

PriceTag

Collaborative Shopping System

Human-Computer Interaction Methods

Carnegie Mellon University

December 3, 2008

Group 16

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Executive Summary

While working together for the semester, our group found that working towards a common goal helps members of a group to get to know one another and to build a community that is closer. This inspiration along with the methods learned throughout the semester and the meetings with our instructors Bonnie and John led to the main theme of our collaborative shopping system: community.

A collaborative shopping system allows the users to work together towards an end goal. Throughout the process, our system allows the users to get to know the likes and dislikes of the group they are shopping with through the tags and comments each user can leave about a product. This allows the group to get to know each other a little better even when verbal communication is not an option.

Another theme for the system was automation. When purchasing an item, there is a limited time frame. Automating the saving of the ads in a database allows the user to see more ads in a given amount of time. The automatic ordering also helps the group to choose an item faster by showing the items with the features the group liked more overall near the top, eliminating the time spent looking through all the ads again.

The last theme of the system was the elimination of double work. By storing all of the ads in one place, users would not have to send countless emails back and forth with links to ads. The group would be able to spend more time looking at ads and would be able to see quickly which ads other members of the group had already looked at and the opinions about the product based on the tags.

To develop the system our group brought together the expertise of computer science, communication design, information systems, and cognitive science. This allowed us to look at the product from many points of view and to go far beyond what any of us alone could create.

The first method that our team used in designing the collaborative shopping system was conceptual inquiry and conceptual design. These helped us to see the flow of work and the important aspects the system needed to support. Next our group used the heuristic evaluation method. This helped us to learn important design heuristics, which we applied to our own design. The keystroke level modeling inspired us to leave behind switching to a program to make comments about the ad and instead tag important features and write comments within the same tab as the product ad. Cognitive walkthrough and think aloud reminded our group to keep the user of the system in mind and the previous knowledge they would have before ever using the system.

Our design allows the freedom for each individual to choose when and where to look at couches while still encompassing each individual within the group using group preferences and a shared repository of items found.

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Themes

Community

The scope of the challenge tackled by the system far surpassed the selection of a product. Indeed, the couch purchase was the common goal of the group we studied to create the system, but it was quickly discovered that the interactions of the group, the community tasked with making the decision, was the subject of concern.

The system does not select the product on behalf of the group. Instead, it facilitates and mediates the interactions between the people who are purchasing the product. In effect, it is a tool that fosters the development of a community that becomes closer throughout the process of achieving the common goal. It is a tool that enhances communication, relays ideas, and brings people together when they cannot be physically present.

During the Contextual Inquiry process, our group realized the importance of the flow of information and the exchange of artifacts. It became immediately clear the burden of information processing was largely associated with the challenge of effectively communicating ideas and preferences between group members.

Automation

Time is a limited and scarce resource. It is a resource that is not trivially extended – one cannot simply purchase substantial grants of time. The practical way to optimize the use of time is to delegate tasks to others so that one's own time may be spent pursuing tasks of higher priority. In this case, collaborative purchase of an item can take a lot of time. By offloading the overhead of the collaboration process, the time necessary to achieve the common goal can be greatly reduced.

In the Contextual Inquiry process, our group realized that the limited time of each person involved in the shopping process warranted the use of automation to create a persistent medium on which to conduct a community effort without the necessity of each person's physical presence.

Automation not only offloads the time cost of collaborative shopping, but also enhances the ability of each person to communicate and visualize only relevant information. One flaw due to the automation is the system cannot support non-internet based ads that a user may find. Our group decided not to support these because the user would have to enter the information into the system. This would be more time consuming for the user.

Elimination of Double Work

An inefficiency of many group processes is double work. Rather than repeating tasks that have already been done, users can share results with each other. However, often it is impractical or considered inconvenient to achieve the level of communication necessary.

During the process of Contextual Inquiry, we observed the mention of double work when ads previously rejected by a group member were re-examined by another group member because they were unaware of what has already been done.

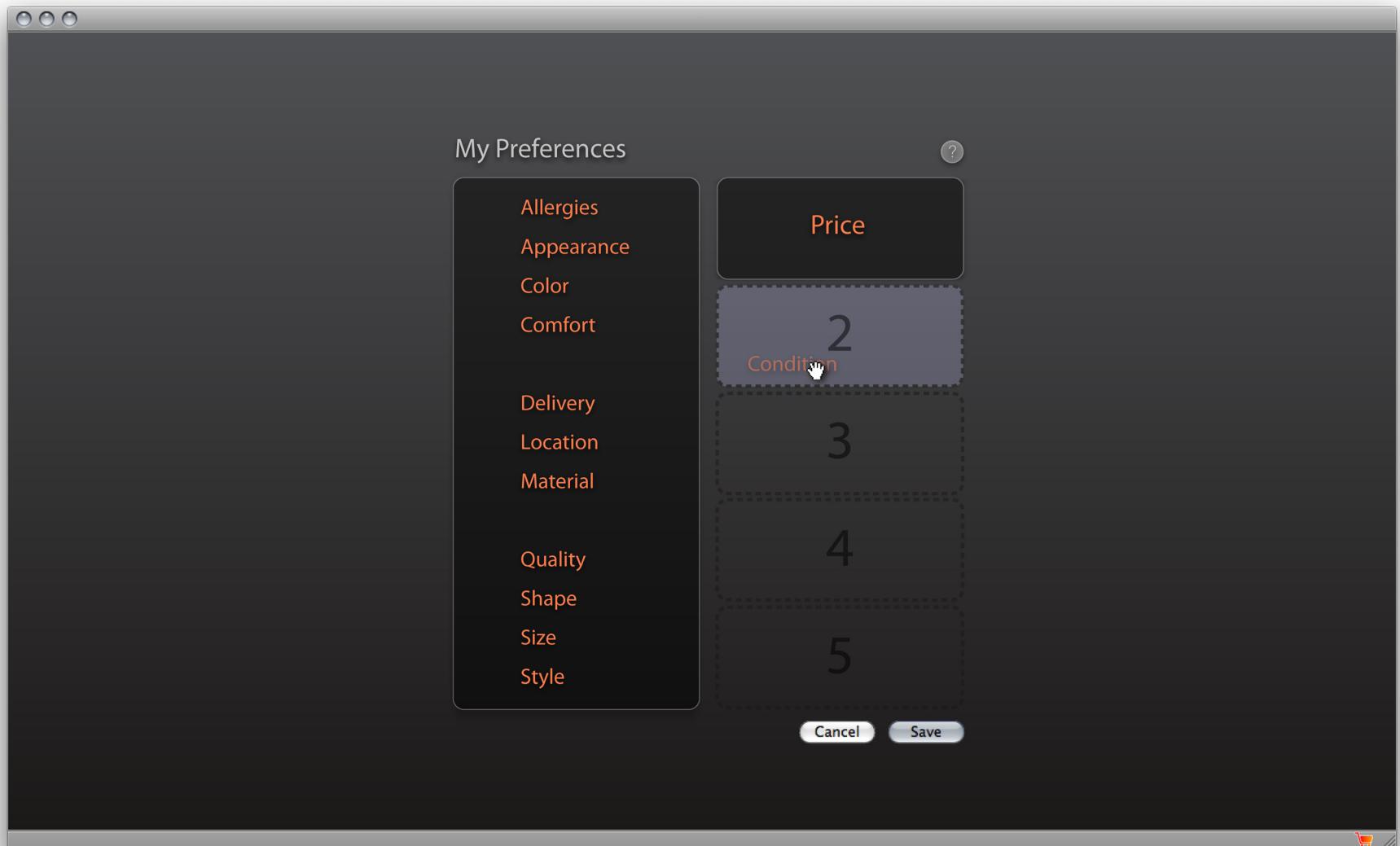
Our system enhances communication to reduce the level of double work. All ads that have been viewed are automatically marked as such and communicated to the other members of the group when they are viewing ads. Thus, each user does not need to start from scratch in viewing ads nor does each user need to manually track the status of each ad viewed and communicate the continually changing status. The system takes care of ensuring the communication each step of the way.

Preference Setting

When starting a shopping session, the users set up their preferences for the session. These preferences represent what aspects the users are looking out for in the product. Based on the title that the users entered when first starting the session, the system will provide a list of up to 20 commonly used and relevant preferences. The users then pick 5 each and rank them in order of importance. The selection of preferences came from the flow and cultural models. The group had verbal discussion about what sort of couch to purchase and each of user's preferences influences the other users.

The selected preferences are then combined to provide a set of group preferences. These group preferences will in turn be used to calculate a group preference score for each item that will be used to rank the product.

To determine which preferences are included in the group preference list, as well as the priority of that preference, a simple algorithm is employed to weight each preference. Preferences ranked #1 by a user are given 5 points, all the way down to a preference ranked #5, which is given 1 point. The preference scores are then added up for each user and preference, and the top 10 preferences (based on combined score) will be included in the group preference list.



Group Preference Updating

After the group preferences have been set, it is still possible for users to re-rank the group preferences, to reflect a change in their personal priorities that might occur throughout the shopping experience. This was supported through the discussion with the instructors and from the CI where the user changed her mind as to how strict she was about allergies. After the initial preference setting (as described in the previous section), the top 10 preferences or so are set. Users can then re-rank the preferences in that list.

As the user reorders the list, a second ranked list is shown below, which represents how the group preferences are affected by the user's personal priorities. Changing the priorities for an individual user may or may not cause the group ordering to change, as the group ordering is based on a collation of all of the users' preferences.



Tagging

Tagging is one of the major features of our redesign. Tags are generated from the preferences each user sets before starting the shopping sessions. While browsing an item, the user can bring up the sidebar. There are three parts on the sidebar: "Likes", "Tags", and "Dislikes". The "Tags" section is where the tags are initially. The size of each tag is correlated to the priority of that preference i.e. the higher the priority of a preference, bigger it is.

The user can drag and drop each tag to the "Likes" or "Dislikes" section in accordance to their preference. As the user drags a tag over either the "Likes" or "Dislikes" section, that section will be highlighted. After every action, the status is automatically saved so that the user does not have to save it explicitly. Tagging allows the system to support sharing an opinion as seen in the flow model. The tagging was implemented to save time over the time it takes to type a comment.

Also, given that the drag and drop interface for tagging may be foreign to some users, we have chosen to provide context sensitive help in the sidebar. The context sensitive help is accessible through a button with a question mark on it. After our group went through the Cognitive Walkthrough and Think Aloud exercises, we determined that users who were unsure about how to use an interface often looked for help, and that the question mark icon was the most obvious to them, which thus led to our decision to place a help button on screen.

Couch And Love Seat

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Couch And Love Seat - \$750 (North Hills)

Reply to: sale-912545644@craigslist.org [[?\]](#)
Date: 2008-11-09, 9:23PM EST

Sofa and Love Seat Sage Green .One year old excellent shape all reasonable offers considered,412 369 5044



- Location: North Hills
- it's NOT ok to contact this poster with services or other commercial interests

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My View [?](#)

Likes

Condition

Price

Color

Size

Location

Dislikes

Group View

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My View [?](#)

Likes

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Price 

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Group View

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Comments

While browsing for an item, the user can click the Comment icon and leave comments. A comment box will appear, together with Save and Cancel buttons. Once the user is done entering comments, he can click the Save button and be brought back to the tagging interface. Clicking on Cancel does not save the text, and brings the user back to the tagging interface.

Comments can either be viewed on the item page, in which the user can see the number of comments left by other users and view them directly on that page. Comments can also be viewed from the Central Repository page using the Quick Look feature; the user can bring up the page for an item that shows all the comments.

Comments are especially useful when the users need to leave notes about the items that cannot be easily expressed with tags. Moreover, since the comments are more personal than just tagging are readily available to other users for reading; they can be useful for creating a community.

Couch And Love Seat

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My View ?

Likes

Condition

Price

Color

Size

Location

Add Comments

Cancel Save

Group View

Group View

While the sidebar is active, the user can click on the Group View button to see what the other members of their group have said about the product. This view shows the tags that other group members have listed as "Likes" or "Dislikes", as well as any comments they have written.

This feature helps to support communication between group members even if they may not be able to meet physically. The flow model showed that the communication between the groups needed to be supported.

Couch And Love Seat

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My View

Group View ?

Automatic Group Ranking: 1 of 32

Annie



Likes: Condition, Color, Size
 Dislikes: Price
 Comments: Sophisticated but pricey!

Can



Likes: Color, Size
 Dislikes: Price
 Comments: I think this might be a bit too pricey. Looks nice but kind of overkill...

Dave



Likes: Condition, Color
 Dislikes: N/A
 Comments: It looks really clean!

Jenny



Likes: Color
 Dislikes: Price
 Comments: I am not sure if the cushions are foam...

ZQ



Likes: Condition, Color, Price
 Dislikes: Size
 Comments: I like everything except the armrests look a little small.

Central Repository

An important feature of the collaborative shopping system is the central repository. Within the central repository, there are many features that make it useful. The central repository provides a place for the group to look through all of the products that are found. The repository lists the items found according to weight of group preferences or in the order the couches were added. The couches are sorted in one dimension to encourage the users to open the Quick Look for more information about the couch, which will help to build community through knowledge of the other group members.

The products, which the individual user has not looked at, will be highlighted with orange borders so that they pop-out and the user will be able to find new products easier. The user will also be able to filter based on the products they have already seen or the products they have not seen.

The individual product icons can be clicked on to bring the user to the original page the product was found on in a new tab. Every time a user logs onto the system, it will do an automatic check to make sure each of the links is working; if the link no longer works the system will gray out the product and put an x through it to show that the couch has been sold or the link no longer exists.

The repository will have multiple pages, which can each be accessed through the use page markers. The top of the page displays the subset of couches that are being shown out of the total amount of couches. The repository was designed to support the flow of the work seen in the flow model. It supports role sharing and allows the group to see what other group members have done to prevent double work.

Show: All Sort by: Automatic Group Ranking Items 1-8 of 32

Couch & Love Seat
Price: \$750
Location: North Hills

Blue Couch & Loveseat
Price: \$400
Location: Washington

Couch & Chair
Price: \$125
Location: Mt. Lebanon

Dark Green Schnadig Couch
Price: \$250
Location: Ben Avon

Matching Couch & Love Seat
Price: \$60
Location: Ohara

Tan Leather Couch
Price: \$75
Location: Sharpsburgh

Large Blue Couch
Price: \$30
Location: Cranberry Twp

Couch Dual Recliner
Price: \$75
Location: South Park

Filtering

The central repository can be filtered either by the items the user has seen and the items the feature has not seen. The filter showing the items the user has already seen allow the user to have a smaller subset to look through when looking for a particular couch they have already seen. The filter showing the items the user has not seen allows the user to look through couches they have not seen yet quickly. The filtering process was designed to support the sequence of the information and help the user quickly see the products others have added. It also supports the breakdown in the artifact model seen when looking for a particular ad. The user will now have a smaller subset to look through.

Show: All
 Unviewed Items
 Viewed Items

Sort by: Automatic Group Ranking

Items 1-8 of 32

The screenshot shows a dark-themed user interface for a classified ads website. At the top left, there's a dropdown menu labeled 'Show' with three options: 'All' (checked), 'Unviewed Items', and 'Viewed Items'. To its right is a 'Sort by' dropdown set to 'Automatic Group Ranking'. On the far right, it says 'Items 1-8 of 32' followed by four small circular navigation dots. Below these controls are eight furniture listings arranged in two rows of four. Each listing includes a thumbnail image, the item name, price, location, and a magnifying glass icon for more details.

Thumbnail	Item Name	Price	Location	Actions
	Couch & Love Seat	\$750	North Hills	
	Blue Couch & Loveseat	\$400	Washington	
	Couch & Chair	\$125	Mt. Lebanon	
	Dark Green Schnadig Couch	\$250	Ben Avon	
	Matching Couch & Love Seat	\$60	Ohara	
	Tan Leather Couch	\$75	Sharpsburgh	
	Large Blue Couch	\$30	Cranberry Twp	
	Couch Dual Recliner	\$75	South Park	

Automatic Ordering

On the central repository of our system, the products can be ordered using "Automatic Group Ranking". This uses the scores for each preference in the group preference list, and the ratings that users have given the item based on those preferences (like, dislike, neutral).

Each item has a score that is determined by preferences. The system works as such: If a user likes a certain aspect of a product, he indicates that by dragging the appropriate tag into the "Likes" box. The tag represents a preference, such as "price". This lets the system create a quantifiable score for each product. The weight of that preference is added to that item's score. Similarly, dragging a tag into the "Dislikes" box causes the system to subtract the weight of that preference. A score of 0 is given if a user did not rate that particular preference.

The products are ordered according to their scores; the product with the highest score is shown first. The system takes into account the agreement among users; as more users "like" a certain product, its score gets bigger and it is placed higher in the ordering. This was designed from the limited time to find a couch as seen in the CI and to support quickly displaying the product that was liked to the group as seen through the emails in the flow model.

Show: All Sort by: ✓ Automatic Group Ranking Newly Added

Items 1-8 of 32 ● ● ● ●

The screenshot shows a dark-themed user interface for a classified ads website. At the top, there are three circular window control buttons. Below them is a toolbar with a search icon, a refresh icon, and a user profile icon. The main content area displays eight furniture items in a grid. Each item has a small thumbnail image, a title, a price, and a location. A search bar is located at the bottom of the page.

Thumbnail	Title	Price	Location
	Couch & Love Seat	\$750	North Hills
	Blue Couch & Loveseat	\$400	Washington
	Couch & Chair	\$125	Mt. Lebanon
	Dark Green Schnadig Couch	\$250	Ben Avon
	Matching Couch & Love Seat	\$60	Ohara
	Tan Leather Couch	\$75	Sharpsburg
	Large Blue Couch	\$30	Cranberry Twp
	Couch Dual Recliner	\$75	South Park

Redesign 25

Quick Look

From the central repository, each couch will have a button to open a dialog box allowing a quick view of the item. This dialog box will show the comments and tags given by the other group members about the product. The same picture of the product as in the central repository will show up on the left side of the box. On the right side, each group members' name will be listed along with the tags they put under "Like", "Dislike", and any comments they left.

This feature is for the convenience of the user to have all group comments on the same page. It is also meant to build community within the group through getting to know each other when they are not physically together. To get back to the central repository page, there is a small button in the bottom right corner that closes the box.

Show: All Sort by: Automatic Group Ranking Items 1-8 of 32

Couch & Love Seat

Price: \$750 Location: North Hills Added: 11-09-2008, 09:23PM EST

Automatic Group Ranking: 1 of 32

Matching Couch & Love Seat
Price: \$60 Location: Ohara

Tan Leather Couch
Price: \$75 Location: Sharpsburgh

Annie Likes: Condition, Color, Size
Dislikes: Price
Comments: Sophisticated but pricey!

Jenny Likes: Color
Dislikes: Price
Comments: I am not sure if the cushions are foam...

Can Likes: Color, Size
Dislikes: Price
Comments: I think this might be a bit too pricey.
Looks nice but kind of overkill...

ZQ Likes: Condition, Color, Price
Dislikes: Size
Comments: I like everything except the armrests
look a little small.

Dave Likes: Condition, Color
Dislikes: N/A
Comments: It looks really clean!

Couch Dual Recliner
Price: \$75 Location: South Park

This screenshot shows a user interface for a couch and love seat listing. At the top, there are filters for 'Show' (All) and 'Sort by' (Automatic Group Ranking), along with a page indicator 'Items 1-8 of 32'. Below this, a main card displays a large image of a green couch and love seat set in a living room. The card has a title 'Couch & Love Seat', price '\$750', location 'North Hills', and a timestamp 'Added: 11-09-2008, 09:23PM EST'. Below the main card are two smaller cards for 'Matching Couch & Love Seat' and 'Tan Leather Couch'. To the right, five user reviews are listed in cards, each with a profile picture, likes, dislikes, and a comment. The reviews are for users Annie, Jenny, Can, ZQ, and Dave. A sixth review card for 'Couch Dual Recliner' is partially visible on the right. The bottom right corner features a shopping cart icon.

Retrospective

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Contextual Inquiry & Design

Contextual inquiry (CI) is a way for a team of developers to gather data about the user's needs. It is important in the design process because the designers are not the users and cannot know what the user wants and needs based on their own experiences. The CI allows the developer to find the room for development and new products within the current environment.

CI must be done in the field because it is important to see what the user actually does instead of the user trying to recall what they usually do. Our group found that the context in which the information is used is as important as what the user says about the system. Users cannot remember how often they do something or the last time that they did it or on an absolute scale how much they like something. This makes it important to observe what the user does and what the important steps of the task are that must be supported.

Our group looked at the CI data at the beginning of the redesign of the shopping system. Before starting the redesign process, while making the models, our group thought that the CI and contextual design (CD) process was not worth our time. During the redesign we saw how the process is useful in showing the user's capabilities and constraints. Looking at the models, allowed us to see the shopping process from a different point of view and opened up new ideas. Within the data, we saw that collaborative shopping is not just about buying the item needed, but it is about getting to know the members of the group and building a community.

The CI can be done before the design team knows anything about the product area. The CI helped our group to gain information about what to make compared to the other methods which help to refine the system to make it more usable. In this way, CI can be used before any of the system has been developed while the other methods need at least a partially developed system. The CI can also be used to suggest tasks for the methods that require a task such as the keystroke level modeling, cognitive walkthrough, and think aloud.

CD follows the CI process. CD is the development of models which represent the work of the user in a qualitative way. The models represent the flow of communication in the system, the cultural influences, the detailed sequence of the subtasks, the physical environment in which the task is done, and the details of the artifacts used. Our group found that it is important to model the artifacts because in the case of couch ads, each seller provides a different set of information and a user needs a way to compare the information. One improvement our group would like to see in models is a weight system for the breakdowns. Each breakdown is not of the same importance but is represented that way in the models. A weight system would bring out the more important information.

Our group found that building the models from the CI data is a very subjective process. The design team must interpret the data from the CI videos and infer information. Our team found it is easy to infer more than what is in the provided information. There would often be a group discussion to develop a group consensus about what something meant. It is useful to have a more experienced interviewer so that less follow-up is needed after the interview.

The CI method is an empirical method that requires users. The use of users, however, can make the method more expensive to use. The cost includes preparing for the interviews, conducting the interviews, follow-up questions if needed, and building of the models. The cost of the interviews depends on the cost of the users' time being used. Interviewing more users make the models more representative but would cost more. Our group found that the one interview used for class may not have been representative of every collaborative shopping experience. One issue with the CI is making sure to find users that are representative of the work being done.

Heuristic Evaluation

Heuristic evaluation (HE) is a usability engineering technique that is based on evaluating a design against a set of usability practices, or “heuristics”. HE can be used very early in the design process and does not require users or tasks. Described as a “discount usability engineering method”, it can identify obvious problems easily.

HE does have its drawbacks. As it does not have a theoretical backing like some of the other methods do, it is not validated and may be at times unreliable. Also, HE is disconnected from users and tasks, and thus may find problems that the user might not experience or problems that are not important for the usability of the system. Moreover, given its tight relationship with a static set of heuristics, it might be not suitable for evaluating cutting edge technology.

Our group used HE in the beginning of our redesign process to investigate one of the currently available systems, Wetpaint. Our group felt that HE was probably the most straightforward method we have used. Although expert evaluators might have been required in special domains, our case was general enough that we did not require them. The fact that we did not need prescribed tasks made it easy to get good coverage.

Although the process for finding the problems was not difficult, our group found it much harder to combine the individual Usability Aspect Reports (UARs). Despite HEs rigid structure with a set of heuristics and guidelines for filling in the UARs, the lack of theoretical backing made it hard to use the method objectively. Our group found that choosing a severity ranking was a very subjective process. While combining our UARs, we often had discussions on how to rank the UARs and what aspects affected the severity of the problem.

As a group, we generated 35 negative aspect reports and 14 positive aspect reports with very little overlap between all the reports, only 1 aspect is found by at least 3 of the 5 members. As obvious from our chart, different

evaluators found disjoint sets of problems. The lack of overlap gave us better coverage of the system but left us unsure of the quality of our coverage.

HE as a method was best used in accordance with Contextual Inquiry. Often times, our group tried to rely on the data from CI to make more relevant and objective decisions especially with regards to rating the severity of the issues. It was harder to combine the data from HE with other methods directly; we used the HE on a specific website that was used only in the Keystroke level modeling (KLM) in addition to HE. Running a separate Think-Aloud study on the Wetpaint would have possibly confirmed our findings from HE.

Because the HE heuristics are not universal for all systems, our group suggests having methods to create new heuristics. Some heuristics might lose their validity with new technology and currently creating new heuristics is an expensive process requiring experts. Some guidance to evaluators on how heuristics are generated might be useful for making this method relevant for future studies also. Understanding how the heuristics are generated would provide a deeper understanding of the heuristics and where they apply.

Our group believes HE helped us become better usability engineers indirectly. Being able to discuss the good and the bad aspects of a website using well-defined heuristics rather than using ambiguous terms helped us express our design ideas succinctly. Moreover, just working with heuristics made us more conscious about certain issues such as "Match between system and real world" and "aesthetic and minimalist design", and this certainly helped us create a better design.

Keystroke Level Modeling

Keystroke level modeling (KLM) is a technique used to estimate how long an expert user will take to perform a task with a certain interface. Creating a KLM using automated tools, like CogTool, is quicker and less error prone than making the model by hand. KLM is used to compare performance between multiple systems and designs.

KLMs have a more gradual learning curve and do not require the evaluator to be an expert in GOMS (Goals, Operators, Methods, and Selection rules), as the method of calculating a predicted time using KLM is a simple matter of following predefined rules. Also, with CogTool, KLM results are easy to obtain as the system does all the calculations, and the evaluator needs only to analyze the models.

However, KLM does have problems. Setting up and analyzing a KLM test without the use of tools is time consuming and tedious. Also, KLM assumes that the user being modeled is an expert, and thus does not take into consideration mistakes or slip-ups. In addition, since the method is designed to estimate time taken for an expert user, the times reported will typically be faster than the average case. Setting up a KLM test requires some care, as the correct widget types and sizes need to be set or inaccurate results could arise.

Our group utilized KLM to study the differences in performance among various methods (Gmail, Google Notebook and Wetpaint) of sharing a link and comment about a particular couch advertisement. The use of CogTool greatly simplified the task and provided an easy method to compare the different interfaces. An analysis of CogTools' output gave an insight into the critical path of performing a task with a given interface, and allowed us to determine an interaction path that is efficient. Also KLM could be used as part of the redesign process after rough prototypes are developed. CI/CD provides the ideas for the redesign, and the other techniques tweak the interface, and then KLM can be used to see if there is an improvement between iterations in the time each interface takes to accomplish a task.

KLM tends to find different problems from CW and HE, as KLM deals mainly with the time it takes to accomplish a task within an interface, while CW and HE deal with the usability of an interface, including the look and feel. CW and HE tend to follow a set of rules and find violations of those rules, while KLM implies problems based on the estimated performance of the user (e.g. if a certain task takes an exceptionally long time to complete with a certain interface, KLM can hint at what features of the interface created the increase in time). However, KLM did give us an idea on how to optimize the interface, as it made us more conscious about how different components affected the performance of the interface. Also, KLM brought to our attention the time it takes to change from keyboard to mouse and vice versa, which we would normally not have thought of.

An improvement to KLM would be to provide an extension to CogTool that would operate on an actual interface. The extension would monitor what the user does and automatically generate the interface elements and sizes needed for the task. This would reduce the amount of errors stemming from incorrect choice of interactive components. The evaluator would be able to tweak the sizes or components as necessary to achieve an accurate prediction.

Cognitive Walkthrough

Cognitive walkthrough (CW) provides valuable information on the effectiveness of a user interface by examining how a novice user interacts with an interface. It is task-oriented and the reviewers evaluate the interface by considering how a user with the goal of accomplishing a task will do so.

For many reasons, CW is efficient and beneficial to perform. Compared to model-based processes such as KLM, CW is more holistic and covers processes beyond the scope of individual interface elements. Our group observed that the problems discovered in CWs tend to be more knowledge, temporal, and sequence based as a scenario is a set of time-based steps. In CWs, assumptions are developed during the process. The assumptions about the user affect the set of problems which are found with the interface.

Developing a set of assumptions as we reviewed the transitions was an effective way to identify the prior knowledge and context required for success given the interface. This was beneficial as this information can be used to compare with the intended target user's background to determine the likelihood of overall success and user acceptance in a real-world deployment of the interface.

CW is a very subjective process, and its success is contingent on the performance of the reviewers and the reviewers' understanding of the cognitive theory of learning by exploration as well as the intended target audience. In addition, the scope of the walkthrough has inherent flaws of defining a certain type of scenario. Therefore, unless CWs are exhaustively performed for all scenarios, the results may be skewed depending on reviewer preferences. When reviewers perform CWs, they are assuming the role of the user. This could lead to very inaccurate assumptions as the reviewer and the user may have very different backgrounds and it may be hard for the reviewers to put themselves in the mindset of the user.

In our group, we used CW to examine a user placing an item for sale on eBay. For each step transition, we answered the questions of: 1) will users be trying to produce whatever effect the action has, 2) will the users see the control for the action, 3) once users find the control, will they recognize that it produces the effect they want, and 4) after the action is taken, will users understand the feedback they get, so they can go on to the next action with confidence. Often we found that these questions were ambiguous and given that we were in a group setting it would be challenging to reach a perfect consensus for each question. The ambiguity stems from the fact that in each transition, the isolated user mindset may be perceived differently, and within each transition several thought process steps may exist.

Some possible improvements to the process include extensively reviewing the assumptions based on a thorough analysis of target personas and validating this with data collected in real-world situations, as well as clearly defining the objectives of the CW ahead of time and increasing the granularity of the steps (transitions) defined.

Think Aloud

The think aloud (TA) technique is considered the gold standard in usability testing. TA is related to talk-aloud and mediated processes and can be done in either the laboratory or the field with the use of laptops. There are three types of verbalization of thought: talk aloud, think aloud, and mediated thinking. TA differs from talk-aloud in that the information used in TA does not have to be linguistic in nature, and it differs from mediated thinking in that in TA the user should not be explaining what they are doing but just reporting.

Our group found that there are constraints on using the TA while doing a study. For the use of some systems a time constraint is an important factor. We found that when using the TA, the time the user takes cannot be measured because it takes longer to think aloud than it would normally take do the same task when not thinking aloud.

Our group found that this empirical technique could threaten external validity when the users are not representative. A large set of users is needed for the task so that the problems found will be more objective and representative of the general population. In our study, the novice user could not find the sell button on the front page but the user does not shop online often. Our group thinks it would be better to choose the users to test the system from a set of target users, such as those that shop online. The target users may have prior knowledge other users would not have, which would affect the problems found.

The use of the TA method can be expensive because of the use of users. Users must be found to test the system and then the qualitative data must be analyzed. This also makes the method time consuming especially if it is hard to find users. For lecture we did not have to find users to test our system but often much iteration is needed to find enough users.

TA is used later in the system development when some sort of prototype has been developed. It is often used after the HE or CW because those methods can find initial problems in the system that should be fixed before the user is brought to use the system. The TA can also be used to confirm problems found using the HE or CW methods. Our group found that many of the problems found using CW were not confirmed by our TA. The assumptions made for the CW were not true for the TA user making the problems encountered different.

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Appendix A: Complete UARs

UAR Code	Type	UAR Title
AT-HE-02	Good Aspect	Breadcrumbs present on "Create a free wiki" form
AT-HE-08	Problem	Lack of user controls while creating Wetpaint website
AT-HE-10	Problem	"Wetpaint Injected Developer Resources" page is inconsistent with rest of site
AT-HE-11	Problem	Wiki or Website?
AT-HE-12	Problem	No indication where user has navigated to
AT-TA-04	Problem	"Sell" link not visible
AT-TA-11	Problem	Local Pickup delivery option not visible
CD-HE-03	Problem	User cannot browse by all possible categories
CD-HE-08	Problem	"Wetpaint attachment" and "Wetpaint injection" are ambiguous
CD-HE-11	Good Aspect	The user is notified of existing usernames immediately
CD-HE-12	Problem	The user is not prevented to go onto the next step with identically named Wetpaint site

CD-HE-14	Problem	Progress indicator or creating Wetpaint sites are not accurate
CD-TA-05	Problem	The user is unable to specify Local Pickup as the delivery option
CD-TA-07	Problem	"Sell" link found on all pages is not visible enough
DC-HE-01	Problem	Incomplete validation for URL/Address in creation form
DC-HE-02	Problem	Green stripe to the left of form fields appear to be positive feedback indicator
DC-HE-03	Good Aspect	Undo/redo functionality in EasyEdit
DC-HE-10	Problem	Adding internal link requires user to enter URL
DC-HE-11	Problem	State of Bold ("B") button does not change when using Cmd-B shortcu until text is entered
DC-TA-06	Problem	User did not see the buttons in the top right for selling, etc
DC-TA-19	Problem	Local pickup is hard to discover, classified as a shipping option
JO-HE-02	Problem	Logo link back to the homepage
JO-HE-04	Good Aspect	Cancel button for injected process

JO-HE-08	Problem	Help search searches all Wetpaint websites
JO-HE-11	Problem	Error message without specifications for tags
JO-HE-12	Problem	Privacy policy opens in same tab
JO-TA-01	Problem	System does not have obvious sell link
JO-TA-10	Problem	Unclear how to enter the shipping information
ZY-HE-03	Good Aspect	Tabs on account setup screen indicate progress
ZY-HE-04	Problem	"Drop down" list does not behave as expected
ZY-HE-08	Problem	Site layout selector scrolling wraps around
ZY-HE-09	Problem	Tab states user is on final step, but button on bottom says "Next..."
ZY-HE-12	Problem	Cancel link does not ask for confirmation
ZY-TA-01	Problem	Link to "Sell" page is not obvious
ZY-TA-08	Problem	Unclear if "Local Pickup" can be selected in shipping details section

Appendix B: Feature Sources

Automatic Ordering

Cultural Model :

- “Campaign for my preferences”
- Bargain/deal

Sequence Model:

- “Send email with new ad to rest of housemates” (Possibly from this, as the email(s) do not list the couches in order).

Central Repository

Flow Model:

- “Verbal: planning, preference, price”

Cultural Model:

- Time devoted to task
- Shared vs. single buyer

Sequence Model:

- Breakdown “Can’t tell which ads have been rejected by housemates”
- Breakdown “Can’t find ad that she saw earlier in the session”
- “Housemate is available to review ads together”
- Intent “Examine Prospective couches sent by housemates”
- “Show new ads to housemate”

Artifact Model:

- Breakdown “Can’t tell which ads contain items that have already been sold”
- Breakdown “Can’t find previously viewed ad”
- “Links in purple marks an ad the current user has already viewed/considered”

Comments

Flow Model:

Breakdown "Inability to share opinion"

Sequence Model:

Breakdown "Can't mark an ad if she approves"

Filtering

Sequence Model:

Breakdown "Can't find ad that she saw earlier in the session"

Artifact Model:

Breakdown "Can't find previously viewed ad"

"Links in purple marks an ad the current user has already viewed/considered"

Group Preference Updating

Flow Model:

"Verbal: planning, preference, price"

Cultural Model:

"Campaign for my preferences"

Group View

Sequence Model:

Breakdown "Can't tell which ads have been rejected by housemates"

Artifact Model:

Breakdown "No indication of ads previously considered by co-shopper"

Preference Setting

Flow Model:

"Verbal: planning, preference, price range, status"

Cultural Model:

"Campaign for my preferences"

Quick Look

Sequence Model:

"Look at ad and consider picture and other features"

Tagging

Flow Model:

Breakdown "Inability to share opinion"

Cultural Model:

"Campaign for my preferences"

Sequence Model:

Breakdown "Can't mark an ad if she approves"

Intent "Prepare a reply but look for other ads to include in the reply" (tagging makes this part quick)

KLM:

Based on experience with KLM, we decided that dragging an object into large drop areas would be faster than having the user select from a drop down list for each preference item.

Appendix C: Group Heuristic Evaluation

Combine Aspect Report	Heuristic(s) Violated	Individuals	Average Rating
		UARs	
Negative Aspects			
Wrong typography for website menu selection The option to select a new image is presented in the same typography as the descriptions for elements are presented.	Consistency and Standards	cd-HE-13	1
Date of birth months as numbers The months in the birthday dialogue are presented in numbers instead of their English names. This causes the user to have to calculate each month.	Flexibility and Efficiency	cd-HE-05	1.2
No previous button When going through the website making or injection process, there is no back button to go to a previous page.	User Control and Freedom	jo-HE-06 at-HE-08	1.6
Marking required fields is redundant On this page, all the fields are required but there are still marks for "required" fields.	Aesthetic and Minimalistic Design	cd-HE-06	1.6
Multiple links to "Explore WetPaint Sites" There are multiple links within the same area on the Wetpaint homepage which bring the user to the same link.	Aesthetics and Minimalist Design	jo-HE-09	2
Controls on video are limited Video playback controls only allow for play and pause but does not allow you to go to a specific point in the video, for example through a slider bar.	User Control and Freedom	at-HE-01 cd-HE-01	2

Select category does not behave as expected The select category field looks like a drop down list, but does not behave like one. It shows a multicolumn list of options, instead of 1 option per row.	Consistency and Standards	zy-HE-04 cd-HE-07 dc-HE-09	2
Styling page requires scrolling to see preview Changing a style requires a user to scroll down the page to see the preview.	Aesthetic and Minimalist Design	zy-HE-07	2
State of “B” button doesn’t change in edit with keyboard shortcuts When changing the state of bold formatting using keyboard shortcut Cmd-B, the “B” button state does not change until the next keypress.	Visibility of System Status	dc-HE-11	2
My Profile/Profile links look similar On the wiki page, the captions “My Profile” and “Profile” within “My Profile” are not distinctly labeled or explained.	Recognition Rather than Recall	dc-HE-12	2
Options to view/edit are presented differently For the “who can view your site” option, there is only pure text, but for the “who can edit” section, there are pictures as well.	Consistency and Standards	zy-HE-05	2.2
Pulldown menu has no keyboard shortcut The pulldown menu is not accessible by keyboard shortcuts.	Flexibility and Efficiency	cd-HE-04	2.2
Wetpaint injection + attachment ambiguous The concepts “attachment” and “injection” do not make any sense in this context; they are neither related to each other nor related to any sort of web conventions.	Match Between System and Real World	cd-HE-08	2.2

Inconsistent sidebar within “Learn More about Wetpaint” The first seven links within this section keep the sidebar to go between the sections. In the “jobs” or “add wetpaint to your site” section the sidebar disappears.	Consistency and Standards	jo-HE-01	2.4
No status indication on navigation bar, tab highlight The navigation bar does not highlight where on site the user is currently at, nor does it include some kind of breadcrumbs to help users understand the structure of the site to help them navigate.	Visibility of System Status	at-HE-12	2.4
Cluttered UI There is a lot of instructional text in the right of the screen on the first step of the sign up process.	Aesthetic and Minimalist Design	zy-HE-02	2.4
EasyEdit asks for URL for internal links EasyEdit always asks for a URL for a link. There is no other way to insert links to internal URLs.	Recognition Rather than Recall	dc-HE-10	2.4
Create website asks to friend self When the user first creates a Wetpaint site, he is asked to get to know himself and even become friends with himself.	Consistency and Standards	cd-HE-09	2.4
Sends new message but unclear what message is When the user first creates a Wetpaint site, a notification appears on the top right but it is not clear what the message is referring to.	Consistency and Standards	cd-HE-10	2.4

Scrolling theme selector misleading	When selecting a style for your site, Wetpaint allows users to scroll through available webpage styles. The numbers up at the top show which page you are on, and you can jump to each page by clicking on a number. However, when you click on the left and right arrow buttons, the pages seem to go on forever, when in reality, it is simply scrolling through 3 pages continuously.	Match between System and Real World	at-HE-06 zy-HE-08	2.6
Green stripe for required field is misleading	A green stripe is displayed to the left of required fields. Green in real world situations typically represents positive feedback.	Match Between System and the Real World	dc-HE-02	2.6
Inconsistent naming of service	Wetpaint is inconsistent about what they call their service. On some pages they tell users to create a free website, and on others they will insist that users start a free wiki.	Consistency and Standards	at-HE-11	2.8
"Exit" from EasyEdit doesn't warn about discarding changes	Using the "X" button in EasyEdit mode to exit does not prompt the user that the changes will not be saved.	Error Prevention	dc-HE-04	2.8
Mistakenly asks about own post	When posting a new thread, the system asks the user if his or her own thread is helpful.	Aesthetic and Minimalist Design	dc-HE-08	2.8
User cannot browse all categories	The user is allowed to pick from 20 categories but in the Explore page, only 9 of those categories are listed.	Recognition Rather than Recall	cd-he-03	3
Ambiguous error in tagging process	When trying to add a tag to an injected website, an error occurs whenever the tag tool is used. The error message does not report what error is happening.	Help User Recognize, Diagnose, and Recover from Errors	jo-HE-11	3

Privacy policy opens in same tab When filling out the information to create the website, there is a privacy policy link within the application that if clicked on, opens in the same window without a way for the user to return to the website process.	User Control and Freedom	jo-HE-12	3
Modal dialogs break elements When "Sign in to Wetpaint" is clicked, a popup box appears containing sign in fields. While this box is open, users are still able to explore the webpage. However, the "See how Wetpaint works" video seems to disappear, and reappears only when you close out of the sign in box.	Consistency and Standards	at-HE-07	3
Last part indicator is misleading The tab (which represents current system state) says that the user is on the final step, but there is a button to go to another step at the bottom of the screen.	Visibility of System Status	zy-HE-09 cd-HE-14	3
"Cancel" doesn't ask for confirmation The cancel link just links back to the Wetpaint homepage without asking the user for confirmation.	User Control and Freedom, Error Prevention	zy-HE-12	3
Logo link to homepage When "Developer Resources" is clicked on at the main navigation bar, Wetpaint takes you to what looks like a separate page with developer resources. While the Wetpaint logo on each page usually takes you back to its homepage, the one of the Developer Resources page simply takes you back to Developer Resources.	Consistency and standards	jo-HE-02 at-HE-10	3.2
Search in "Help" searches entire Wetpaint The list of results from a help search returns links that do not pertain to help articles or posts.	Help and Documentation	jo-HE-08	3.2

No validation in URL/address

In the creation form, the URL/address field does not warn for validation errors of invalid characters immediately, though it warns for other problems like duplicate name.

Error Prevention

dc-HE-01
cd-HE-12

3.6

Positive Aspects**Keyboard shortcuts**

The process of filing out information includes tabs to go through the fields and enter to go onto the next step.

Flexibility and Efficiency of Use

jo-HE-10

1.6

Green bars for required fields

Required fields have a green bar next to them to indicate that they are required fields.

Error Prevention

zy-HE-10

2.2

Grayed out buttons for editing privileges

If the user clicks on only invited users can view the website, then the first two options for who can edit the website are grayed out.

Error Prevention

jo-HE-05

2.6

Homepage has minimalist design

The website uses keywords such as "free" and uses a simple two-line form.

Minimalist and Aesthetic Design

at-HE-04

2.6

Red highlight of missing fields

If the required fields are not filled out and the user tries to continue to the next step, red text will highlight the fields which remain to be filled out.

Help User Recognize, Diagnose, Recover from Errors

jo-HE-03

2.8

Immediate preview of styling

When picking a new layout, the bottom panel updates to show the new style.

Visibility of System Status

zy-HE-06

2.8

Check username availability

There is an immediate feedback of whether the username entered already exists or available

Error Prevention

cd-HE-11

2.8

Breadcrumbs for showing progress	There are checkmarks and different shades of highlighting to indicate how much of the process the user has completed.	Visibility of System Status	jo-HE-07 at-HE-02 zy-HE-03	3
Popups for form fields	Form fields that are not clear have links to a popup that provides a more detailed explanation.	Help and Documentation	at-HE-05 dc-HE-06	3
Progress bar for photo uploads	A progress bar shows the progress of uploading photos in the photo gallery.	Visibility of System Status	dc-HE-05	3
Tabbing for to-do sections	Tabs are used to separate the sections of the to-do feature.	Aesthetic and Minimalist Design	dc-HE-07	3
Cancel button in webpage and injected process	A cancel button/link is present at the bottom left of any process screen (injection, webpage creation)	User Control and Freedom	jo-HE-04 zy-HE-11	3
Popup for creating similarly named sites	Popup informs users right away if their URL has been taken, also indicating if a site related to the subject matter has already been created, allowing users to visit and contribute to those pages instead of creating a new one.	Error Prevention	at-HE-03 zy-HE-01	3.4
Undo/redo in EasyEdit	EasyEdit allows the user to undo/redo most actions in the editing mode.	User Control and Freedom	dc-HE-03	3.6
Only one Wetpaint account needed per user	When creating a new website on Wetpaint, users are prompted to create a new Wetpaint account, however if the user already has a Wetpaint account, he does not need to create a new account.	Match Between System and Real World	at-HE-09	4

No. **Group16-HE-01**

Problem/Good Aspect: **Problem**

Name: No validation in URL field

Evidence:

Heuristic: Help users recognize, diagnose, and recover from error

URL: <http://www.wetpaint.com/wiki?zone=cyoGo&wikiName=&wikiUrl=>

Upon typing invalid characters for the URL field, the system does not provide immediate feedback.

Create a URL / Address .wetpaint.com Example: "mountainbike"
The value may contain only letters and numbers with no spaces.

Create a URL / Address .wetpaint.com Example: "mountainbike"

Explanation: **The website does not provide immediate feedback for invalid URLs to the user; it only shows there is an error after the user tries to move to the next step. This is a violation of the *Help users recognize, diagnose, and recover from error* diagnostic because it does not help the user to recognize an error.**

Severity or Benefit

Rating: 3.6, This is a major usability problem

Justification (Frequency, Impact, Persistence)

Frequency: Medium, we expect some users to type in invalid URLs

Impact: Medium, an inexperienced might not know what kind of URLs might be valid

Persistence: Low, this will not be an issue after the initial encounter

How these factors are weighted and why: We weighted the impact and frequency high because all the users who are trying to create a Wetpaint site will have to go enter in a URL and inexperienced users especially are more prone to committing errors.

Possible solution and/or trade-offs: The website can provide instant feedback as the user is typing, telling user that the entered URL contains illegal characters. There is a chance of creating minimal visual clutter.

Relationships:

at-HE-03 [Benefit] Popup for creating similarly named sites

zy-HE-01 [Benefit] Popup for creating similarly named sites

dc-HE-01 [Problem] No validation in URL/address

cd-HE-12 [Problem] No validation in URL/address

No. **Group16-HE-02**

Problem/Good Aspect: Problem

Name: Search function in "Help" searches across entire website

Evidence:

Heuristic: Help and documentation

URL: <http://www.wetpaintcentral.com/?t=anon>

When the searches for something using the "Search" field within the help page, results irrelevant to documentation and help are shown.

How to Use This Site

Browse the [Table of Contents](#) or use the "[Search this wiki](#)" box in the upper left corner to find a topic. Can't find the answer? Post your question in the [Discussion Forum](#).

[66 website](#)

go on gangstazkillyou.wetpaint.com its gangsta and pimped still workin on it though but make an account and i might make u admin or stuff like dat if u tell me idea for it

Reply to thread:

[66 website](#)

(4 replies)

Thread location:

[Discussion Forum](#)

Keyword tags: [Chat](#), [embed](#), [games](#), [polls](#), [video](#), [widget](#), [widgets](#)

Posted: Jan 23 2008, 7:33 PM EST by Anonymous

Explanation: **The users come to "Help" section to find solutions to their problems but the search results are not related to help topics. This can further confuse the user who is already looking for help. This violates the *Help and documentation* heuristic since help is not readily available to the user looking for it.**

Severity or Benefit

Rating: 3.2, This is a major usability problem

Justification (Frequency, Impact, Persistence)

Frequency: Medium, we do not expect all users to try the help section but it will be frequent for all users who search help.

Impact: High, users on this page are already confused and they will not get help.

Persistence: High, there are no workarounds.

How these factors are weighted and why: We value impact highly because this is an important issue for inexperienced users.

Possible solution and/or trade-offs: Search on "Help" section should primarily show to actual help topics, preferably written by Wetpaint developers and other results should be optional.

There would be some development cost to this solution.

Relationships

jo-HE-08 [Problem] Help search searches all wetpaint websites

No. **Group16-HE-03**

Problem/Good Aspect: Problem

Name: Logo links to different pages

Evidence:

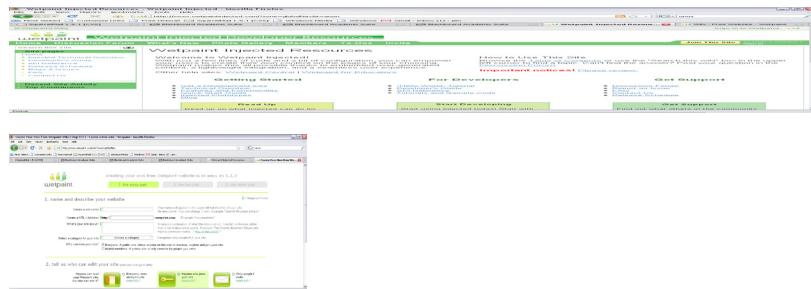
Heuristic: Consistency and standards

URL: <http://www.wetpaint.com/wiki?zone=globalNav>

<http://www.wetpaintinjected.com/?zone=globalNav>

<http://www.wetpaintcentral.com>

On certain pages like Wetpaint creation page, the Wetpaint logo on top left links to wetpaint.com, the main homepage. However, on other pages, such as the Developer Resources and Help, the same logo links to different pages, specifically the homepage of specific Wetpaint sites instead of the Wetpaint homepage.



Explanation: The same image, which is Wetpaint's logo is used in same locations on different pages and the user is expecting them to link back to Wetpaint main page. Also, it is a web convention to put a link back to the main page on top left part of a website.

Severity or Benefit

Rating: 3.2

Justification (Frequency, Impact, Persistence)

Frequency: Medium, we do not expect all users to try to go to the homepage using the logo.

Impact: Medium, it might take longer for user to get back to the homepage.

Persistence: Low, after a user encounters the problem once, he/she will figure out where the logos link to.

How these factors are weighted and why: We value the impact highly because it might unnecessarily consume time for the user to figure out a way to get back to the homepage.

Possible solution and/or trade-offs: Different logos could be used for different Wetpaint sites to notify the user that the logos link back to different pages.

Relationships

jo-HE-02 [Problem] Logo link back to the home page

at-HE-10 [Problem] Logo links back to homepage

No. **Group16-HE-04**

Problem/Good Aspect: **Problem**

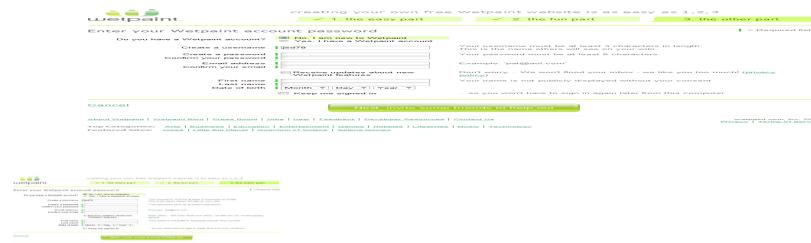
Name: Last part indicator is misleading

Evidence:

Heuristic: Visibility of system status

URL: <http://www.wetpaint.com/wiki/other>

On the “other” step, it is shown that the user is on the final stage although there are actually more steps.



Explanation: **After completing the first two steps, the user is shown that he is on the last step indicated by the highlighted tab. However, there are actually more steps after the “other part” that goes into creating a Wetpaint site.**

Severity or Benefit

Rating: 3, This is a major usability issue

Justification (Frequency, Impact, Persistence)

Frequency: High because it will be experienced by all Wetpaint creators

Impact: Medium, as it can be overcome easily but it is deceptive at first.

Persistence: Low as the users will realize this after the first time.

How these factors are weighted and why: Frequency is weighted highly because it will be experienced by all of the users who create Wetpaint sites.

Possible solution and/or trade-offs: The final step might be split into two sections so the user will have exact visual indication of their progress.

Relationships

jo-HE-07 [Benefit] Checkmarks for progress

at-HE-02 [Benefit] Breadcrumbs for showing progress

zy-HE-03 [Benefit] Breadcrumbs for showing progress

zy-HE-09 [Problem] Last part indicator is misleading

cd-HE-14 [Problem] Last part indicator is misleading

Aspect Report	David Chen (DC)	Can Duruk (CD)	Jennifer Olsen (JO)	Annie Teng (AT)	Zhiquan Yeo (ZY)
User cannot browse all categories					
Inconsistent sidebar within “Learn More about Wetpaint”					
Logo link to homepage					
No previous button					
Search in “Help” searches entire WetPaint					
Multiple links to “Explore WetPaint sites”					
Ambiguous error in tagging process					
Privacy policy opens in same tab					
Controls on video are limited					
Scrolling theme selector misleading					
Modal dialogs break elements					
Inconsistent naming of service					

No status indication on navigation bar, tab highlight					
Cluttered UI					
Select category does not behave as expected					
Options to view/edit are presented differently					
Styling page requires scrolling to see preview					
Last part indicator is misleading					
"Cancel" doesn't ask for confirmation					
No validation in URL/address					
Green stripe for required field is misleading					
"Exit" from EasyEdit doesn't warn about discarding changes					
Mistakenly asks about own post					
EasyEdit asks for URL for internal links					
State of "B" button doesn't change in edit with keyboard shortcuts					

My Profile/Profile links look similar					
Date of birth months as numbers					
Pulldown menu has no keyboard shortcut					
Marking required fields is redundant					
WetPaint injection + attachment ambiguous					
Create website asks to friend self					
Sends new message but unclear what message is					
Wrong typography for website menu selection					