105 1402">Very Difficult</th> <th colspan="2" data-bbox="1268 1371 1417 1402">Very Easy</th> </tr> </thead> <tbody> <tr> <td data-bbox="855 1407 943 1438">G: 1(x1)</td> <td data-bbox="943 1407 1057 1438">2(x1)</td> <td data-bbox="1057 1407 1154 1438">3(x1)</td> <td data-bbox="1154 1407 1235 1438">4(x1)</td> <td data-bbox="1235 1407 1349 1438">5(x2)</td> </tr> <tr> <td data-bbox="855 1442 943 1474">MQ: 1(x2)</td> <td data-bbox="943 1442 1057 1474">2(x2)</td> <td data-bbox="1057 1442 1105 1474">3</td> <td data-bbox="1154 1442 1203 1474">4</td> <td data-bbox="1235 1442 1349 1474">5(x1)</td> </tr> </tbody> </table>	Very Difficult			Very Easy		G: 1(x1)	2(x1)	3(x1)	4(x1)	5(x2)	MQ: 1(x2)	2(x2)	3	4	5(x1)
Very Difficult			Very Easy													
G: 1(x1)	2(x1)	3(x1)	4(x1)	5(x2)												
MQ: 1(x2)	2(x2)	3	4	5(x1)												
<p>Q. Did you get the results you expected?</p> <p>What may be lacking?</p>	<p>Google: Yes(x5) No(x1) MapQuest: Yes(x2) No(x4)</p>															

Scenario 4 - Property (Google Only)

Task	Notes
You are thinking of buying a property in Union City, Indiana. You want to make sure the property (907 N Plum St) is worth looking at before you fly all the way to Indiana. In particular, you are interested to know how crowded the neighborhood is and whether there are a lot of trees in the area.	
Task: Look at location in satellite/hybrid view (google only) 1. Does user get disoriented in satellite mode? 2. Does the user pan/zoom more in satellite mode? 3. Where does the user hesitate?	Google: Was the user successful? Yes (x6) No # of frustrations: None

Scenario 4 - Overall

Task	Notes/Answer				
Q. What, if anything, confused you about this task?	Google: "Marker Placement" (didn't match building it was pointing to) (#6)				
Q. Do you have any questions?					
Q. Do you have any comments?	Google: "I like the satellite" (#4)				
Q. Overall, how satisfied are you with this map service in performing this task?	<table style="width: 100%; border: none;"> <tr> <td style="text-align: left;">Very Unsatisfied</td> <td style="text-align: right;">Very Satisfied</td> </tr> <tr> <td>G:1 2 3(x1)</td> <td>4(x1) 5(x3)</td> </tr> </table>	Very Unsatisfied	Very Satisfied	G:1 2 3(x1)	4(x1) 5(x3)
Very Unsatisfied	Very Satisfied				
G:1 2 3(x1)	4(x1) 5(x3)				
Q. Overall how easy was it for you to examine the property?	<table style="width: 100%; border: none;"> <tr> <td style="text-align: left;">Very Difficult</td> <td style="text-align: right;">Very Easy</td> </tr> <tr> <td>G:1 2 3</td> <td>4(x3) 5(x3)</td> </tr> </table>	Very Difficult	Very Easy	G:1 2 3	4(x3) 5(x3)
Very Difficult	Very Easy				
G:1 2 3	4(x3) 5(x3)				
Q. Did you get the results you expected?	Google: Yes (x6) No				
What may be lacking?	"Yes. Better, you can actually see the trees" (#4)				

Appendix I: Contact Info

For questions or comments please contact:

		
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