Redesign Report
Home Work 7

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Executive Summary

For this project our tasks was to design a system to help apartment hunters make sustainable choices in their apartment search. In addition, the design should support groups of users looking for shared housing together. Our team consists of three members, all of which have backgrounds in Computer Science. Additionally, individual members have backgrounds in Psychology and Media Studies and our team has a combined 20 years of experience creating web sites. In completing this task, we employed multiple usability methods to give us a broad prospective for thinking about the design issues. However, the method that had the greatest impact on our project was Contextual Inquiry.

During our Contextual Inquiry we observed a user while he searched for apartments in the San Francisco area. Observing this user's work process gave us great insight into the issues encountered while searching for an apartment. Many of these issues arose from the fact that our user had to employ several different web services to achieve his task. Therefore, we sought to simplify the user's work process by integrating these various sites into a single integrated system.

From this central design idea we developed four goals for our system:

- **Improved Navigation**: Due to the need to interact with so many different web sites, we observed navigational issues moving between browser tabs or windows. Our user also occasionally forgot the address of a site and had to ask a friend or search through email for a link. Our redesign eliminates these issues by bringing the various sites together into a single system.

- **Information Transfer**: When moving between sites, we observed that our user had to reenter information from one site into another. This was occasionally a source of breakdowns and was often inefficient. By bringing multiple sites together our system can reduce the need for the user to reenter information and allow them to focus on the task of apartment hunting.

- **Organization**: We observed that our user employed a Wiki as a repository for organizing information gathered during the apartment search. However, the effort required to add information to the Wiki limited its usage. Bringing together the various sites into a single system gave us the opportunity to automate many of the tasks that went into creating the Wiki. This will hopefully allow users to create richer, more organized information.

- **Communication**: Since we were interested in how groups of people looked for apartments, it was important to support communication between prospective roommates. Therefore, we tried to make it easier for users to send updates on work that they had done while searching for apartments.

By supporting these four design goals, we believe that our new system preserves the usefulness of the web sites utilized during the apartment search while streamlining the work flow. This will provide a platform from which we can encourage sustainable choices in housing by highlighting apartments that provide shorter commutes and easier access to mass transit.

Redesign

Problem

The central issue with user's current work process is the lack of a comprehensive and integrated system for searching for apartments. While there are many sites that contribute useful information to the apartment search, our Contextual Inquiry reveals that none of these sites provide users with all the information they need. We observed our user going to a Wiki to check for updates from his roommates, going to Craigslist to look at new apartment listings, going to Google maps to find out about the location of apartments, going to Walk Score to find out about nearby entertainment and visiting 511.org for bus route information.

While the user was able to accomplish his task, he did so in a suboptimal way. At times the user had to flip through several browser tabs/windows before finding the desired web page. In other instances, the user forgot the name and URL of at least one web service and had to ask a friend for it. We also observed that the user had to re-launch pages he had been to previously. This abundance of pages often caused the user to go back and forth between pages to complete a task.

In addition to these navigational issues, there were also issues with transferring information between sites. The user would have to retype the address of an apartment into Walk Score to find out about bars and restaurants in the area, a process that was time consuming and error prone. To further exacerbate this issue, users also had to spend time reentering information from Craigslist into his Wiki in order to share it with his prospective roommates. During the Contextual Inquiries, the user indicated that originally they had put much more effort into organizing this Wiki information, but reduced the energy that they put into it because it was too time consuming. This suggests that a system that would reduce the need to transfer information between sites would be of great benefit to the user's work process.

The organization of potential apartment listings was an important part of our user's work and the Wiki that stored this information was the major artifact that we studied during our Contextual Inquiry. The Wiki also served as a means of communication since it was a central place for all of the roommates to record information that they had gathered. However, because the Wiki was not integrated into the sites used to research apartments, our user put less effort into organizing the Wiki as time went on. This presented an opportunity for us to increase the ease of organizing information in a way that would allow our user to consistently create the kind of richly detailed information that he discussed creating at the beginning of his search.

Finally, while not a major source of breakdowns, communication was central to our user's task. Because he was collaborating with his prospective roommates in the search, it was important for him to communicate about desirable apartment listings and send out reminders to continue the search effort. This presented an opportunity to assist the user and automate parts of the communication tasks when possible.

While these issues suggested the need for a single website, it would be difficult to recreate each of the various systems that our user employed during their search. Besides the technical and design challenge, it would be difficult to achieve the critical mass of a popular site like Craigslist. The solution that our team

has developed is to combine several existing web services into a single integrated site. This way the costs of navigating and transferring information between systems would be reduced, communication and information organization could be encouraged, and our user's work flow could be streamlined.

Redesign Features by Task

Searching

Since searching for apartments is at the heart of the user's task, it is also at the heart of our design. Users returning to our site are shown their saved searches (if they have any) when they open up the site. *(Fig. 1)* This is because we observed that our user began his search process by clicking on a link to a saved search in his Wiki. Thus, we simplify the process of creating and retrieving saved searches.

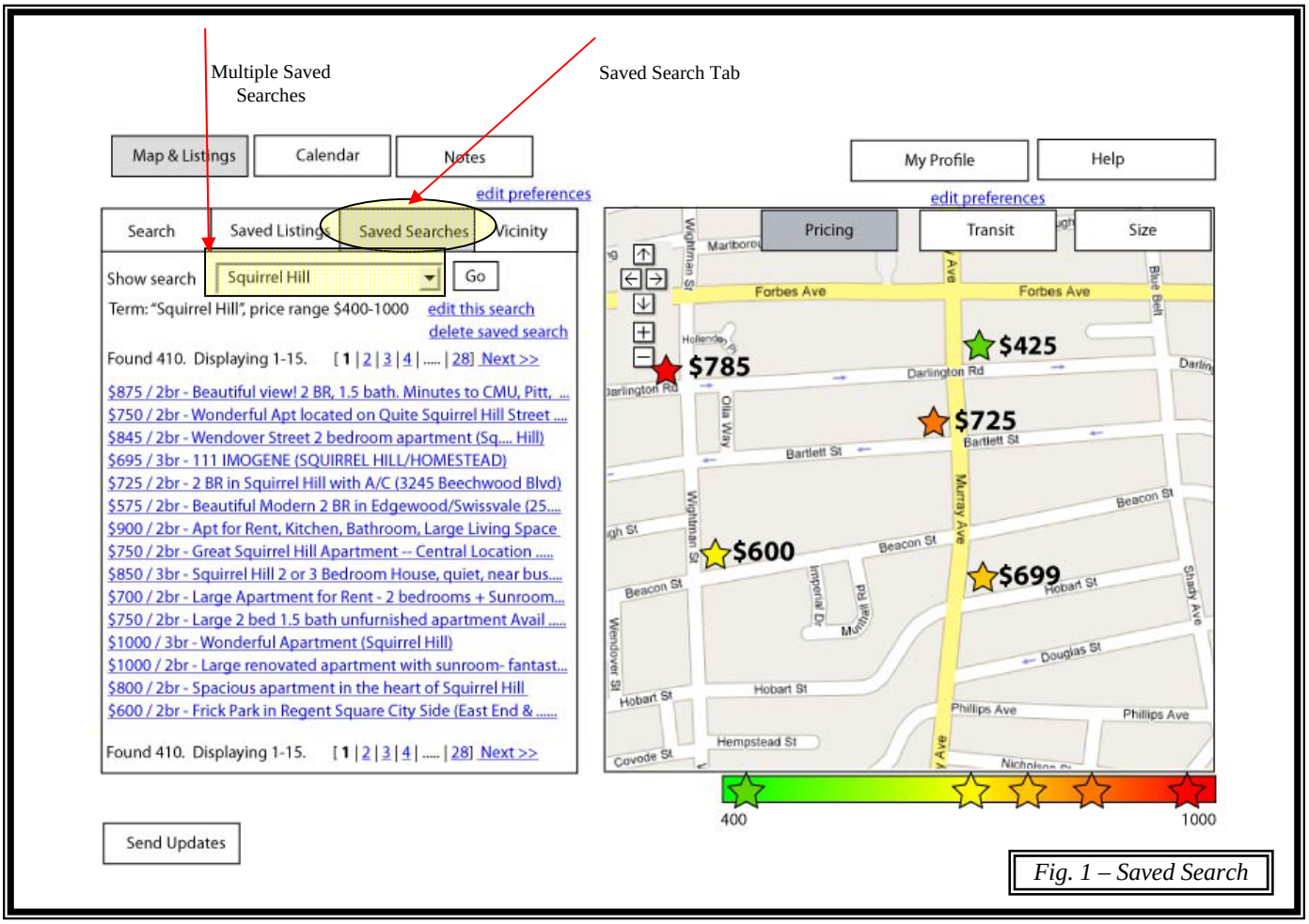


Fig. 1 – Saved Search

We also allow users to save multiple searches *(Fig. 1)* if needed. For users who are new to the site, we provide an empty search page for them to create a new search *(Fig. 2)*. This is also available for returning users.

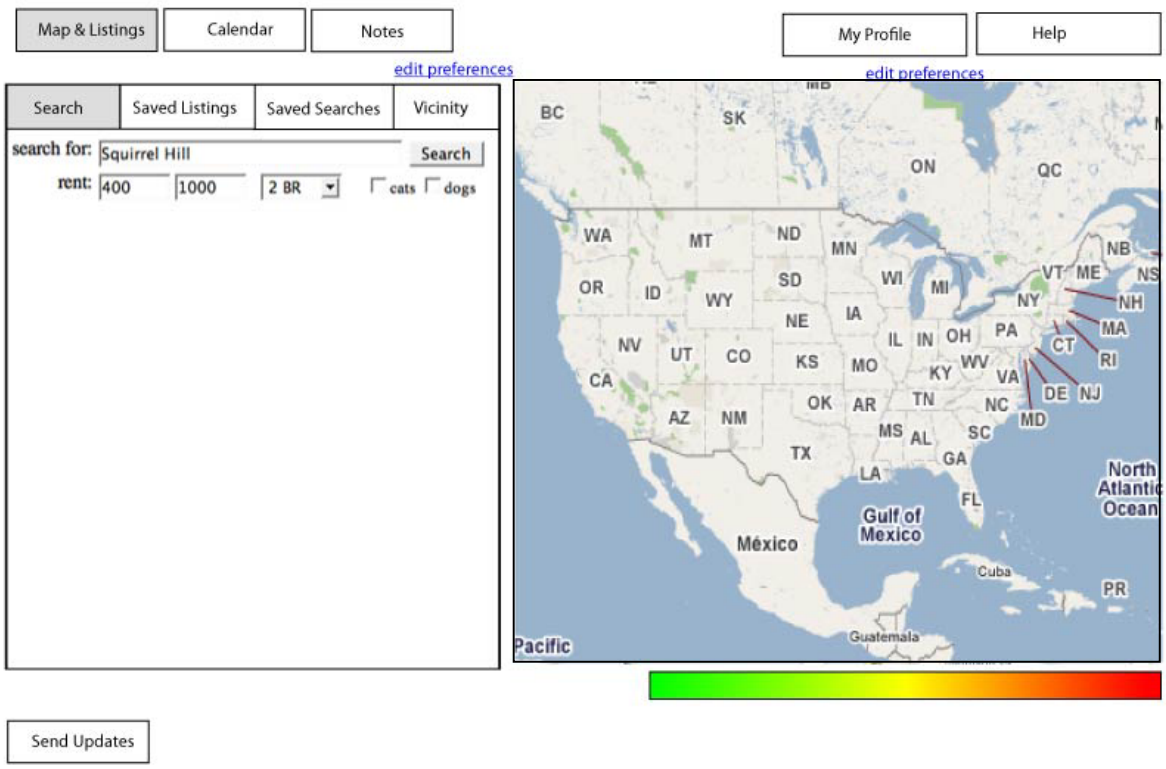


Fig. 2 – Empty Search

Once the user retrieves results, a map appears with the location and price of the apartments in the search results *(Fig. 3)*. Price and location were both important initial criteria for our user, and thus this information is presented along with the initial results.

Fig. 3 – Search Results

After viewing the search results, our user would open up interesting apartment listings in a new tab to view their details. Doing this can result in multiple tabs being opened at once, leading to clutter and difficulty in finding the desired tab. Therefore, we display the details of a listing in an overlay on top of the map. *(Fig. 4)* This avoids the need for multiple tabs and allows the user to more quickly switch from the details of one listing to another. It also supports the next step in the user's work, viewing the location of a listing on Google maps. Previously this required clicking on a link and opening yet another tab. With our redesign the user can simply look at the map in front of them to see the location of the apartment.

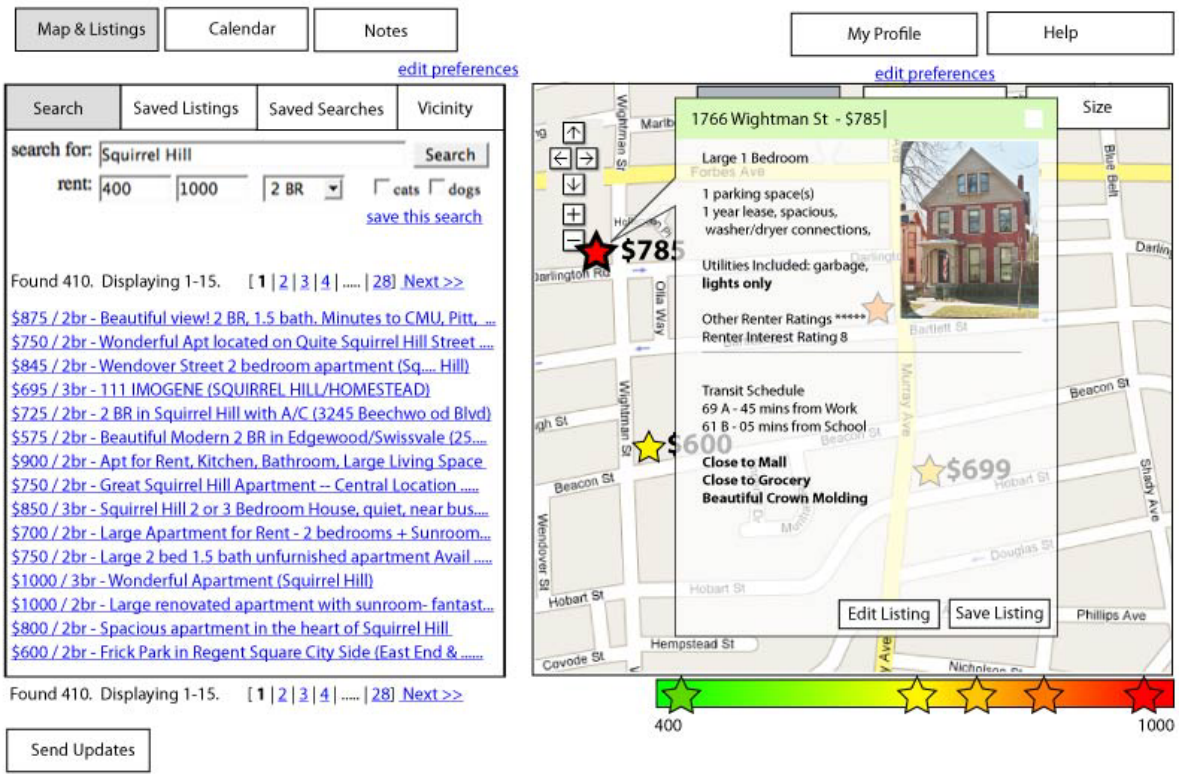


Fig. 4 – Listing Overlay

Finding Additional Information

After viewing the details of a listing to make sure that they were acceptable, our user would then look for information on transportation and get a feel for the neighborhood by looking for bars, restaurants, and other services around the apartment. This required the user to go to additional sites such as Walk Score.com or 511.org. Once there, the user often had to return to Craigslist or Google Maps to copy the apartment's address and paste it into the external site.

We streamline this by allowing users to bring up results from yelp.com (a site that provides information on business, etc for Walk Score .com) directly on the map by clicking on the "vicinity" tab in the left hand pane. *(Fig. 5).*

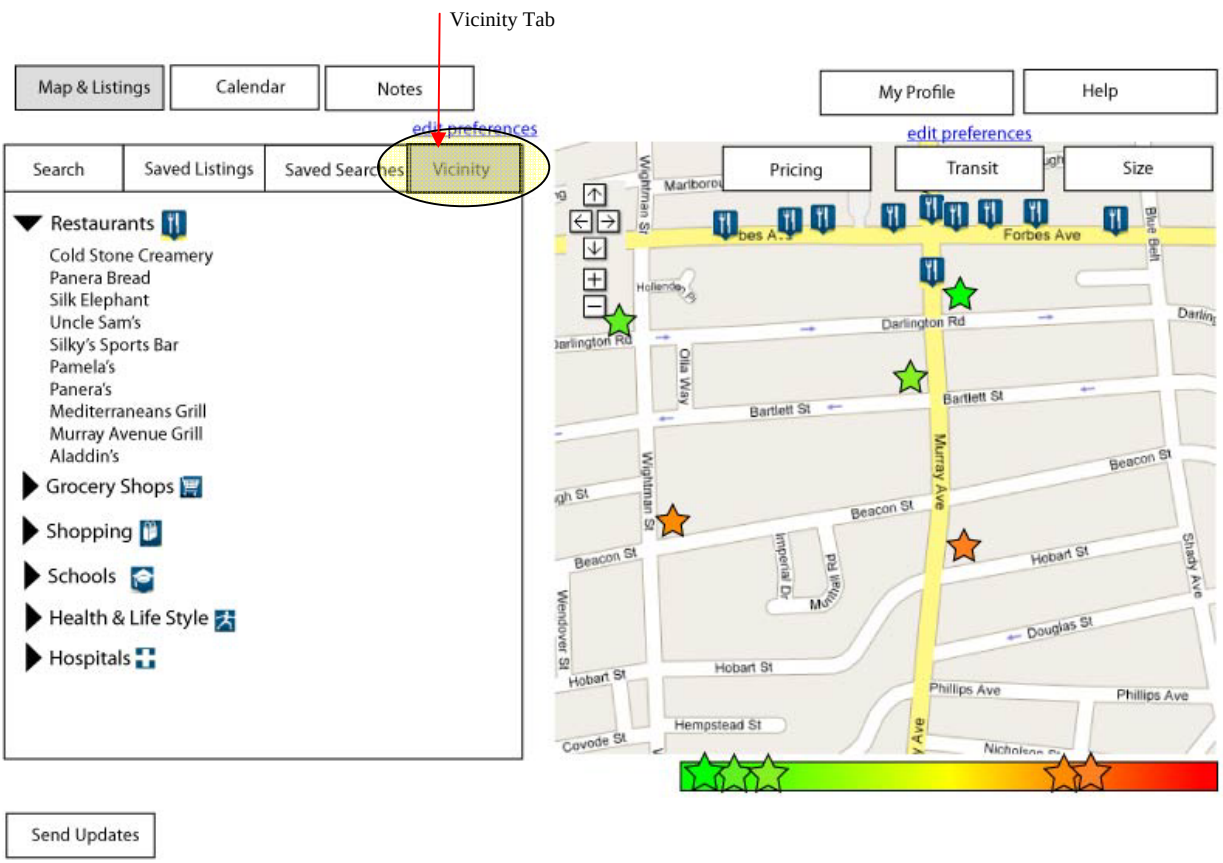


Fig. 5 – Vicinity Results

Users can also view transit information by clicking on the transit button on the map. *(Fig.6)*. this will show the user estimated transit time by bus or car to a given point of interest for the user (such as work). To avoid having to enter the address of this destination repeatedly, it is stored as part of the user's preferences and is editable by clicking the "edit preferences" link above the map.

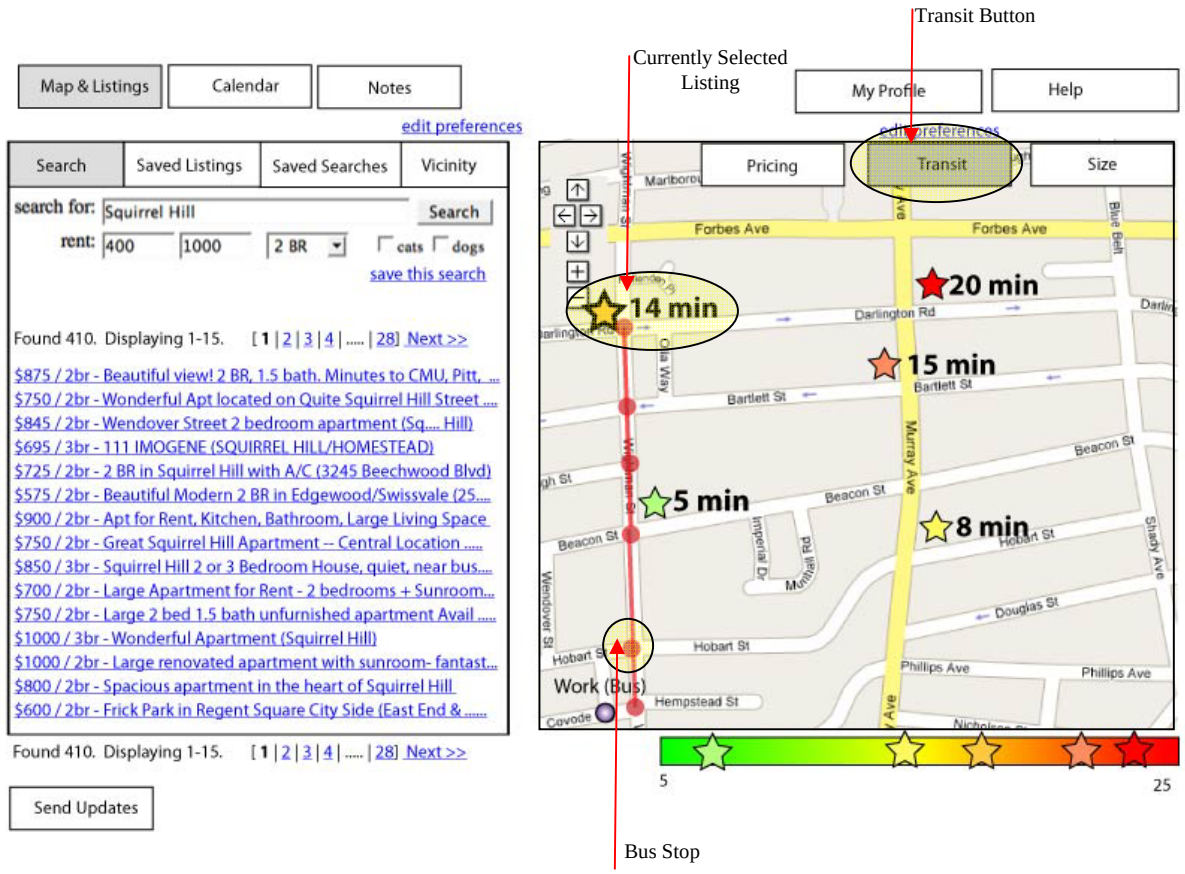


Fig. 6 – Transit Info

Organizing Information

After looking at information about transit and businesses near the apartment, the user would add the apartment to the Wiki if he liked it. Sometimes a simple link would be added. Other times the price, size, a brief description and even notes about the apartment would be included. The user mentioned that this attention to detail while useful, became too much of an effort. Therefore it seems that the user would like a richer more detailed list of apartments that he is interested in, if the effort currently required to create such a list could be reduced. To address this desire, our design has a "saved listings" tab that displays apartments the user is interested in *(Fig. 7)*.

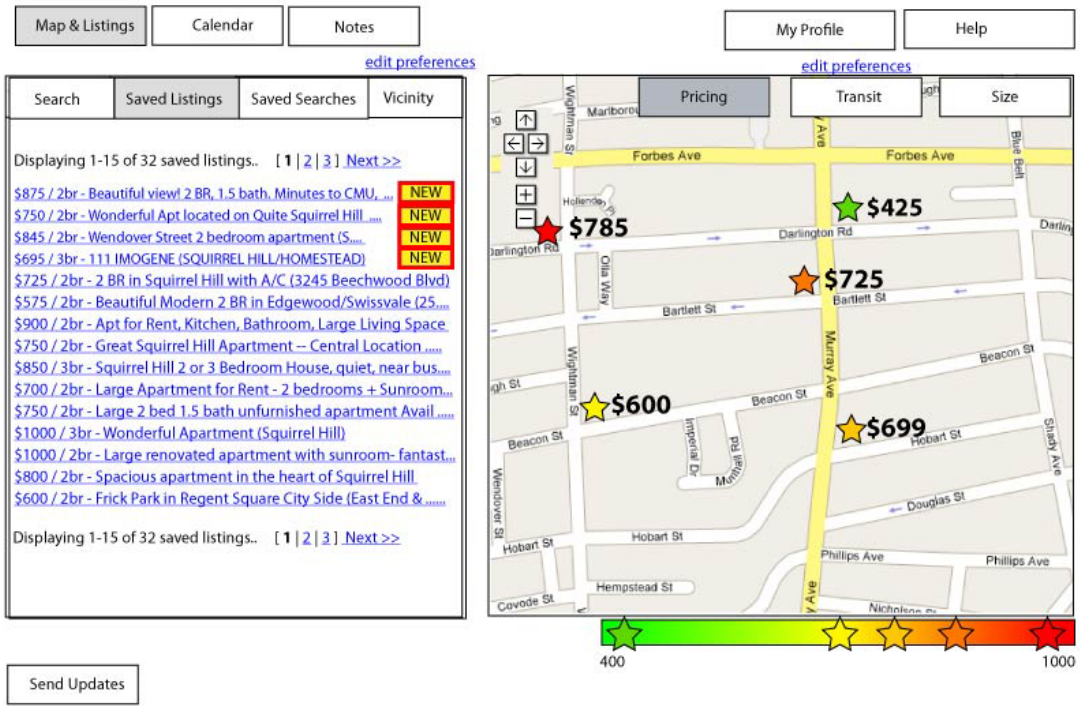


Fig. 7 – Saved Listings

This list is sorted by date since that is how the users organized their Wiki. To add an apartment to the "saved listings" the user can click on the "save listing" button at the bottom of the detailed listing overlay.

When saving a listing, the user is allowed to edit the information presented because the overlay editable. *(Fig. 8)*. This allows the user to add notes or other information about the listing. It also provides the original contents of the listing so that the user does not need to duplicate any of the information already provided.

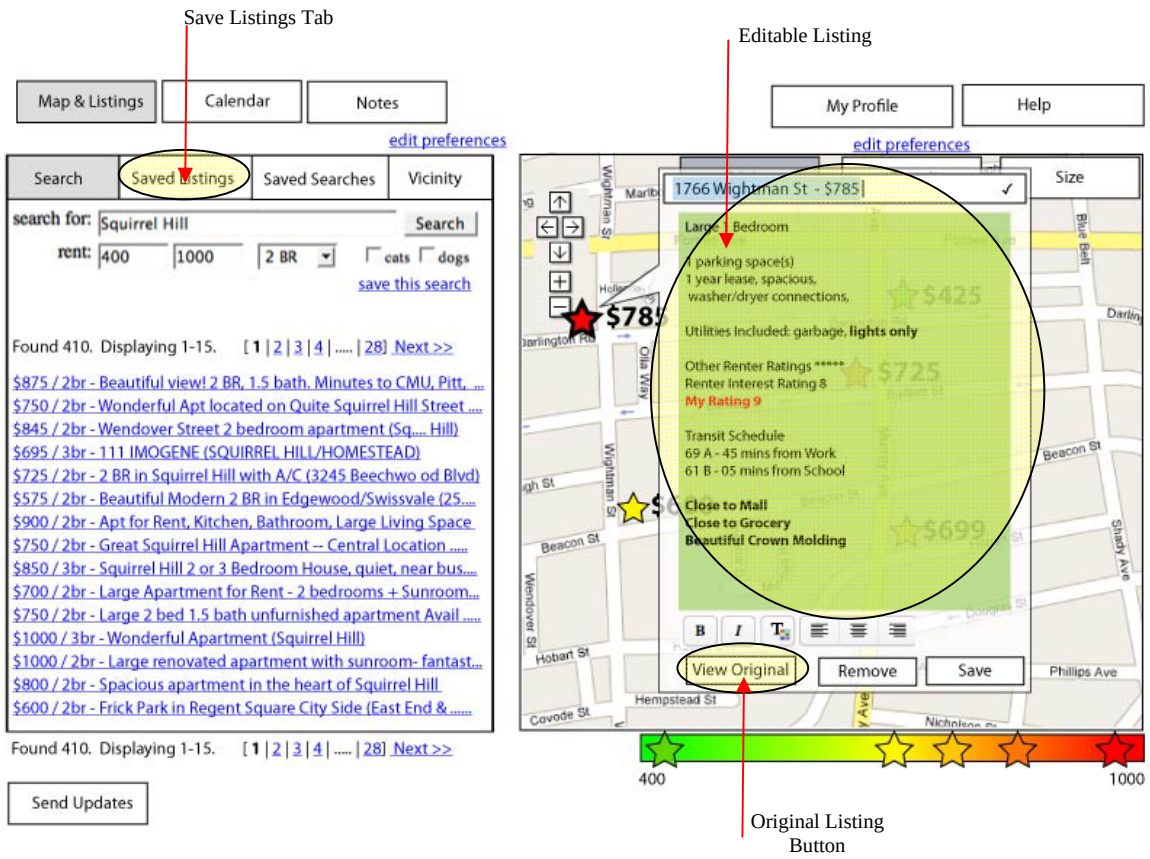


Fig. 8 – Editable Listing

In order improve convenience, this overlay also provides info specifically calculated for the user such as the transit time to locations that the user has defined in their preferences. In case the user deletes some of the listing text and later wants to read it, a button to view the original listing is also provided *(Fig. 8)*. Once saved, the annotated listing information can be accessed by clicking the link for the listing in the "saved listings" tab *(Fig. 8)*.

For information besides the listings themselves, we provide a calendar *(Fig. 9)* and a section for notes. The calendar was inspired by the schedule of open houses on the user's Wiki and allows users to plan out days of intensive apartment hunting or other rental events. In contrast, the notes page allows users to store other, more eclectic information and allows the users to access basic Wiki functionality for things like lists of needs/wants or just writing notes back and forth.

When either of these items is updated, the button is highlighted *(Fig. 9)* to indicate to the user that there is new information. This indication prevents the user from missing vital updates. Calendar and note updates are also included in the message sent out to other users as discussed below.

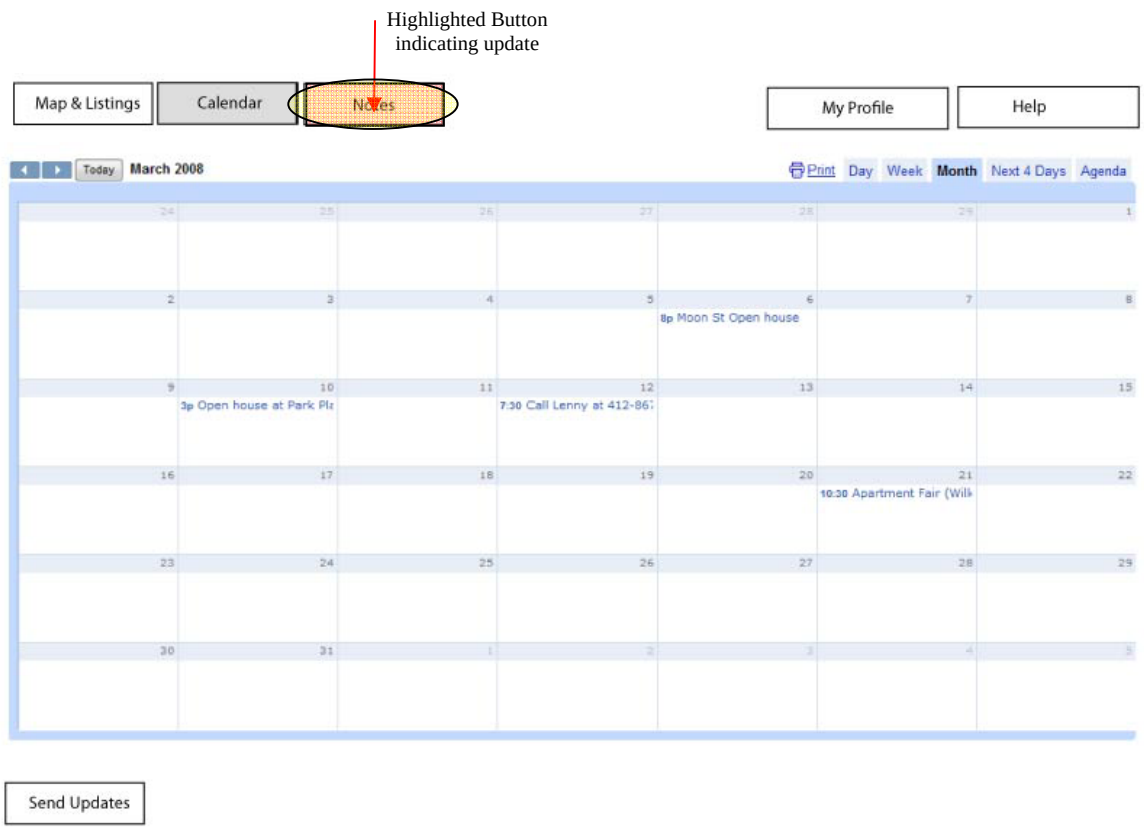


Fig. 9 – Calendar

Communication

After finding a particularly desirable listing, or just when done apartment hunting for the day, our user would send out an email to his prospective roommates. In order to facilitate this, our redesign incorporates a "send updates" button at the bottom of the page. When the user clicks this button, an overlay appears that allows users to send out a message to their prospective roommates *(Fig. 10)*. The message window text defaults to a generic message with a list of new apartments added to the saved search list, calendar entries, notes updates and apartments whose details have been edited. The user can change this text if they desire or just leave it as it is.

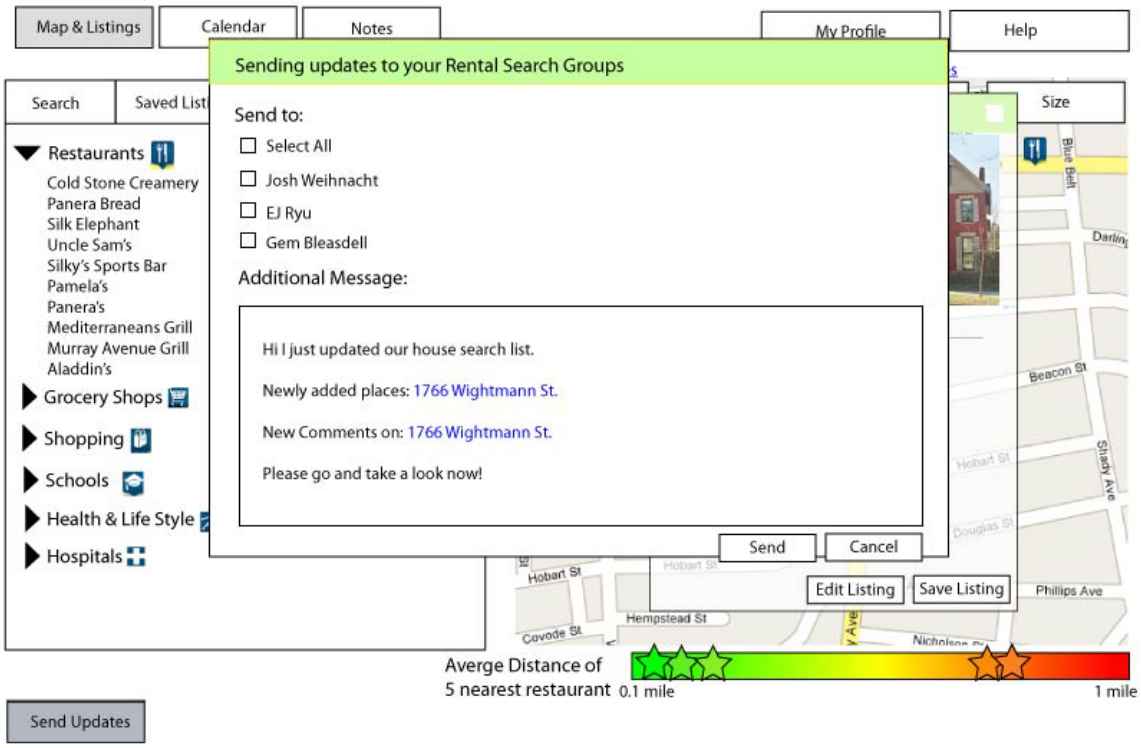


Fig. 10 – Send Updates

Redesign Validation

A major motivation for our redesign was to increase the efficiency of the user's work, thereby allowing users to do more thorough searches and have access to more detailed data. In order to demonstrate how our new design would be faster for experienced users, we did several Keystroke-Level Models on the new design as well as on the previous collection of sites.

To complete this UEM, we modeled the task of performing a search and looking at the details for 5 different listings. This task took 44.54 seconds using Craigslist. In contrast, our redesign reduced the time of this task to 35.96 seconds.

Next we modeled the task of looking up information on bus routes and restaurants near an apartment. Here we saw our most dramatic results. Previously this task took 79 seconds. In our redesign we were able to reduce this to 10 seconds, in part because the user did not need to reenter information about the apartment's location into additional sites.

Finally, we modeled the task of adding a link to the user's Wiki. This task was modeled during our previous work on Keystroke-Level Models and was found to take 59 seconds. In the redesign, adding a link to the Wiki has been replaced by saving a listing. When this task was modeled it took only 23.55 seconds. It should be noted, however, that there are some known inaccuracies with modeling this last task. The modeling results from the old task are known to be inflated, in part due to the inaccuracies with the way that CogTool models typing of longer pieces of text. In addition, the modeling of our redesign includes adding a short note about the apartment which was not a part of the task modeled for the old system. We added this step since we hoped that users would add more information about listings since the overall cost of saving listings has been reduced.

Sustainability

In addition to supporting the user's current work flow when looking for apartments, we also wanted to encourage the user to make more sustainable choices in their housing. One of the primary components of people's carbon foot-prints is the energy that they use for transportation. Our site encourages users to take mass transit by showing them bus routes and other transit routes nearby potential apartments, encouraging users to choose an apartment that is closer to public transportation. For users that prefer not to take mass transit or who live in areas where it is not feasible, the transit feature can still encourage sustainability. Users can edit their preferences to show driving routes and times instead of transit times. In this way, users will be encouraged to choose apartments that give them a shorter commute time to work. This will also mean less gas used and will therefore be better for the environment.

Since users often print out listing when they go to visit apartments, we saw an opportunity to reduce the amount of paper used during the apartment search process. Therefore, when sending out apartment updates to prospective roommates, users can choose to send this information to their mobile phones so that they do not need to print out the listings.

Conclusion

We studied users searching for new housing to discover ways to better support their needs while also encouraging them to make more sustainable choices in their housing. Our Contextual Inquiry found multiple breakdowns in the user's work flow, often centering around the user's need to switch between multiple sites to complete his task. However, we wanted to maintain many of the best aspects of the sites that our user found helpful in his search activities. Thus we have proposed a new system that combines the existing systems our user employed (Craigslist, a Wiki, transit information, yelp/Walk Score) into a single integrated system.

We feel that our design will eliminate many of the breakdowns that our user experienced and will increase the efficiency of his work. At the same time, the design will encourage the user to choice more sustainable housing by helping the user find apartments that provide a shorter commute and easier access to mass transit.

Retrospective

Contextual Inquiry (CI) and Contextual Design (CD)

Contextual Inquiry involves observing existing users perform tasks of interest in their environment and asking the user questions about what they are doing. Contextual Design then takes information generated by the Contextual Inquiry and uses it to build models to describe various aspects related to the user's work process.

Contextual Inquiry/Contextual Design is by far the most time consuming of the methods, but in return it provides the richest data. It is also the method most likely to suggest entirely new directions for what type of systems to create. This is because CI/CD looks broadly at the entire work practice of users. Other methods tend to merely point out specific usability issues with an existing system rather than teaching you about the user or the task. The analytic methods tend to focus on a specific type of issue such as usability for new users or efficiency for expert users. The issues that they find tend to relate to a specific system and are therefore less useful in suggesting an entirely new way to work. The only other empirical method we studied, Think-Aloud, gives users a task to perform. Therefore it is difficult for it to suggest an entirely new way to structure the task.

Thus, it is no surprise that the primary inspiration for our redesign came from behavior that we observed during our Contextual Inquiry. We noticed that users must switch between many different systems during their work. This switching is an opportunity for breakdowns to occur both in the action of switching itself and in the need to transfer information between the systems. Other methods either require a predefined task (Keystroke-Level Modeling, Think-Aloud, Cognitive Walkthrough) or are not concerned with tasks (Heuristic Evaluation). Its almost impossible to learn about what the task is from these methods. Because of this, CI/CD is a good initial method for a project because it can help to set the direction and provide a context within which the other methods can answer specific questions or look for areas in need of improvement.

Heuristic Evaluation (HE)

At its core Heuristic Evaluation describes the seemingly obvious practice of usability experts going through an interface and recording any issues that they find. What separates HE from an unstructured search for usability issues is a standard list of heuristics to focus evaluators thinking and the realization that different people will notice different issues. By combing the efforts of multiple evaluators a larger number of issues can be uncovered.

Heuristic Evaluation is the most general of the analytically methods. Keystroke-Level Modeling and Cognitive Walkthrough are focused on looking for specific types of issues that affect either new or expert users. Heuristic Evaluation can find a wide variety issues and does not focus on a specific class of user. Therefore it can be a useful method in many situations.

Heuristic Evaluation is primarily limited by the experience of the evaluators, the set of heuristics used and how strictly the heuristics are interpreted. An evaluator's skill in performing HE should improve over

time. However, the set of heuristics and their interpretation present serious limitations to the method. Not all issues that an analyst might discover happen to match an available heuristic. For example, none of the heuristics tend to deal with improving aspects of the interface that are workable but could be refined or polished. So Heuristic Evaluation might help an analyst notice that help is missing. But if an analyst noticed that parts of the help system are adequate but could be better written or organized, they might have difficulty fitting this observation into a heuristic when the existing system meets the minimum requires of the “Help and Documentation” heuristic.

Heuristic Evaluation is also the only method we studied that allows a usability expert to simply record an issue that they see with an interface, whether not it happens to come up during a user study or through the analysis of a specific task. In this way it can be freeing since it allows an analyst to finally capture something that they may have previously noticed while working on an interface but were not able record with other methods. However, here the limitations of the available heuristics come into play again. While analysts are able to record some of the issues that they have noticed, they are likely to notice other issues that do not fit neatly into the available heuristics. For example, if an analyst notices that the available search options are too limited and additional ways to filter search results would be helpful it may not be possible to fit this insight into a heuristic.

While constraining the ability of analysts to record some of the issues that they see with the site, the available list of heuristics can also compel analysts to record minor issues that the analysts themselves do not really think are issues. For example a minor violation of an interface metaphor, such as placing a house icon in the middle of the road when real houses are always on the side of the road, may lead an analyst to record an issue with the “Match between system and the real world” heuristic. Despite the fact that the analyst may not really think that this is an important issue, it is easy to argue that this is a violation of a heuristic. Thus Heuristic Evaluations can be frustrating for analysts as they record issues that they believe to be trivial and are unable to capture insights that they believe could truly improve the site. Of course, this effect may be lessened when analysts are not competing with their colleges to find the most issues regardless of importance. And when the analyst is also an interface designer they may have other chances to communicate design improvements that Heuristic Evaluation cannot accommodate. This is, however, less likely if they are being brought in as an outside consultant.

Besides simply ignoring minor issues, the limitations of HE can be addressed in two ways. A different set of heuristics can be used or the heuristics can be interpreted less strictly. Our group is interested in exploring alternative heuristics but has not had the opportunity to research or practice with anything other than Jakob Neilsen's set. Also, any alternate list that can be memorized will also be inherently limited and will thus still have gaps. It will also be less commonly used within industry. Interpreting the heuristics more broadly also has appeal. For example, "user control and freedom" when strictly applied mostly refers to allowing users to cancel and undo their actions. However, the principle could be more loosely interpreted to support providing users with appropriate control over the filtering and sorting of information. This makes the heuristic more powerful and can help to capture more issues. However, a draw back of this approach is that evaluators will become used to a nonstandard interpretation that is not shared by other professionals. Still, after doing a round of Heuristic Evaluations our group agreed that we would want to experiment with either modifying the list of heuristics or applying them less strictly when using this method in the future. A sensible starting point for this exploration would be for a team to modify Neilsen's heuristics list by adding additional heuristics relevant to the project domain.

Perhaps the limitations of Heuristic Evaluations can best be illustrated by looking at the website of their

creator and principle proponent, Jakob Nielsen (http://www.useit.com). While not a horrendous site, it does not really represent the type work that our group would hope to produce. We do not doubt that Jakob Nielsen has thoroughly applied all of his heuristics to the site. We just think he needs some additional methods to make the site more enjoyable and pleasant to use.

Keystroke-Level Modeling (KLM)

Keystroke-Level Modeling is the only method we studied that provides objective numerical data about an interface. Because of this, it is the method where flaws in the results are most apparent. Unfortunately, while the results of KLMs can be suspect, it is sometimes hard to figure out where to place the blame. The modeler may have made a mistake, in which case the source of the error is often subtle and may take a good deal of effort to track down. The tool itself may have biases or flaws, such as CogTool modeling text typing at an unrealistically slow rate. Finally, the theory itself may be flawed or insufficiently developed for the given domain. For example, its not clear that the “command” vs “argument” distinction developed for command line interfaces should apply to GUIs. And if it does apply, its application is not always obvious and may be subject to errors.

Despite these drawbacks, KLM can still provide useful insights and analysis when developing interfaces for routine expert use, or to increase efficiency. It can suggest which parts of a task are too slow and need to be improved upon. In this respect, it is the only analytical method we studied that really lends itself to continually improving an already functioning interface as opposed to just fixing issues to make it “good enough”. And even when the numerical results of a KLM are suspect, they can still be useful for making comparisons between similar tasks. However, these comparisons should be given more scrutiny when comparing tasks accomplished in very different ways, such as using the keyboard versus using a mouse. For these reasons, of all the methods that we studied KLM is the one that we feel the need to be the most cautious in using since we have experienced how it can provide misleading results.

However, if an issue discovered by a Cognitive Walkthrough or a Heuristic Evaluation does not turn out to be a problem during user studies, you can always argue that other users may experience this issue even if it only affects a small percentage of users. The issue is more likely to be heavily de-prioritized rather than completely contradicted. In contrast, the numerical results generated by KLMs are so concrete that sometimes said issues are open to immediate suspicion even without the need to perform other methods.

Cognitive Walkthrough (CW)

After working on an interface for a long time, it can be difficult for an analyst to look at it as a new user would. The problem is compounded when new users have different levels or technical or domain knowledge than the analyst. Cognitive Walkthrough is useful because it helps the analyst to systematically think through a new user’s first experience with an interface in a methodical, step-by-step way. In a Cognitive Walkthrough, a specific task is defined and broken up into small steps. Then the analyst goes through each step and asks a series of four questions dealing with the user's intentions, perception of the interface, interpretation of the interface, and interpretation of the results of their actions. Issues are recorded when a problem is uncovered by any of these questions. Thus Cognitive Walkthrough can help to discover some of the more obvious issues with an interface before a user test is done. And if user testing is not possible, Cognitive Walkthrough is only analytical method we studied that will really find issues specific to new users.

However, the methodical nature of Cognitive Walkthroughs also has its down side. After an hour or two of repeatedly asking the same four questions about each mouse click or piece of text entered, it becomes easy to forget which question you are answering and which step of the task you are on. Thus it can require a good deal of discipline to keep from jumping ahead and analyzing questions or even entire steps out of order. Because of this, Cognitive Walkthroughs can be somewhat tiring to perform. It should therefore be performed allowing short breaks which allow the analysts to return to their original frame of mind, thus breaking the monotony of the method.

Cognitive Walkthrough also has a few limitations in the type of information it uncovers. It requires the analyst to define a task and the correct steps required to perform that task. Therefore, it cannot tell the analysts about whether real users would actually want to perform this task or would perform it in a different way. A Contextual Inquiry would be required to validate the task itself. CW also does not say what happens to a user when they fail to take the correct action. Therefore it can be difficult to tell if a mistake would take the user 10 seconds or 10 minutes to correct. In contrast, Think-Alouds can provide direct evidence for how severe an issue is and how a user might go about trying to recover. Finally, Cognitive Walkthroughs present a challenge for the analysts because CW expects “yes or no” answers to questions that are sometimes more subtle. For example, a control may be visible on the screen but due to its position within the page design it may be somewhat difficult but not impossible for users to notice. For example, our group saw the possibility for a user to overlook a form field but found it easier to explain why the field would be seen than to construct a convincing story for why it would not be seen. In these cases, Cognitive Walkthrough can fail to capture information about areas where at least some new users may encounter issues. This is in contrast to the UAR format used to record issues which explicitly discusses the relative frequency of an issue.

When looking back at the issues uncovered by Cognitive Walkthrough, they are all very specific to the interface being evaluated and often do not directly translate outside of that interface. For example, issues discovered by Cognitive Walkthrough often take the form of “the title of X is unclear”. These types of issues are not particularly insightful when designing a brand new system. However, the issues tend to fall into a few broad categories that do provide useful lessons for making other interfaces easier to learn. For example, a clear and concise labeling is vital or especially on links and buttons, or avoid the use of jargon and terms that new users are unlikely to understand is one broader lesson to be taken from the scenario mentioned earlier. Keeping these types of lessons in mind during design will help prevent many of the errors that a Cognitive Walkthrough might uncover.

Think-Aloud (TA)

Think-aloud usability studies have been called the “gold standard” of usability methods. Indeed since they provide data from real users the findings of Think-Aloud usability studies are more compelling and their findings are generally appear more trustworthy. Therefore, results from a Think-Aloud can be used to support or refute the findings of the analytical methods. For this reason it is useful to perform a Heuristic Evaluation or Cognitive Walkthrough as a way to discover and fix the more obvious issues in an interface before a Think-Aloud is performed. If a Heuristic Evaluation or Cognitive Walkthrough was performed immediately after a Think-Aloud, the results might still be useful but would tend to either repeat the findings of the Think-Aloud or carry less weight since they were not encountered by real users.

Think-Alouds are also useful because they tend to highlight bigger issues than the analytical methods, which

can have a tendency to find minor issues. Think-Alouds also provide direct evidence of the severity of an issue. Instead of rationalizing the impact of an issue, an analyst has direct evidence of when a user takes 10 minutes or 10 seconds to overcome problem. Similarly, by comparing the incidents from several different users analysts have at least some empirical evidence for the frequency of an issue.

But like all methods, Think-Aloud studies do have their limitations. Even though users in Think-Aloud did not have difficulty in an area where an analytical method predicted that they would, it is still possible that it is merely a minor issue rather than not an issue at all. Since Think-Alouds tend to find more major issues with an interface, other methods must be used together with Think-Alouds to discover the full range of issues in an interface. For example, it is hard to imagine issues of typographic consistency coming up in a Think-Aloud even though this may be an issue worth fixing.

A more subtle issue with Think-Alouds comes from their interpretation. Some incidents are clearly issues. Other times there may be a slight pause that provides some evidence that the user experienced a degree of confusion. But there is also evidence that the user quickly figured out what to do and was able to successfully complete the task. Thus a judgment must be made as to whether this is really a critical incident or not. This was one of the most difficult aspects that our group encountered when using TA. We tended to focus on the idea of "extreme behavior" and only record an issue when there was little doubt the it was a problem. In retrospect, its probably worthwhile to capture less "extreme" issues. Even if the current user did not have major trouble, other users may have more difficultly with this issue and it is useful to capture it. These less extreme incidents also suggest places that the interface could be polished even if it isn’t completely broken and should be recorded for future reference. For example, even if a user's deviation from tasks or an error made is only minor but it is seen when studying every user, the consistency of it will cause a high frequency rating and thus cause this to be a major issue.

General Insights

All the methods, other than CIs, can be employed throughout the research and design process and can be used to analyze existing systems, competitors or test prototypes. It is perhaps useful to use these methods through several iterations of the design, making improvements as data is gathered.

Appendix

I. Design Ideas Reference Table

II. Contextual Inquiries

III. Heuristic Evaluation UARs

IV. Cognitive Walkthrough UARs

V. Think Aloud UARs

I. Design Idea Reference Table

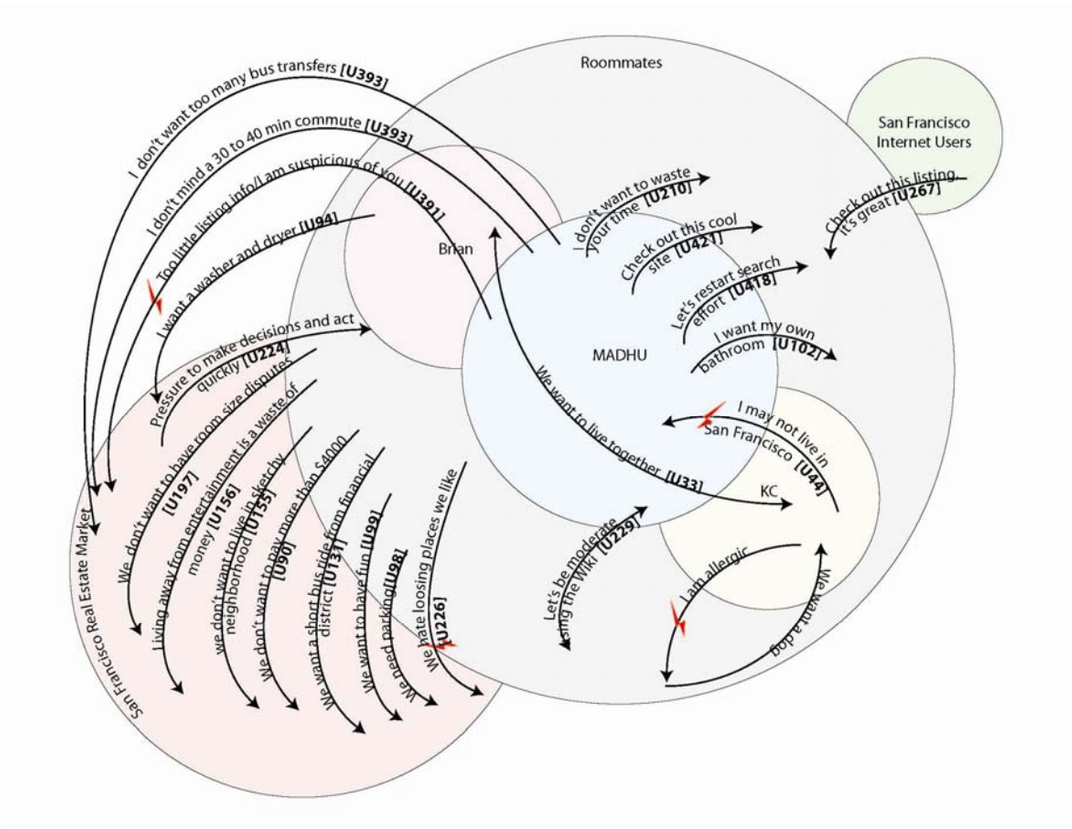
Number	Design Idea	Technique Inspiring Design	Problems Solved/Good Aspect Maintained	Supporting Data
D1	Allowing users to save multiple searches	Contextual Inquiry	Manually creating links	CI Transcript U219, U336
D2	Integrating several systems into one interface	Contextual Inquiry	Forgetting the names and URLs of useful web services	CI Transcript U258
D3	Integrating transit/driving information with the map	Contextual Inquiry	Switching between multiple windows to complete a task	CI Transcript U386
D4	Integrating yelp.com results through the "Vicinity" tab	Contextual Inquiry	Switching between multiple windows to complete a task	CI Transcript U386
D5	Listings alongside map	Contextual Inquiry	Multiple tabs/windows cluttering screen	CI Transcript U386, U245
D6	Overlay details of a listing over map	Contextual Inquiry	Multiple tabs/windows cluttering screen	CI Transcript U386, U245
D7	Provide a blank search page to new users	Contextual Inquiry	Users can create new searches	CI Transcript U229
D8	Provide easy accessibility to blank search page for returning users	Contextual Inquiry	Users can create new searches	CI Transcript U229
D9	Providing pricing and location along with results	Contextual Inquiry	Multiple tabs/windows cluttering screen User clearly sees useful pricing information in search results User is interested in viewing the actual location as it relates to his areas of interest	CI Transcript U245, U386
D10	Show returning users saved searches	Contextual Inquiry	Eliminates tedious steps taken to add links to the WIKI	CI Transcript line U161 (User starts search with a saved search), U336(Manually Creating Link)
D11	Storing relevant addresses in the user's preferences	Contextual Inquiry Heuristic Evaluations	Switching between multiple windows to complete a task Incorrect entry of search parameters Incorrect data returned due to poor address format	CI Transcript U386(switching part), U398(address, entry part)
D12	Allowing users to save listings	Contextual Inquiry Heuristic Evaluations	Manually creating links Recording all relevant information to WIKI Forgetting the address of desirable listings	CI Transcript U336(manually creating link)

		Keystroke Level Modeling	Incorrect data returned due to poor address format Adding links to WIKI took 58 secs	
D13	Providing easy access to saved listings to all users	Contextual Inquiry	Users were interested in creating a richer wiki, but found that it was too much so they settled for simpler information that was easier to produce.	CI Transcript line U83
D14	Sorting saved listings chronologically	Contextual Inquiry	Users added updates to the top of the WIKI page	CI Transcript U229, U83
D15	Ability to customize listings	Contextual Inquiry	Recording all relevant information to the WIKI	CI Transcript U83
D16	Providing original content to customization panel	Contextual Inquiry	Unmotivated	CI Transcript U229
D17	Automate searching for commute times	Contextual Inquiry	Users employed 511.org to find the commute times for work route Switching between multiple windows to complete a tasks Multiple tabs/windows cluttering screen	CI Transcript U383,U245, U386
D18	Automate organization of listings and recommendations	Contextual Inquiry	Users were interested in creating a richer wiki, but found that it was too much so they settled for simpler information that was easier to produce	CI Transcript U83
D19	User changes and customizations become the main view	Contextual Inquiry	In searching the first page the user opened was the WIKI which contained his personal notes	CI Transcript U81
D20	Allow user to revert to the original information provided by the system	Contextual Inquiry	User provided links to the original listing information to his colleagues	CI Transcript U288
D21	Implementing a calendar that allows the user to schedule rental events	Contextual Inquiry	User suggests dates and times his colleagues to attend open houses	CI Transcript U417
D22	Implementing a notes page	Contextual Inquiry	Unmotivated	CI Transcript U229
D23	Highlighting updates to notes & calendar when user returns to page	Contextual Inquiry	Unmotivated	CI Transcript U229
D24	Send updates feature which includes ability to append a message to the update	Contextual Inquiry	User sent email to his friends about the progress he made along with a short note	CI Transcript U73,U415
D25	Default send updates message with a lists of new apartments	Contextual Inquiry	Unmotivated	CI Transcript U229
D27	Updating map dynamically as content becomes available	Heuristic Evaluations	Visibility of System Status	jmw-he-02
D28	Attaching icons to vicinity headers	Heuristic Evaluations	Icons not always intuitive	Group3-he-02
D29	Users can browse and filter vicinity information	Heuristic Evaluations	Users cannot filter WalkScore results	Group3-he-01
D30	Buttons, Icons, etc are named to match user norms	Cognitive Walkthrough	Users can overlook links that are not appropriately named	Group3-CW-01

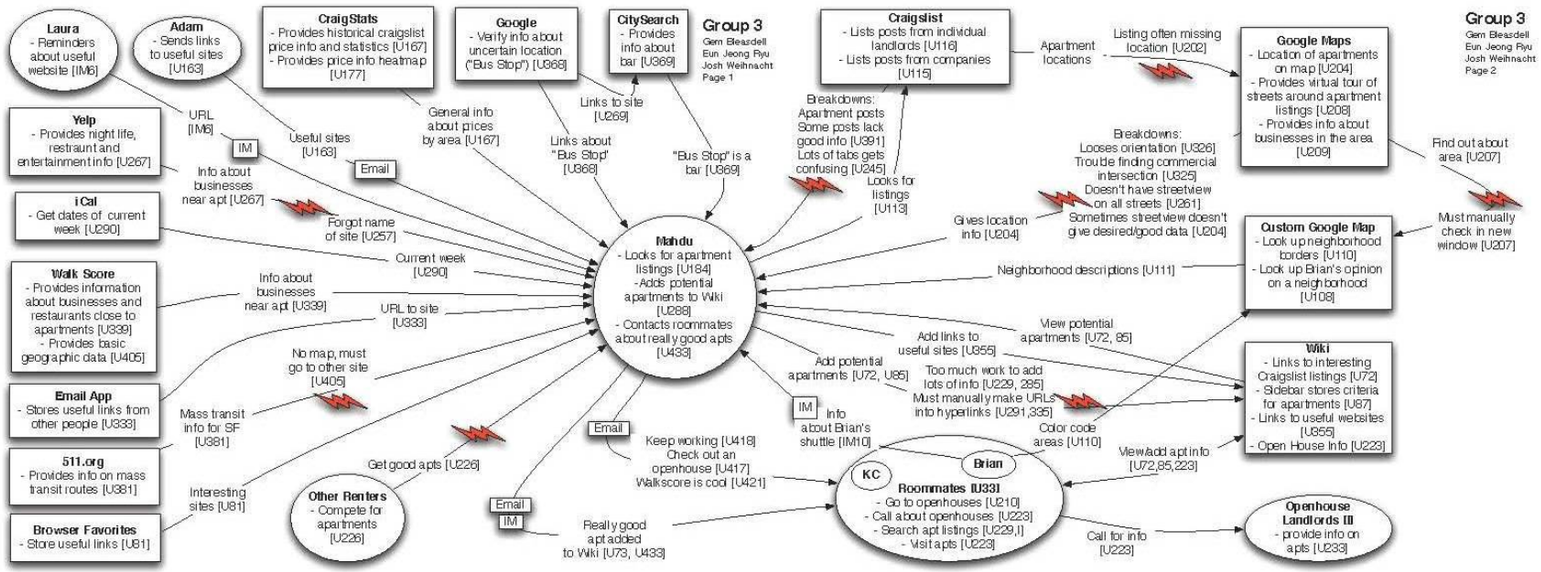
D31	Menus and links are placed from the top left to bottom right	Think Aloud Cognitive Walkthrough	Users can overlook menus and links situated to the left or base of the screen.	Group3-CW-05, Group3-TA-04
D32	All links to listings are bulleted and start in individual lines	Think Aloud Cognitive Walkthrough	Links embedded within paragraphs can be overlooked by the user	Group3-CW-04, Group3-TA-02
		Think Aloud		

II. Contextual Inquiries

i. Cultural Model



ii. Flow Model



iii. Sequence Model

Group 3: Gem Bleasdell, Eun Jeong Ryu, Josh Weihnacht
05-610: Homework #2

Intent: Find out length of commute [U381]

Trigger: Find favorable listing [U320]

↓

Goes to 511.org [U381]

↓

Clicked on trip planner link [U384]

↓

Breakdown:
- Forgot address [U388]
- Too many tabs opened, clicked to wrong tab [U386]

Intent: Find apartment address [U388]

Tabbed to Craigslist [U388]

↓

Selected favorable listing (opened new tab) [U388]

↓

Highlighted listing address [U388]

↓

Copied listing street address (saw edit menu flash) [U388]

↓

Return to 511.org [U389]

↓

Pasted listing street address [U389]

↓

Typed listing city [U389]

↓

Typed work address & city [U389]

↓

Selected time of trip [U390]

↓

Submits Form [U391]

↓

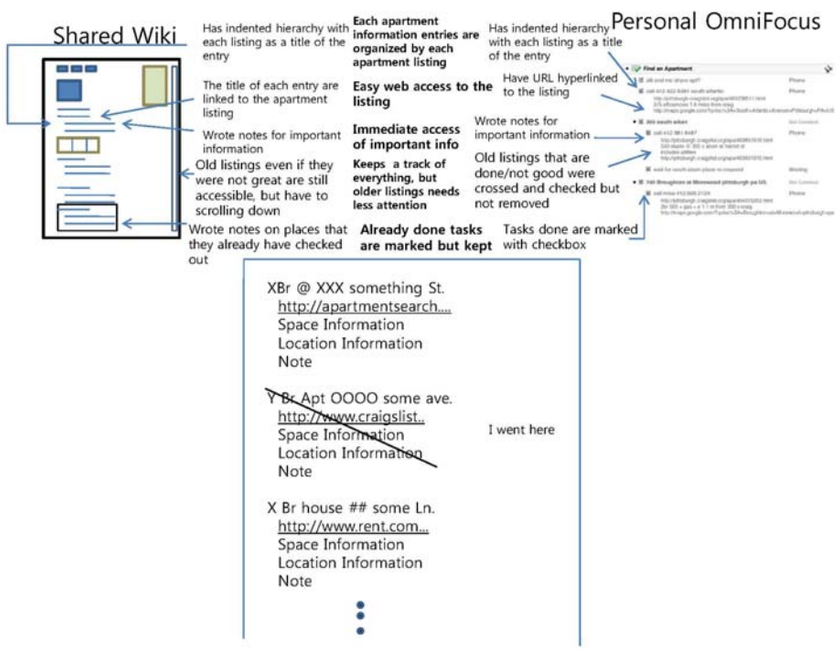
Breakdown:
Returns wrong results [U398]
Site takes a long time to load [U392-7]

Page 1

Group 3: Gem Bleasdell, Eun Jeong Ryu, Josh Weihnacht
05-610: Homework #2

Intent: Determine & correct error [U400]	Hits back button [U400]
	Corrects error [U400]
	Views correct results [U401]
Intent: Determine closeness of bus stop to apartment [U404]	Gets address of bus stop [U404]
	Breakdown: No map on 511.org [U404]
	Returns to walk score [U404]
	Finds bus stop location on map [U406]
	Returns to 511.org to get length of bus trip [U409]
Intent: Find duration of bus ride [U409]	Reads length of bus trip [U409]

iv. Consolidated Artifact Model



III. Heuristic Evaluation UAR

No. ***group3-he-01 (jmw-he-08, ejr-he-04)***	**Problem/Good Aspect:** Problem
Name: Icons Can Overlap	
Evidence Heuristic: **8 - Aesthetic and minimalist design** Interface aspect: Icons for locations often overlap. In extreme cases, an icon may be almost entirely covered up by another icon.  	
Explanation Users may be unable to tell what a specific icon is for because it is partially covered by the icon for another location. In extreme cases, users may not be able to tell how many icons are in a specific area because one or more of the icons are almost completely obscured by other icons.	
Severity or Benefit ***Rating:*** 3 - Major ***Justification (Frequency, Impact, Persistence)*** ***Frequency:*** High. This seems to happen often in urban areas. Even in suburban areas with low walkscores, stores and restaurants seem to cluster together so the icons on the map are still likely to overlap. ***Impact:*** Medium. In many cases, if users zoom in the icons will overlap less, however	

they may still overlap at the highest magnification. Users can click on an icon to see what the location is, however sometimes there is not enough of an icon visible to be clicked on. They can view a list of each type of location in the left hand column and click the name of a location to see it on the map, however they may have to click several items to find the icon they are looking for. Finally, the intention of the site seems to be to provide a rough idea of how many places are within walking distance of an address/intersection rather than finding specific places. So the details of a location represented by an individual icon may not be important to many users. ***Persistence:*** Persistent. New users may be slightly more affected because they may be less likely to realize that icons overlap. However, in general this will affect both new and existing users equally. ***How these factors are weighted and why:*** This is the average of the group scores. This is a frequent and persistent problem and its impact is medium. However, it does not entirely detract from the goal of getting an idea of how many places are close to an address.
Possible solution and/or trade-offs When two icons are close to each other, place them side-by-side instead of allowing them to overlap. If multiple icons are too close or too numerous to make the “side-by-side” strategy feasible, locations can be marked with a small dot and the icon can be placed to the side with a line connecting the dot and the icon. The trade off of this approach is that it may not convey the density of restaurants/bars/stores/etc as well as the current implementation.
Relationships ejr-he-03 “Misleading place icons” ejr-he-02 “House Icons Gets Hidden by other icons” and jmw-he-20 “House Icon sometimes covered” are related because it is essentially a special case of this issue when the house icon is involved. jmw-he-19 “Icon Meanings Not Always Apparent” also deals with interpreting icons, since obscured icons are harder to interpret.

No. ***group3-he-02 (jmw-he-19, gsb-he-10, ejr-he-16)***	**Problem/Good Aspect:** Problem

Name: Icons not always intuitive

Evidence

Heuristic: 10 – Help and Documentation
Interface aspect:
There is no key or guide for interpreting the meaning of icons.

Explanation

Although many of the icons for locations are easily recognizable, there may still be some confusion about the meaning of particular icons. This is especially an issue on the icons for libraries (open book icon) and book stores (closed book icon) as users must remember the difference. To learn the meaning of an icon, users can either click on the icon and hope it provides information on what type of place it is, or they can click on the item under the category listing to see which icon it brings up. Some users may also fail to recognize or forget the meaning of particular icons.

Severity or Benefit
Rating: 2.66 – (Almost) Major
Justification (Frequency, Impact, Persistence)

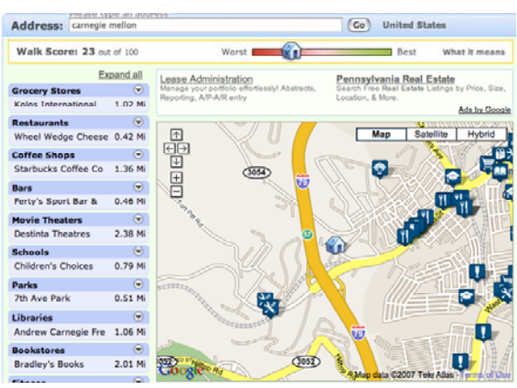
Frequency: High. The icons appear on every search and it is expected that almost all users will perform a search and thus encounter the icons. ***Impact:*** Medium. Users can click on an icon and get more information about the location. However, some users may not realize that they don't correctly understand what the icon means. ***Persistence:*** Medium. Users who are interested are likely to learn the meaning of the icons by clicking on an icon to see what type of location it is. However, some users may not bother and other users may forget the difference between similar icons. ***How these factors are weighted and why:*** This is the group average. Although this issue effects most users, it has a low impact and it will only take a little more time for users to find out more information about a location.
Possible solution and/or trade-offs Provide a key on the page that indicates what each icon represents. The trade-off is that this will consume more screen space if the key appears on the same page or the key will appear on a different page than the map.
Relationships jmw-he-08 "Icons often overlap" also deals with difficultly in interpreting icons. When an icon is partially covered it is even harder to tell what the icon represents.

No. ***group3-he-03 (jmw-he-21)***	**Problem/Good Aspect:** Problem

Name: No Notification of Multiple Addresses

Evidence

Heuristic: **9 – Help users recognize, diagnose, and recover from errors**
Interface aspect:
When an ambiguous "address" is entered, such as "Carnegie Mellon", the system does not indicate that there was difficulty determining the intended location. Instead, the system appears to select one of the possible addresses to show without indicating that there were alternates. For example, searching for "Carnegie Mellon" displays Mellon St in Carnegie, PA instead of Carnegie Mellon University. A search for "100 Main Street" displays an address in Boston, even though there are many possible such addresses in the country.
http://walkscore.com/get-score.php?street=carnegie+mellon&go=Go
http://walkscore.com/get-score.php?street=100+Main+St&go=Go



Explanation

Users may not realize that they have entered in an ambiguous address. Therefore, they may not realize or may take a long time to realize that they are looking at a map that is incorrect for their desired location.

Severity or Benefit
Rating: 3 - Major
Justification (Frequency, Impact, Persistence)
Frequency: Low. It is expected that many users will enter an address that contains enough information to be uniquely located.

Impact: High. If users are familiar with the location, they should be able to recognize that the incorrect map is being shown to them and correct the address. However, many users may be looking for information on areas that they are unfamiliar. In this case it may be more difficult to realize that the address/intersection being searched for is not being shown correctly on the map. If this happens, the user may not realize that they are receiving incorrect information.

Persistence: Persistent. When an ambiguous address/intersection is entered this issue will affect both new and experienced users more or less equally.

How these factors are weighted and why: This is the group's average score.

Although this issue is not likely to occur frequently, its impact is high and experience will not help to mitigate the issue very much. Therefore this can be a major issue when it happens.

Possible solution and/or trade-offs

When multiple addresses are found that may match the given address/intersection, provide a list of possible alternatives for the user to select from. This can be very similar to the solution that Google Maps uses when multiple possible matches are found for a location search. A trade-off of this approach is that it may take longer for users to access the map when the system would have guessed correctly anyways. Users may also be confused or annoyed at having to click on additional screens.

The system can also use information about where you are (based on the current location of the map) to help choose the most likely option for your search. The trade-off of this solution is that searches for places far away from your current location will still have this issue.

Relationships

jmw-he-09 "Invalid addresses can be entered" is related because this issue may go away or be mitigated if it was possible to only allow valid addresses to be entered.
jmw-he-10 "No Indication of Invalid Addresses" displays a similar behavior.
gsb-he-11 "No Indication of possible options"

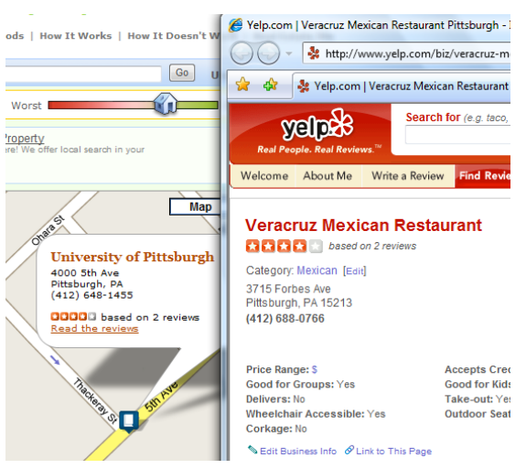
No. ***Group3–he-04*** ***(EJR-HE-19)***	**Problem/Good Aspect: Problem**

Name: Links to Location Reviews sometimes incorrect

Evidence:

Heuristic: **4 - Consistency & Standards**
Interface aspect:

Some of the links are incorrect, for example University of Pittsburgh's link goes to Veracruz Mexican restaurant.



Explanation:

Users may be confused when they see an incorrect review the current location. Users have no way to get the correct reviews for the location from this site.

Severity or Benefit
Rating: 3 - Major
Justification (Frequency, Impact, Persistence)
Frequency: Rare. Most links see to be for the correct location.
Impact: Hard to overcome. There is no way to find the correct review without going to another site.

Persistence: Persistent. Experience will not help a user to find the correct review on this site. ***How these factors are weighted and why:*** Group average score. Even though this issue is rare, it is difficult to overcome when it happens and it is persistent. There is no way to solve the problem without leaving the site.
Possible solution and/or trade-offs Use a more accurate source of information. A trade-off is that it is likely to be more expensive to find a more accurate source of information or to make the current source more accurate.
Relationships None at this time.

IV. Cognitive Walkthrough and UAR's

A Priori Description of Users and Background Knowledge

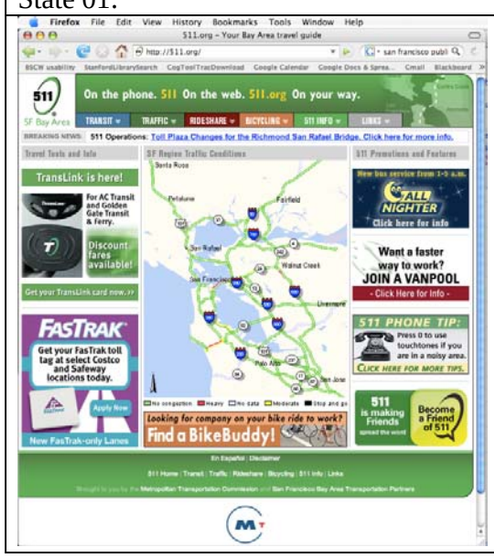
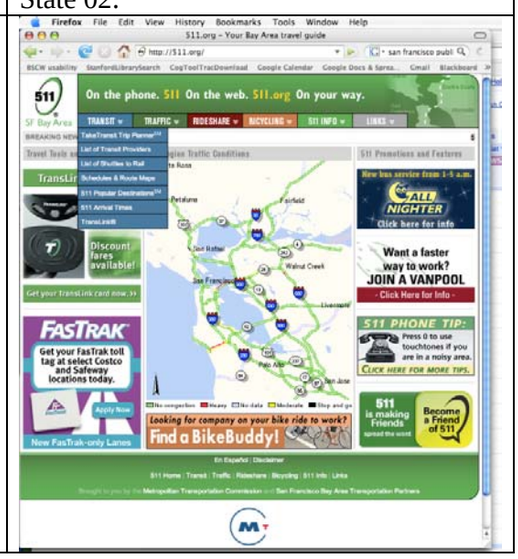
Assumption 1: The user is a skilled Macintosh user who knows how to use the keyboard and mouse and can recognize and use standard widgets (e.g., buttons [~U282]), tabs [~U282]), pull-down menus [~U291]) on a website.

Assumption 2: The user knows the start and end address of the trip, or at least knows how to find the start and end address [~U389] somewhere else.

Assumption 3: The user knows that 511.org exists, that it provides information on mass transit in the Bay Area and how to get to the site [~U381]. However, it is assumed that the user had not actually used 511.org before.

Assumption 4: The user knows what time in the future he is likely to take a trip [~U390].

Assumption 5: The user is interested in finding out mass transit information for the Bay Area [~381].

State 01:		State 02:
	→	

Step 01. Rollover Transit

1. *Will users be trying to produce whatever effect the action has?*

Yes. When the user does not see transit information on the home page, they will know from their experience using websites that they have to use site navigation to find the information that they want.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

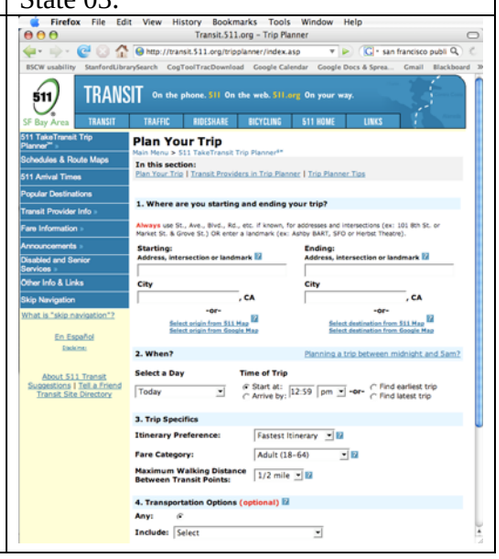
Yes. The user will see the link because it is visible and it is in upper left hand corner so it is not likely to be missed.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user is likely to recognize that the word “transit” will link to information about mass transit. The downward arrows will also suggest that it is a pull down menu.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. Upon seeing a pull down menu, the user will realize that they have activated the menu item and the contents of the pull down menu will reinforce that it’s the correct menu item.

State 02:		State 03:
	→	

Step 02. Click on TakeTransit Trip Planner℠.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will attempt to click on a menu item when they see the pull down menu drop down because they are experienced with pull down menus.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

Yes. The user will see the item because it is visible and it is the first item in the menu and their focus of attention will be on the menu since it recently appeared.

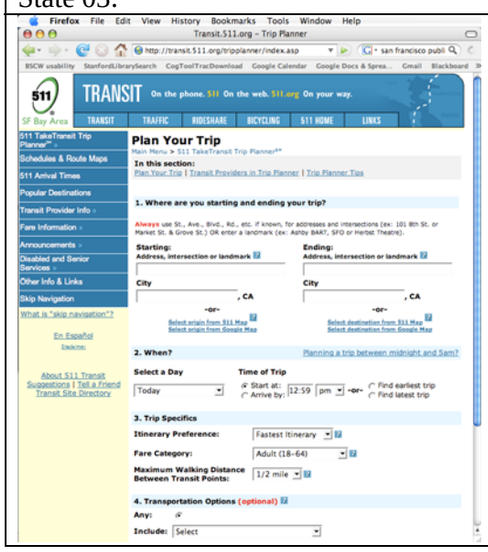
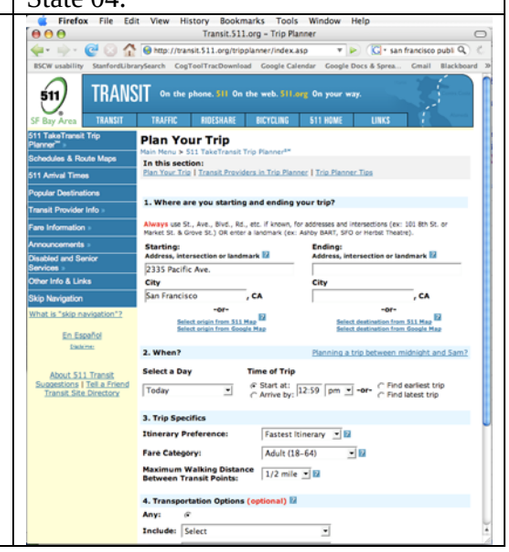
3. *Once users find the control, will they recognize that it produces the effect they want?*

No. The user is likely to think that “Schedules and Route Maps” is the correct menu item because its label is similar to the terminology the user would expect. “Trip Planner” is a term that the user might expect to be associated with long trips that require planning.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see a form with fields for a start and end address and a title that says “Plan your trip”. This should indicate to the user that they are on the right page.

No. ***Group3-CW-01***	**Problem/Good Aspect: Problem**
Name: "TakeTransit Trip Planner" link name is unclear	
Evidence: Task Step: Step 2. Click on "TakeTransit Trip Planer" Cognitive Walkthrough Question: Question 3. Once users find the control, will they recognize that it produces the effect they want?	
Explanation: The user is likely to think that "Schedules and Route Maps" is the correct menu item because its label is similar to the terminology the user would expect. "Trip Planner" is a term that the user might expect to be associated with long trips that require planning.	
Severity or Benefit ***Rating:*** 2 - Minor ***Justification (Frequency, Impact, Persistence*)** ***Frequency:*** Common. The majority of the users will come to this site looking for bus routes, and this will be most frequent link to use. ***Impact:*** Medium. It interferes the user from getting to their goal of finding the bus route, but after additional exploration of the site, users are likely to find the correct page. ***Persistence:*** Low. Once they had experience of using this link, they will know what it means immediately next time. ***How these factors are weighted and why:*** Although this issue is common, it is not hard to overcome and it is not persistent.	
Possible solution and/or trade-offs Possible Solution would be to rename the link "Find transit routes" and have the "TakeTransit" trademark within the page that this item links to. Trade-offs: It reduces the use of the "TakeTransit" marketing term.	
Relationships N/A	

State 03:		State 04:
	→	

Step 03. Type Starting location, "2335 Pacific Ave. San Francisco"

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will want to enter in the start address because that is part of the task. Also, the site prompts the user to enter a start address.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

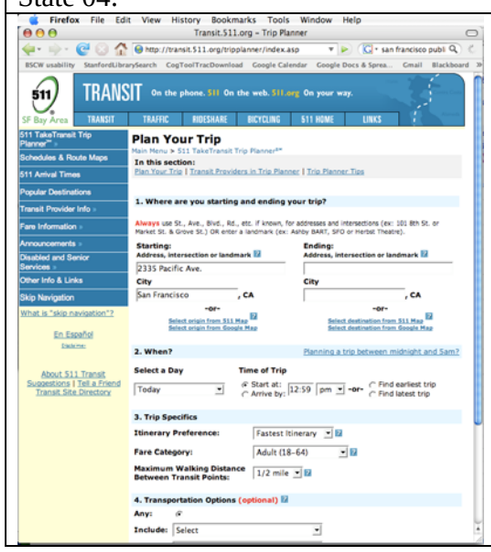
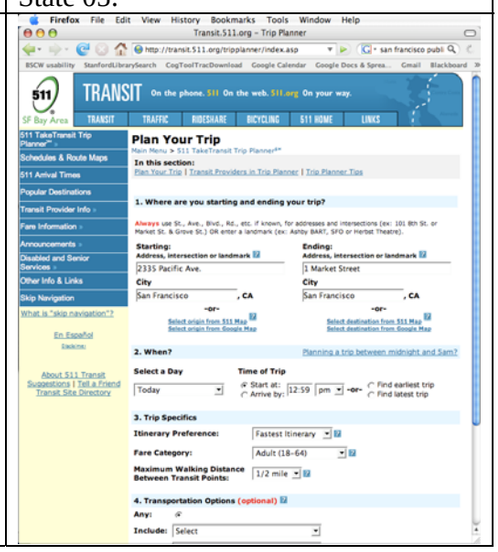
Yes. The user will see the field because it is visible due to the shadow effect on the top and left of the field and the field is in the center of the screen. Also the text label has high contrast.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will recognize from the label on the field that it is for a start address.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see that their address appears in the form fields.

State 04:		State 05:
		

Step 04. Type Ending location, “1 Market Street. San Francisco”

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will want to enter in the ending address because that is part of the task. Also, the site prompts the user to enter an ending address.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

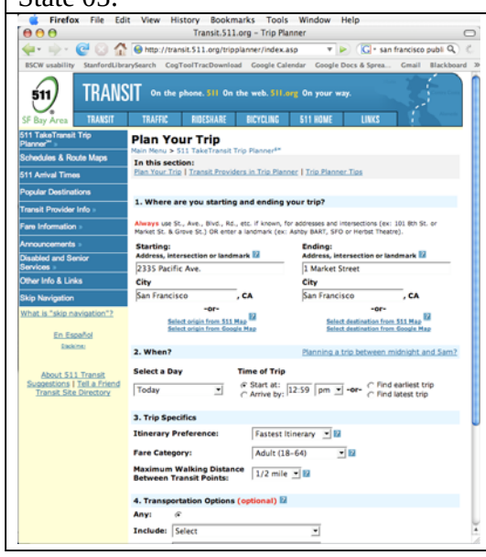
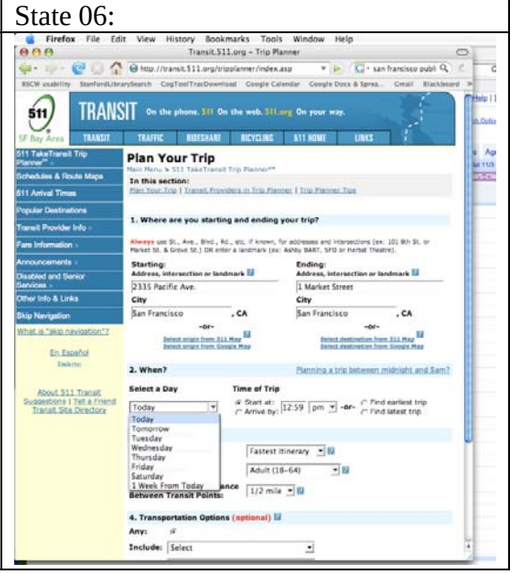
Yes. The user will see the field because it is visible due to the shadow effect on the top and left of the field and the field is in the center of the screen.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will recognize from the label on the field that it is for an ending address.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see that the ending address appears in the form fields.

State 05:		State 06:
	→	

Step 05. Pull down the Select a Day pull-down list.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The site prompts the user to select a day for the trip and the user will see that the current selection is not what he wants.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

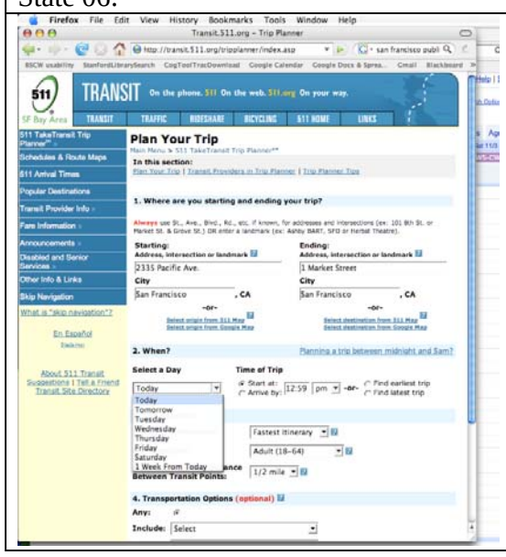
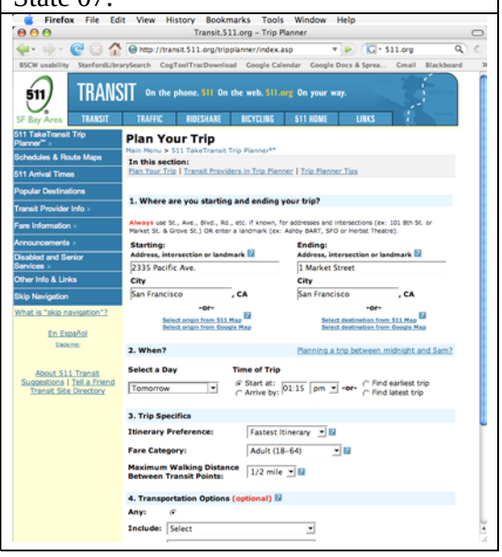
Yes. The form field is visible and it is near by the user's prior focus and is in line with what a user would read next on the screen.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user is familiar with form fields and will recognize that this is a select box. Also, the field is labeled "Select Day" and contains a day ("Today") inside the field so the user will recognize what the field is for.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see a list of days in the drop down that indicate their possible options.

State 06:		State 07:
	→	

Step 06. Click on Tomorrow.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will be trying to complete the previous task by selecting an item in the select box.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

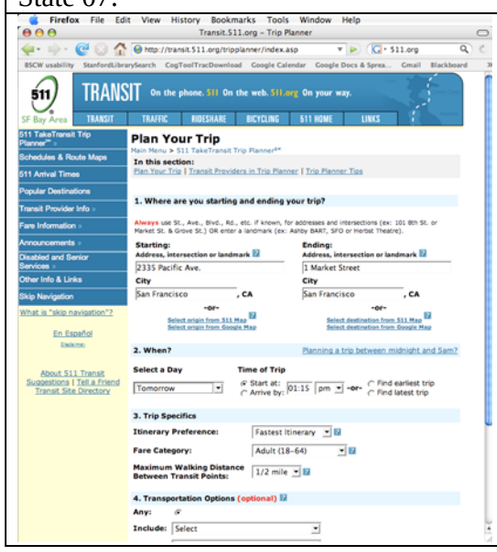
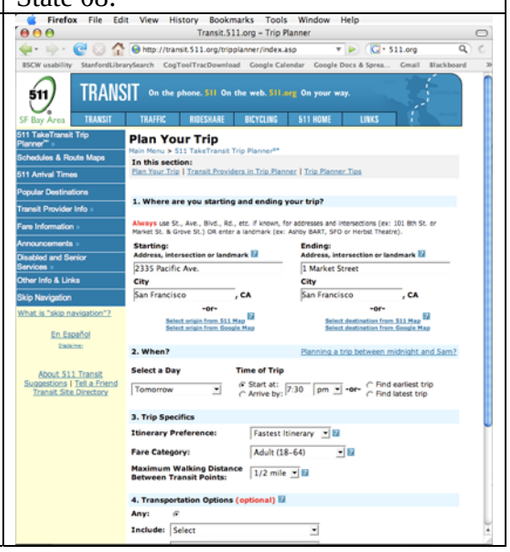
Yes. The contents of the select box are visible on the screen and within the user's focus. Also, the sudden change attracts the users attention.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will recognize from the label "tomorrow" that it is the correct choice to get tomorrow's schedule.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see the word "tomorrow" replaces "today" in the form field.

State 07:		State 08:
	→	

Step 07. Type “7:30” in Time of Trip field.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The site prompts the user to select a time for the trip.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

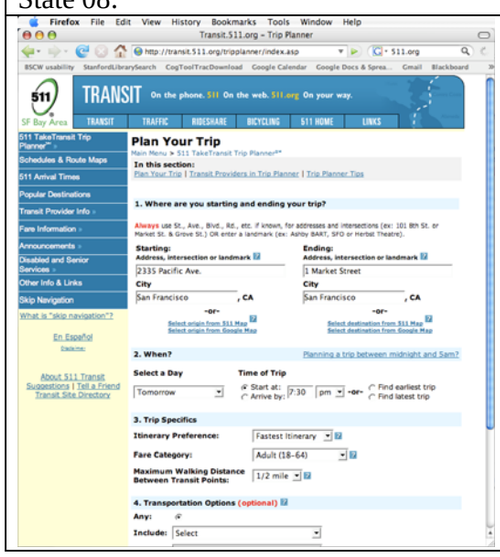
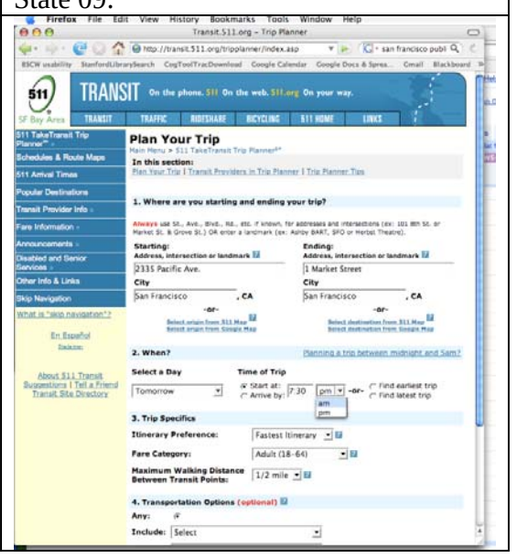
Yes. The field is visible and near by the previous field that was used.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will see a time in the field and the field has a label stating “Time of Trip”.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see the time that they entered inside of the field.

State 08:		State 09:
	→	

Step 08. Pull down list containing “pm”.

1. *Will users be trying to produce whatever effect the action has?*

No. The user has already enter in the time of the trip and the site does not explicitly prompt them to enter “am” or “pm” since the field is already filled in and there is no label above it to prompt the user. Instead, the user likely wants to submit the form.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

Yes. The field is visible and near by their previous focus.

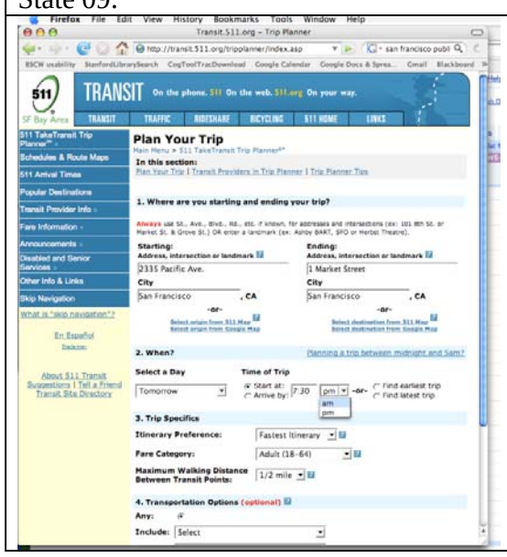
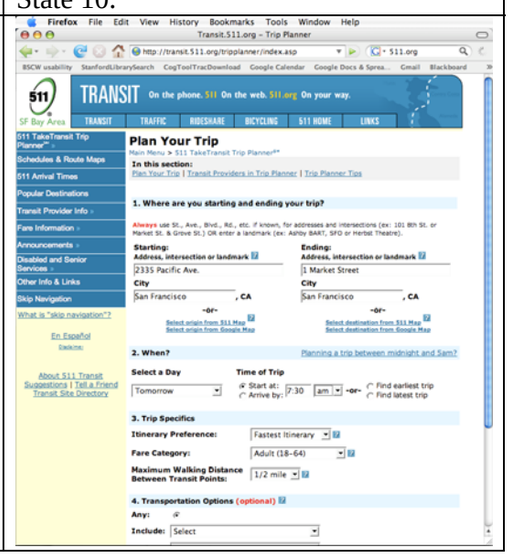
3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user is familiar with the term “pm” that appears in the field because it is a common term and will recognize that it’s associated with the time of day.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see the list with “am” and “pm” that indicates their choices in the drop down.

No. ***Group3-CW-02***	**Problem/Good Aspect:** Problem
Name: Time-of-day pull down may be overlooked	
Evidence: Task Step: Step 08: Pull down list containing “pm” Cognitive Walkthrough Question: 1 -**xxxxxxx**	
Explanation: The user has already entered the time of the trip and the site does not explicitly prompt them to enter “am” or “pm” since the field is already filled in and there is no label above it to prompt the user.	
Severity or Benefit: ***Rating:*** 2 - Minor **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Common - The field looks similar to its surrounding fields and it is already filled in. Therefore, most users regardless of their experience with this site or other websites will overlook this area. ***Impact:*** Easy - Once making the error the user will immediately realize his error and can simply return to the site and make the adjustment. ***Persistence:*** Low - Once the user makes this error they are much less likely to make it again as they are familiar with it. ***How these factors are weighted and why:*** Though this problem is potentially frequent, it is easy to overcome and not persistent.	
Possible solution: Use a single form field to select the hour, minute, and am/pm. Another solution is to explicitly prompt the user to enter time-of-day.	
Possible trade-offs: The first solution may increase the user’s time to complete the task because using a large select field is difficult. For the second solution, additional screen space will be needed.	
Relationships: N/A	

State 09:		State 10:
	→	

Step 09. Click on “am”.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will be trying to complete the previous task by selecting an item in the select box.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

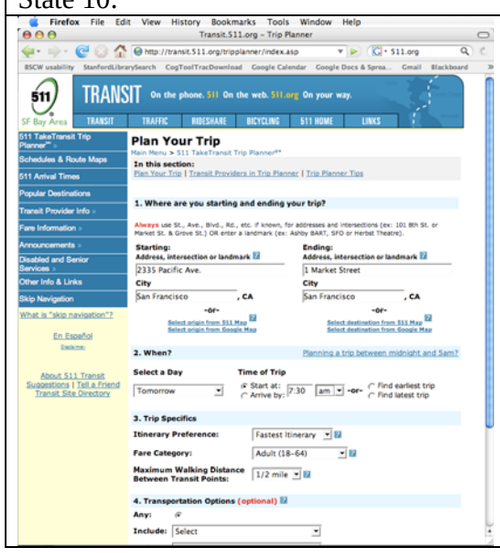
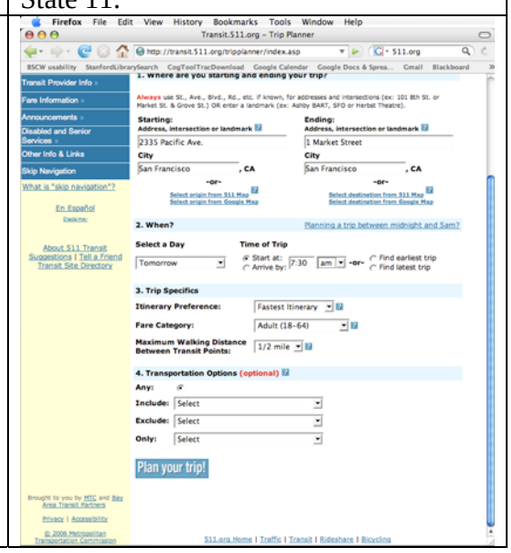
Yes. The contents of the select box are visible on the screen and the sudden change attracts the users attention.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will recognize from the label “am” that it is the correct choice to get the morning schedule.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see the abbreviation “am” in the form field instead of “pm”.

State 10:		State 11:
	→	

Step 10. Scroll down.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will realize from their experience with websites that they have to scroll down because the submit button on the form is not visible

2. *Will users see the control (button, menu, switch, etc.) for the action?*

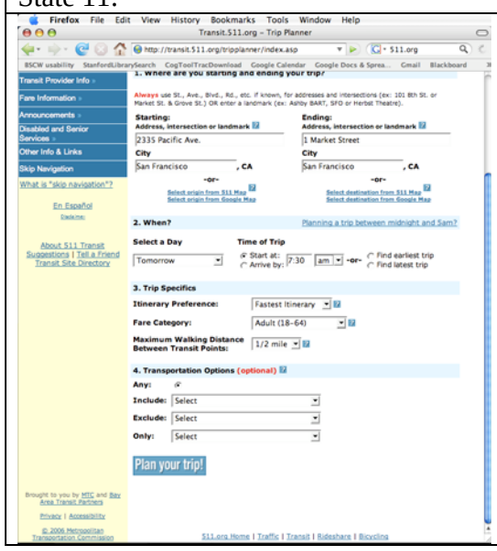
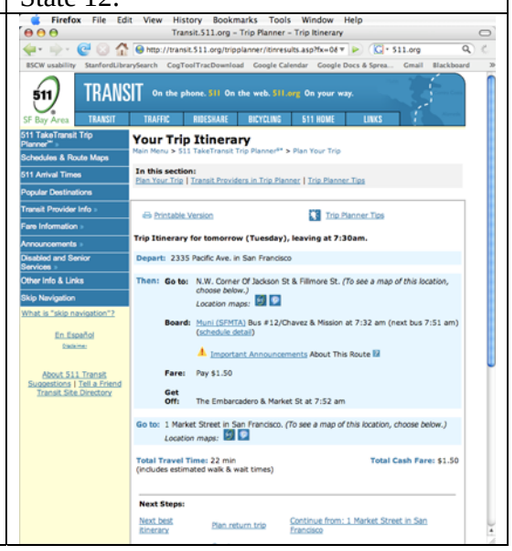
Yes. The scroll bar is visible on the side of the window in an area where the user is accustomed to looking for a scroll bar.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user is familiar with the features of the Mac, including scroll bars.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see that the contents of the page have moved up and additional parts of the screen are visible. Also, the position of the indicator in the scroll bar has changed.

State 11:		State 12:
	→	

Step 11. Click on “Plan your trip!”.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user will know from his experience with websites that he has to click a submit button to complete the form. The user will accept the default values for the remaining fields because they meet his needs.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

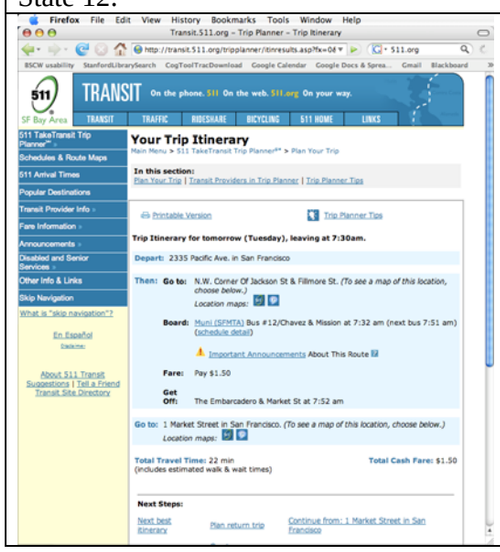
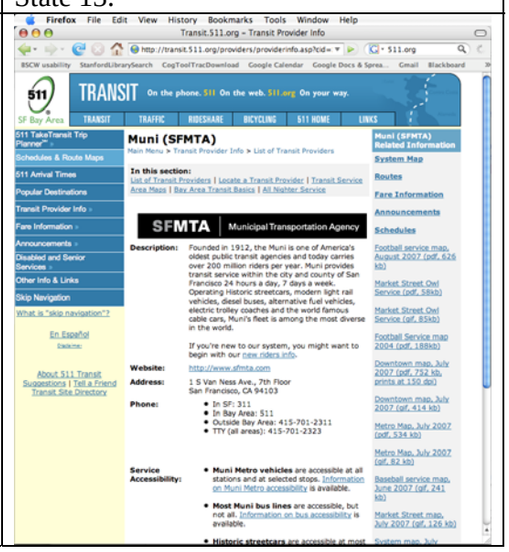
Yes. The button is large and visible and in a different color from its surroundings. The button is also in the position on the page where the user would look for a submit button.

3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will realize from appearance and position of the button that it is a submit button. The label “Plan your trip!” will indicate to the user that it will complete the task. Also, there are no other submit buttons.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The user will see that there is a new page and will recognize from the term “Your Trip Itinerary” that they have received their results.

State 12:		State 13:
	→	

NOTE: Bus route, location, fare and travel time are on this page.
Part of the task is complete.
Step 12. Click on “Muni (SFMTA)”.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user wants to find out information about using San Francisco buses because it is part of the original task.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

Yes. The text “Muni (SFMTA)” is visible on the screen and the screen is not overly cluttered.

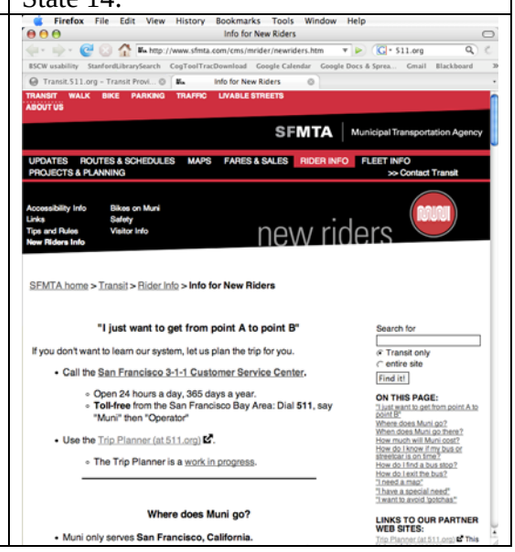
3. *Once users find the control, will they recognize that it produces the effect they want?*

No. The label “Muni (SFMTA)” does not suggest to the user that it will provide information about riding the bus line. The user is unlikely to understand the term “Muni (SFMTA)” and even if it was understood, the term does not suggest that it contains tips for using the transit system.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The resulting page clearly indicates that it contains information about the transit system, so the user will realize that they are getting closer to their goal.

No. ***group-CW-03***	**Problem/Good Aspect:** Problem
Name: "Muni (SFMTA)" does not speak the user's language	
Evidence: Task Step: Step 12. Click on "Muni (SFMTA)" Cognitive Walkthrough Question: Question 3. Once users find the control, will they recognize that it produces the effect they want?	
Explanation: The label "Muni (SFMTA)" does not suggest to the user that it will provide information about riding the bus line. The user is unlikely to understand the term "Muni (SFMTA)" and even if it was understood, the term does not suggest that it contains tips for using the transit system.	
Severity or Benefit: ***Rating:*** 3 - Major **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Medium. This will primarily affect new users who are not familiar with the Bay Area. Users who are familiar with the Bay Area are more likely to understand the meaning of the link. ***Impact:*** Medium. The user can find the same information less efficiently by clicking on links in the navigation that are worded in a way more likely to be understood. ***Persistence:*** Low. Once the user realizes what this links to, they should not have any more issues with the link. ***How these factors are weighted and why:*** Although, this issue is easy to overcome it happens frequently and has a moderate impact.	
Possible solution: Add in a new line with a heading "Transit Provider:" before the link to clarify what the link is for.	
Possible trade-offs: This would take up more screen space and might push content down on the page.	
Relationships: None at this time.	

State 13:		State 14:
	→	

Step 13. Click on “new riders info”.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user wants to find out information about riding the bus because that is part of the original task.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

No. The link does not stand out on the page because it is surrounded by text and other links of similar appearance. Because it is embedded in a block of text, the user must read through the text to get to the link.

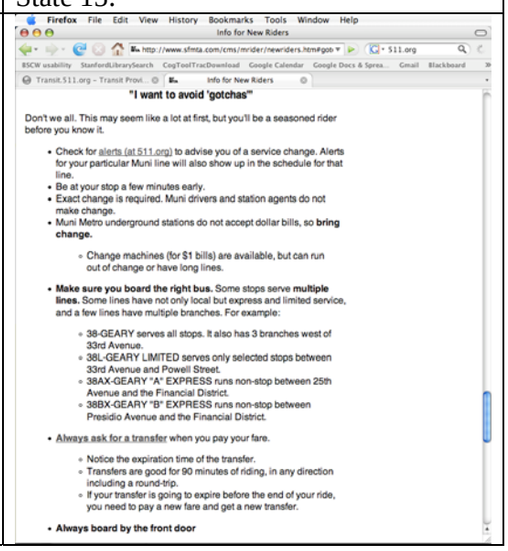
3. *Once users find the control, will they recognize that it produces the effect they want?*

Yes. The user will recognize from the label “new riders info” that it links to information about the conventions for riding the bus.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The resulting page contains the words “New Riders” at three different places at the top of the page. Thus, the user will realize that this page contains information for new riders.

No. ***Group3-CW-04***	**Problem/Good Aspect:** Problem
Name: "New Riders Info" link hidden in text block	
Evidence: Task Step: Step 13: Click on "new riders info" Cognitive Walkthrough Question: 2	
Explanation: The link does not stand out on the page because it is surrounded by text and other links of similar appearance. Because it is embedded in a block of text, the user must read through the text to get to the link.	
Severity or Benefit: ***Rating:*** 3 - Major **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Common - The link is hidden within a text block and cannot be seen unless the user reads through the block. Most users, regardless of skill level will overlook this link as they may never read down to the second paragraph. Most users will only read a couple sentences to determine whether they have found the information they seek. ***Impact:*** Difficult - The user may never realize that they simply overlooked the link and may spend several minutes trying to find an alternative location on that page or other pages before giving up. ***Persistence:*** One time - Once the user finds the link they are likely to know where to look for it and will find it without reading through the paragraph. ***How these factors are weighted and why:*** Though this problem is not persistent, it is very frequent and extremely difficult to overcome.	
Possible solution: Add a new heading next to the link that says "New Riders" to draw attention to the link.	
Possible trade-offs: This will slightly add to clutter on the page.	
Relationships: None at this time.	

State 14:		State 15:
	→	

Step 14. Click on “I want to avoid gotchas”.
“Always board by the front door” is on the bottom of this page.
The entire task is now complete.

1. *Will users be trying to produce whatever effect the action has?*

Yes. The user wants to find out information about riding the bus because that is part of the original task.

2. *Will users see the control (button, menu, switch, etc.) for the action?*

No. The link is surrounded by links of similar appearance so it does not stand out. The text is on the bottom, right corner of the screen where the user is less likely to look for navigation.

3. *Once users find the control, will they recognize that it produces the effect they want?*

No. The user will not recognize the term “gotchas” because the term is slang that conveys surprise while the user is looking for information about conventions for riding buses.

4. *After the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence?*

Yes. The page displays tips and information about riding the bus.

No. ***group-CW-05***	**Problem/Good Aspect:** Problem
Name: Link to “Gotchas” is easy to overlook	
Evidence: Task Step: Step 14. Click on “I want to avoid gotchas” Cognitive Walkthrough Question: Question 2. Will users see the control for the action?	
Explanation: The link is surrounded by links of similar appearance so it does not stand out. The text is on the bottom, right corner of the screen where the user is less likely to look for navigation.	
Severity or Benefit: ***Rating:*** 3 - Major **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Common. Most users will not notice the link since it requires a long visual search to discover its location. ***Impact:*** Medium. If a user scrolls through or searches on the page, they are likely to find the information they want. Otherwise, they will probably not discover how to get the desired information. ***Persistence:*** Low. Once a user discovers the location of the link, they shouldn’t have any more issues with it. ***How these factors are weighted and why:*** Even though this is easy to overcome, it is very common and has a moderate impact that may cause users to overlook information that they want.	
Possible solution: Place the list of links to information “On this page” at the top of the page, to the left or in the center. The links should also be given more contrast by placing them in a bigger font and/or a bulleted list.	
Possible trade-offs: This will take up more screen space on the page and force the contents at the top of the page lower down, possibly below the fold.	
Relationships: Group3-CW-06 is related because it deals with the same link.	

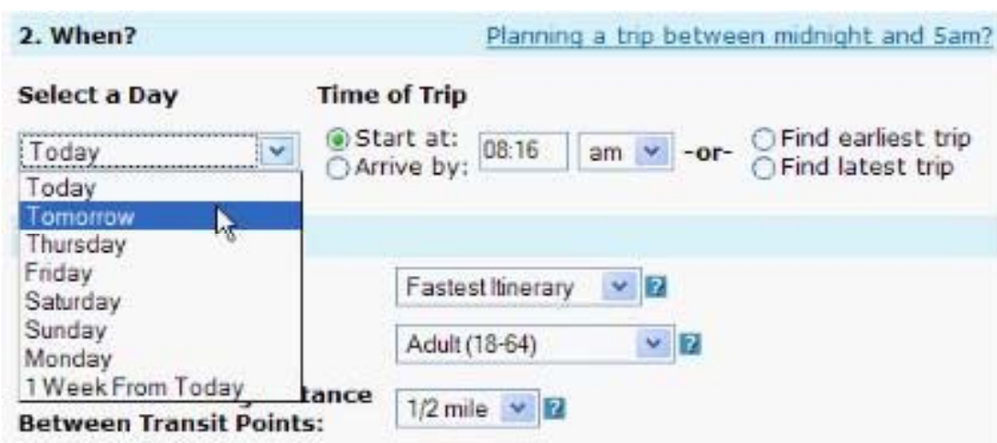
No. ***Group3-CW-06***	**Problem/Good Aspect: Problem**
Name: "Gotchas" link is unclear	
Evidence: Task Step: Step 14. Click on "I want to avoid gotchas" **Cognitive Walkthrough Question:** Question 3 - Once users find the control, will they recognize that it produces the effect they want? "I want to avoid 'gotchas'" is ambiguous. Some users cannot figure out what it means by 'gotchas'	
Explanation: The user will not recognize the term "gotchas" because the term is slang that conveys surprise while the user is looking for information about conventions for riding buses.	
Severity or Benefit ***Rating:*** 3 - Major ***Justification (Frequency, Impact, Persistence*)** ***Frequency:*** Medium. Not all users are unfamiliar with the term, but there are people who will be confused by the term. ***Impact:*** Difficult to overcome. If users do not understand the meaning of "gotchas", they are unlikely to ever find the information that they want. ***Persistence:*** Low. Once the user figures out what this link points, they will know what it means. ***How these factors are weighted and why:*** Although this issue is not persistent, it happens often and is very difficult to overcome.	
Possible solution and/or trade-offs Possible solution: Rename the link to "Tips on using the transit system." Trade-offs: None at this time.	
Relationships Group3-CW-05 is related because it deals with the same link.	

V. Think Aloud UAR's

No. ***G3 -TA01***	**Problem/Good Aspect:** Problem

Name:
User hesitates to convert from the day of week to "Tomorrow"

Evidence:
Video times 1:26 – 1:38
User says "I want to do a Wednesday morning according to the task. So, today is Tuesday, I think, so tomorrow is Wednesday." During this time the mouse cursor hovers over the select drop down.



Criterion: 6 – User expresses hesitation/confusion

Explanation:
When reading the drop down, the user realizes that "Wednesday" is not an option. The user then has to pause and think about what option to select for Wednesday by reviewing what day of the week today and tomorrow are. This leads to slower performance and some uncertainty on the part of the user.

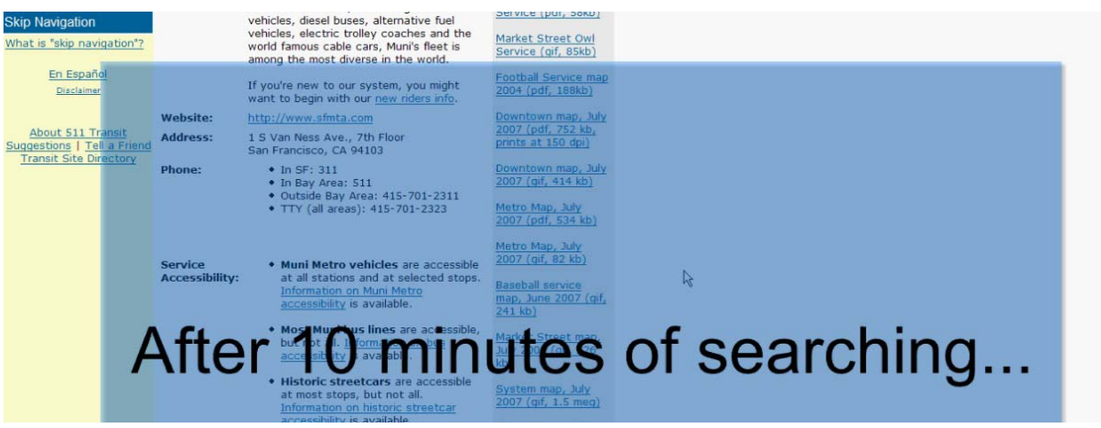
Severity or Benefit:
Rating: 1.33 – (Mostly) Cosmetic (Group Average)
Justification (Frequency, Impact, Persistence):
Frequency: Medium. Users are likely to hesitate when the day that they are looking for is today or tomorrow and they are thinking of a day of the week.
Impact: Low. It only required the user to think for a short period of time and the user was able to accomplish his goal.
Persistence: High. Users will still have to think about this menu option, even once they know it exists.
How these factors are weighted and why:
Even though the persistence and frequency are relatively high, the impact of this issue

is very low and thus is not an important issue.
Possible solution: Rename the first two options to the day of the week followed by “(Today)” or “(Tomorrow)”. For example, “Tuesday (Today)” and “Wednesday (Tomorrow)”.
Possible trade-offs: This will create a very wide drop down and take up more space on the page, effecting the layout.
Relationships: None at this time.

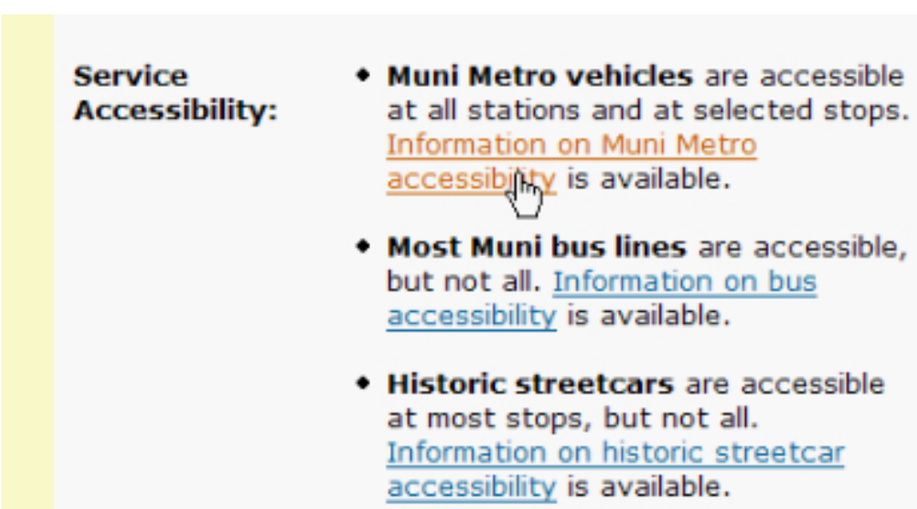
No. ***G3 -TA02***	**Problem/Good Aspect:** Problem

Name:
Difficult to find page with information on bus entrance

Evidence:
Video 3:40 -6:30.
The user took approximately 10 minutes to find and click on the link for the page with information on which door to use to get on the bus.



Video 3:50 - 6:30.
The user is on the “Muni (SFMTA)” page at least three times and explores other links on the page or goes back to the previous page before trying the “New Riders Info” link



Criterion:

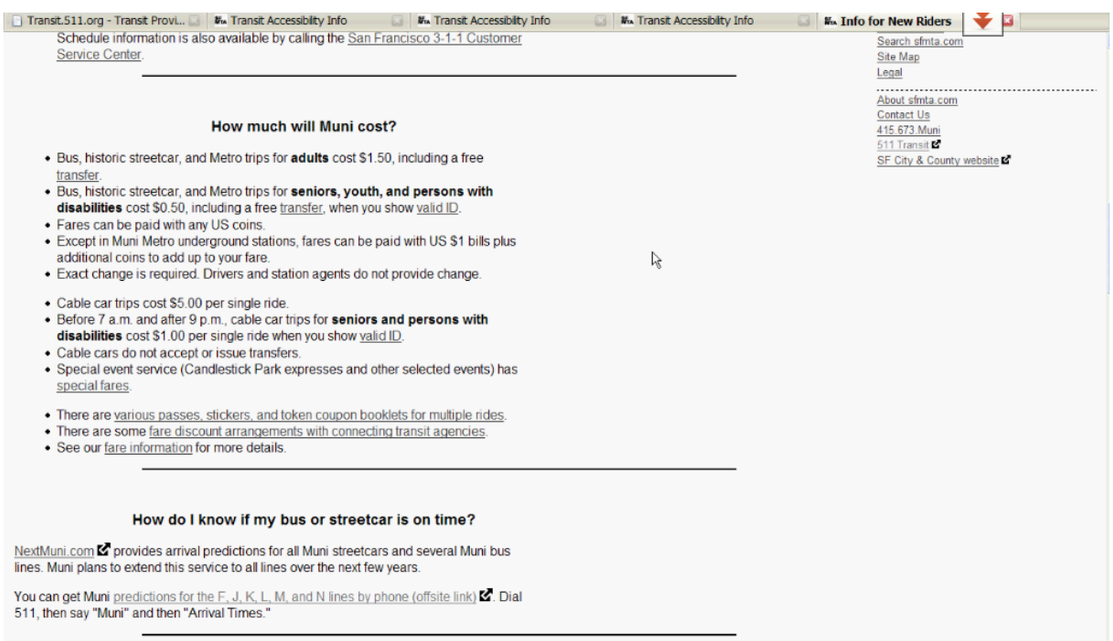
1 - The user articulated a goal and does not succeed in attaining that goal within 3 minutes 3 - The user articulates a goal and has to try three or more things to find the solution
Explanation: The link was embedded in the background information on Muni, which was not related to the user's goal. The user was also distracted by the many links lower down in the page. Thus the user had great difficulty in finding the information on boarding the bus and would likely have given up if not participating in a study. This is despite the fact that the user is on the page with a link to the information that they need several times and does not click on the link.
Severity or Benefit: ***Rating:*** 3.67 – Catastrophe (Group average) **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Medium. Many users of the site will probably not be looking for this information either because they already know it or would not think of needing it. However, almost all users who do look for this type of information will encounter this problem. ***Impact:*** High. The user took 10 minutes and a lot of searching to find the information. Outside of a user test, the user would likely give up and never find the information. ***Persistence:*** Medium. Although the user would be able to find the information easier a second time, there is a good chance that the user would forget the exact sequence of steps required to access this information even on a repeat visit. ***How these factors are weighted and why:*** Although this issue only has medium frequency and persistence, its impact is very high and there is a good chance that users may give up before finding the information.
Possible solution: The user may have missed the link because it was hidden in a line of text. The other links they chose were easier to spot because they were part of a bulleted subheading and thus attention was drawn to them. Therefore, one possible solution is to create a new section title on the Muni (SFMTA) page for "Rider information" with the link to the "new rider information" to the side of it. A bulleted list of some of the major topics covered on this page can also be listed. This will call attention to the link and give more context on what information is provided there.
Possible trade-offs: This solution would take up more screen space and push other content further down on the page.
Relationships: Group3-TA-03 "User finds Muni page unhelpful" Group3-TA-04 "User does not use gotchas link to find bus information" Group3-CW-04 "New Riders Info" link hidden in text block

No. ***G3-TA03***	**Problem/Good Aspect:** Problem
Name: User finds Muni page unhelpful	
Evidence: Video times 3:55-4:12 When the user first visits the Muni home page, he says "This is talking about Muni itself, its not very helpful" and fails to click on the link for the information that he is looking for.	
Criterion: 6 – User expresses hesitation/confusion 7 – User expresses negative affect or says something is a problem	
Explanation: The user seems not to notice the link to the information that he is looking for on this page and seems to interpret the page as just background on Muni itself instead of useful customer information.	
Severity or Benefit: ***Rating:*** 2.33 - Minor **Justification (Frequency, Impact, Persistence):** ***Frequency:*** Medium. Although not all users will visit this page, many of the users who do visit the page are likely to be confused by the information. ***Impact:*** Medium. When the user does not find useful information on the page they are likely to miss the useful information that they are looking for and may never find it. ***Persistence:*** Low. Once a user discovers that there is a useful link on the page, they are likely remember that it exists. ***How these factors are weighted and why:*** While the impact and frequency of this issue are medium, it is essentially a precursor issue to G3-TA-02. The user doesn't find the page helpful, because he doesn't notice the link that he is looking for. Thus, much of the impact of this issue would be mitigated if G3-TA-02 were fixed.	
Possible solution: The user likely finds the page unhelpful because the link they were looking for was hidden in a line of text. Therefore, one possible solution is to create a new section title on the Muni (SFMTA) page for "Rider information" with the link to the "new rider information" to the side of it. A bulleted list of some of the major topics covered on this page can also be listed. This will call attention to the link and give more context on what information is provided there.	
Possible trade-offs: This solution would take up more screen space and push other content further down on the page.	
Relationships: Group3-TA-02 "Difficult to find page with information on bus entrance" Group3-CW-04 "New Riders Info" link hidden in text block	

No. ***G3 -TA04***	**Problem/Good Aspect:** Problem

Name:
User does not notice "I want to avoid 'gotchas'" link

Evidence:
Video 6:33 – 7:25.
On the “Info for New Riders” page, the link "I want to avoid 'gotchas'" will take the user to the section of the page with information he is looking for. However, the user does not click the link and does not speak the title of any of the right hand links while speaking other text on the page. Instead, the user scrolls down the page, causing the links to disappear, until he eventually finds the information.



Criterion: 4 - The user accomplishes the task, but in a suboptimal way

Explanation:
The user seems to not notice the links in the right of the page that would take him directly to the topic that he wants. Therefore, the user must scroll through a very long page, reading the headings of various sections and questions as he goes.

Severity or Benefit:
Rating: 2.67 – (Almost) Major (Group Average)
Justification (Frequency, Impact, Persistence):
Frequency: Medium. Although many users will not visit this page, most of the users who do are likely to overlook the navigational links in the right hand column.
Impact: Medium. The user was able to find the information by scrolling, but it

took over a minute and it is unclear if a less determined user would have put the effort into scanning the entire page to find the desired information. ***Persistence:*** Medium-High. The user did not learn how to use the navigation links on the page, so the same problem would occur next time. One would assume that with frequent use of the page, a user would eventually notice and use the navigation links. ***How these factors are weighted and why:*** Since this issue has medium frequency and impact and a medium-high persistence, it is a major issue.
Possible solution: The side menu is too small and in an unusual spot that is likely to be ignored by the user. Therefore, placing the aforementioned links at the top, center of the page like a standard FAQ page layout would alleviate the issue. Having “Back to top” links at the bottom of each section would allow the user to get back to the list more easily.
Possible trade-offs: This will push content a little further down the page. It also means that the user may miss reading some of the other information on the page.
Relationships: Group3-TA-02 “Difficult to find page with information on bus entrance” Group3-CW-05 “Link to ‘Gotchas’ is easy to overlook”