A Usability Analysis of the Barnegat Light Beach Patrol Website

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Abstract

The following is an analysis of the usability of the Barnegat Light Beach Patrol (BLBP) website. A member of our group was on this beach patrol and decided to study this website in a few ways. Throughout this analysis, comparisons between our chosen website and another beach patrol website, Surf City, were conducted. Task analyses were also performed solely on the BLBP website. A usability analysis program known as Watchfire WebXACT was also used. As a result of all of the analyses, we found that the website actually had good usability. The main problem with the site was that there was a lack of content, which cannot be analyzed and is not a usability problem.
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1.0 Introduction

Everyone has come across poorly designed websites in their time browsing the World Wide Web. The main goal of a website is to be user-friendly. Mainly, the user must be able to find information about a business quickly and easily. The website we chose (blbpalumni.com) could be greatly improved. In this report, we analyze this website in a few different ways. We will also compare it to another, similar website for a couple of these analyses.

1.1 Barnegat Light Beach Patrol

The website, www.blbpalumi.com, was set up in early April 2007. Its sole purpose was to establish a means of communication for the “retired” members of the Barnegat Light Beach Patrol (BLBP), as well as provide updates on the beach patrol. It was created by Brian Heffernan, a former lifeguard in hopes of reaching this goal. However, after speaking with Brian, this goal has turned into a failure and not forgotten about. We intend to potentially bring this website back to the surface and make it flourish.

1.2 Surf City Beach Patrol

The website of comparison, www.surfcitybeachpatrol.com, was set up the spring of 2006. Its intentions were similar to blbpalumni.com, however it goes beyond that. It
provides many pictures, easy to use links, great content and a great choice of background/text color. The page consistency is great throughout all the links. There are many links on the top of each page, as well as the proper page heading on each. This site provides a great basis on which to follow to make blbpalumni.com a better website.

1.3 Explanation of Analyses

The website by itself has a serious lack of content, but that is only the tip of the iceberg. There are only six links on the far left-hand side of the screen, two of which lead the user away from the main design of the page. These links lead the user to either a chat room or a bulletin board, which will be discussed later in the report. The other four links contain very little information that can be useful to a user. Although the website tries to have good content, it simply is not enough. The visual perception is decent, but overall it is low in quality, some links are not needed and others need to be moved around. Also, text needs to be moved around and changes to make things stand out more or less.

There are many website out there to compare and contrast it to. For example, another beach patrol website, surfcitybeachpatrol.com is a great website that has a lot of content. This can be used as a model for a revamped website. The links are easily navigable, as well as big bold letters displaying what the website is (Surf City Beach Patrol). There are pictures laid out on the page as well as different texts to show different headings. The text is a little small, but still readable. This would be a good model to follow, but not mimic, as this website is not perfect either.
For the interface itself, we ran a couple of task analysis approaches to see how the interface could be made easier. The two methods we used are the Keystroke Level Model (KLM) and the Goals, Operations, Methods and Selection rules (GOMS) model. Using KLM, we predicted the amount of time it would take to perform certain tasks on the interface. These predictions will then be compared to the actual time it took users to complete these tasks. With GOMS, we analyzed how users can accomplish the tasks by breaking them down into goals and subgoals. From this model, we can learn how to make the interface easier.

As a final analysis, we ran an online program called Watchfire WebXACT, which can be found at this address: http://webxact.watchfire.com/. It allows users to test the content of webpages based on quality, accessibility and privacy. We ran this program on the homepages of both of the websites that we wanted to analyze. This program pointed out errors on each page that could be looked at. From this analysis, we were able to make some suggestions about how to improve the BLBP website.

2.0 Expected Content

This section of the report will detail content that a user of a beach patrol website would expect to see and utilize. With this information, we analyzed the content that was actually found on the two websites that were studied. Some common content was found between the two sites, while there was some content that was not common. The final part of this section will highlight some suggestions for the BLBP website that we have decided upon from this information.
2.1 Content Expected on a Beach Patrol Website

As with all websites, a beach patrol website must have a purpose for existing. The creators of the site must understand what their potential users will be looking for in order to create a successful interface. One way to come to this understanding is to expect what the site will be used for and what content to include. A list of general features for any generic beach patrol website can be found in Table 1.

Table 1. Content expected to be found on a beach patrol website.

| Location of and facts about beach patrol | How to join beach patrol |
| Contact information for beach patrol | News about upcoming events |
| Rules and regulations of the beach | Updates to the website |
| Information about beach patrol members | Contact information for webmaster |

As seen from the above table, most of the expected content refers to the beach patrol itself. Information such as facts about the patrol, the beach and how to obtain a job with the beach patrol would be very important information for most of the users of the website. Updates to the website and contact information for the webmaster would probably be less important for most of the users.
2.2 Content from BLBP and Surf City

When analyzing our two websites, we found that there were some common features between them as well as some features that were unique to each individual website. Table 2 shows the content found on www.blbpalumni.com while Table 3 shows the content from www.surfcitybeachpatrol.com.

Table 2. Content found on www.blbpalumni.com.

<table>
<thead>
<tr>
<th>Contact information</th>
<th>Chat room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directory of members</td>
<td>Bulletin board</td>
</tr>
<tr>
<td>Upcoming events</td>
<td>Brief description of site and beach patrol</td>
</tr>
</tbody>
</table>

Table 3. Content found on www.surfcitybeachpatrol.com.

<table>
<thead>
<tr>
<th>FAQ page</th>
<th>Employment information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information about lifeguard testing</td>
<td>Site update information</td>
</tr>
<tr>
<td>Lifeguard Tryout FAQ</td>
<td>Upcoming events</td>
</tr>
<tr>
<td>Yearbooks from different years</td>
<td>Contact information</td>
</tr>
<tr>
<td>Beach Badge information</td>
<td>FEMA information</td>
</tr>
<tr>
<td>Description of the site and beach patrol</td>
<td></td>
</tr>
</tbody>
</table>
From the tables, there are actually very few common features between the two websites. Only contact information, upcoming events and site descriptions can be found on both of the websites. Thus, we can really only compare these websites based on this common content.

For instance, on the BLBP website, there is a button on the left hand side of the page labeled ‘Contact Us.’ As the label implies, it leads the user to contact information for the site administrator. On the other hand, the Surf City website has no such link that points the user to its contact information. Instead, the user has to scroll down to the bottom of the page to find a hyperlinked e-mail address in size 7.5 font to find the contact information. Also, this information is not even labeled, the user has to infer that it is the contact address. Figure 1 shows how the contact information is found on each of the websites.

Figure 1. Screenshots of BLBP buttons (left) and bottom of Surf City website (right).
Another similarity between the two websites is that they both have descriptions of their sites. Both of these descriptions can be found on the homepages of the sites, so they are very easily found. The main difference between the two is that the BLBP description gives much less information than the Surf City site does. It does not say much at all about the beach nor does it even explain where the beach is located, as is found on the Surf City site.

The final similarity between the two websites is the inclusion of a section on upcoming events. Each site has its own way of announcing these events. On the BLBP website, there is a button labeled ‘Events,’ as seen in Figure 1. The Surf City website simply incorporates these announcements on the homepage, with the most recent events nearer to the top of the page. The user does not have to click any links to find this information because it is right there when they enter the website.

2.3 Suggestions for BLBP Content

From the comparison of the content of the two websites, there are some suggestions that we can make. This section details these suggestions, both good and bad.

First of all, we decided that the contact information was much easier to find on the BLBP website. This is an area that should not be changed. Not only does the website have a button on the side of the page for this information, the same e-mail address can be found on the homepage as well. A lack of labeling the contact information and the very small font used hurts the ease of use of the Surf City homepage.
While the BLBP page had the better way of finding contact information, Surf City’s description of the site and beach patrol is superior to that of its counterpart’s. As mentioned earlier, Surf City’s site goes into more detail than the BLBP site and gives information about where the beach patrol is actually located. Adding more detailed information would increase the chances that an uninformed user would stop to take a look at the site. While those familiar with the Barnegat Light Beach Patrol would know much of this information, outsiders would know little to nothing about the organization. Interest in the beach patrol could be gathered by providing such information for newcomers.

Lastly, it is our suggestion that the information on upcoming BLBP events should be placed on the homepage, as is seen on the Surf City website. Having the information right on the homepage gives the user this information instantly, without having to click on a button. Also, it would help to give the homepage more content. As it is now, the homepage has very scant information. Adding the upcoming events would make the homepage look less bare.

3.0 KLM and GOMS Models

Using KLM and GOMS models, we were able to compare predicted times to perform tasks with each other and with times from three users not in our group as well as predict user goals. Subjects were asked to perform two separate tasks on the BLBP website that were analyzed using both task analysis models.
The Keystroke-Level Model is used to predict the time it will take a user to perform a task using a system (Ritter & Churchill, 2007). The GOMS model “represents the procedural knowledge required to operate a system in terms of the user Goals, basic actions or Operators, Methods, which are sequences of operators that will accomplish goals, and Selection rules, which determine which method to apply to accomplish a goal (GOMS Models).” KLM is a simple form of GOMS. KLM, as well as GOMS, are system design tools. They are effective in creating a better design of a system.

KLM will only predict one aspect of the human-computer interaction of a system – the time it takes to perform a task. Keystroke-level modeling assumes that only one task is performed at a time and there are no interruptions, among other factors (Ritter & Churchill, 2007). The GOMS method attempts to break down the task into physical, cognitive, and perceptual actions to analyze user-interface interaction (GOMS). It aims to start from goals with selection rules, instead of tasks like the KLM model (Ritter & Churchill, 2007).

For each of these tasks, both a KLM model and a GOMS model were created. The steps for the KLM model can be found in Appendix A. The GOMS method can be found in Appendix B.

3.1 Tasks 1 and 2

The first task that we had users perform was to find the Registration page for the Bulletin Board and type in the string “ist331” in the Username field. This required the
user to click through a few screens to get to the desired Registration page. It also required the user to scan the Registration page to identify the correct link that they needed to follow.

The second task was to find e-mail addresses for two former members of the beach patrol. Subjects had to find the correct page with the e-mail addresses and point to the addresses of the two specified members. Figure 2 shows a screenshot of the Member Directory page where the email addresses are found.

**Figure 2.** Screenshot of Member Directory

![Figure 2](image-url.jpg)

### 3.2 Results of Analyses

After running three different subjects, we found that the actual times required to perform the tasks were longer than the predicted times (see Table 4). This is not surprising, since the KLM model does not take errors into account, which is seen from...
the times for Subject 1. While the other subjects were reasonably close to the predicted time, Subject 1 took a significantly longer time on Task 1 than predicted. This longer time occurred due to an error that the subject committed in performing the task, causing the experimenter to point out the error. The subject typed the string into the Username field in the Log In section instead of the Registration screen.

For Task 2, the first subject also committed an error. This one was slight, but it did affect the time to perform the task. The subject, for this task, clicked the incorrect link to find the information that was required. This problem was easily solved by clicking on the correct link that contained the information that was desired. Despite the simplicity of the error, however, it added time.

By looking at the GOMS model, there appears to be a method that could be added to Task 1. As seen from the results of Subject 1, a method could be added to make sure that the user types the string into the correct Username field. This type of error could result from the user noticing the Username field from the Log In screen. The user would see this field and type in the string, forgetting that they needed to type the string into Username field on the Registration screen. The GOMS model does not take this mental error into account.

**Table 4.** Predicted and Measured times to perform the tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Predicted Time (in sec)</th>
<th>Subject 1 Time (in sec)</th>
<th>Subject 2 Time (in sec)</th>
<th>Subject 3 Time (in sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1</td>
<td>12.38</td>
<td>57.55</td>
<td>16.9</td>
<td>17.7</td>
</tr>
<tr>
<td>Task 2</td>
<td>6.4</td>
<td>16.57</td>
<td>7.5</td>
<td>10.92</td>
</tr>
</tbody>
</table>
3.3 Implications for BLBP Interface

There are many factors that affect the way a particular task is performed, especially when it comes to efficiency. The two models that we used are closely related to each other (KLM and GOMS). They are two tools that can estimate how a user would be able to successfully complete a given task. GOMS is more of a structured concept of completing tasks step-by-step, while KLM is a fast, easy way to compute how long users will take to perform a task.

These tools are not perfect, however, as seen from the results that we obtained. While the subjects had experience with the internet, that does not mean that they do not commit errors. If experienced internet users can make mistakes, we need to take the inexperienced users into account. Some of the users may be unused to using the internet. Designing an interface that can be used by anyone is important.

From the GOMS that was created, we realized that there could be other methods that need to be taken into account, especially for Task 1. As mentioned earlier, it may be necessary to add another method to this task. Using the results that we found from our subjects could help to improve the GOMS as well as the KLM models.

4.0 Watchfire WebXACT Analysis

A good way one can assess the usability of a system is by taking into account people with disabilities. The Barnegat Light Beach Patrol website has some usability flaws. We can measure and point to the errors on the site using a tool called Watchfire
WEBXACT, which is a free online service that lets you test single web pages of web content for quality, accessibility, and privacy issues. By typing in the names of our project website (www.blbpalumni.com) and the site with which we wish to compare BLBP to (www.surfcitybeachpatrol.com), WebXACT will indicate errors in the site's functionality.

4.1 BLBP and Surf City Results

The WEBXACT data results do support our assumption that absolutely nothing but the bare-minimum of design has gone into the Barnegat Light Beach Patrol website. The Metadata Summary appears default with no author, description or keywords. However, the most notable errors can be found when you take a look at the site's accessibility, as seen in Figure 3.
Throughout the accessibility report, there are several errors with guidelines for how to fix them. These warnings point to instances of the error found on the site. Some warnings found on the BLBP page are listed below.

- If an image conveys important information beyond what is in its alternative text, provide an extended description.
- If you use color to convey information, make sure the information is also represented another way.
- Use relative sizing and positioning, rather than absolute.
- Check that the foreground and background colors contrast sufficiently with each other.
- If scripts create pop-up windows or change the active window, make sure that the user is aware this is happening.

These are all apparent and reoccurring themes with the poor design of the BLBP site in its capacity to serve users with disabilities.
As for the Surf City Beach Patrol website, the WEBXACT reported only two glaring problems with the site design:

- Use relative sizing and positioning, rather than absolute.
- Avoid use of obsolete language features if possible.

4.2 Comparison of Results

Since Surf City Beach Patrol is another beach patrol website, it is important to compare features of both sites. If we incorporate new features into the redesign of BLBP's website from the Surf City Beach Patrol site, we should make sure to fix the errors of their own site instead of just taking that burden on in the new design. BLBP's new design should address every problem we can with both sites. Most importantly we have to use text and images to convey information better, as well as use precise, descriptive language. With these features added to the BLBP website, the website would be improved.

5.0 Recommendation/Conclusions

As an interface, the BLBP website was hard to analyze because of its sparse content. This lack of content is not something that can really be analyzed with any kind of tool. To get around this obstacle, we decided to compare common content between the BLBP site and the Surf City website. From such an analysis, we have come to the conclusion that information such as the introduction to the site and beach patrol as well as upcoming events could be changed. Since the homepage is void of a lot of information, it
would be advisable to include more in the introduction section as well as move the upcoming events section to the homepage. In this way, the Events button on the left hand side of the screen can be removed. Also, with more information on the homepage, it will appear that the website is not as bare of information as it actually is.

From the task analyses that were performed, it was observed that the predicted times from the KLM were lower than the observed times. Only one of the times was significantly off, however. This was due to an error, which the KLM does not allow for. For the GOMS, there were some other methods that could have been used. Overall, however, the Bulletin Board task had the worse times to perform the task. Due to this and the fact that the board is only used by bots, it is our opinion that this board either be removed or renovated since it is not performing its intended purpose.

The Watchfire results were hard to analyze. It gives some general warnings about the website, but does not really go into depth about anything. The results told us to use text and images better as well as using more descriptive language. On a website that is as small as the BLBP one, however, it is difficult to tell how helpful these suggestions are. There appear to be no glaring accessibility problems as far as we can see.

As an overall interface, BLBP appears to have good usability. There are some problems with sections that may not need to be there (i.e. Bulletin Board) as well as placement of information (i.e. move Events to homepage). Otherwise, there does not appear to very many problem areas on the website aside from a lack of content, which cannot be analyzed.
Appendix A

KLM

Task 1: Find Registration page for Bulletin Board and type in the string “ist331” for Username

Find link on the main page M

Point to link H(mouse) P

Click on link BB

Find Register link M

Point to Register link P

Click on Register link BB

Find correct link to Registration M

Point to link P

Click on link BB

Point to Username text box P

Click inside text box B

Type in the string “ist331” H(keyboard) M 6K
4*M + 2*H + 4*P + 7*B + 6*K

4*1.2 + 2*.4 + 4*1.1 + 7*.1 + 6*.28 = 12.38 seconds predicted (12,380 ms)

Task 2: Point to e-mail addresses of members Andrew Mescolotto and Stevie Gould

Find link on the main page M

Point to link H(mouse) P

Click on link BB

Scan page for e-mail addresses M

Point to one e-mail address P

Scan page for other e-mail address M

Point to the other e-mail address P

3*M + 1*H + 2*B + 2*P

3*1.2 + 1*.4 + 2*.1 + 2*1.1 = 6.4 seconds predicted (6,400 ms)
Appendix B

GOMS

Task 1: Find Registration page for Bulletin Board and type in the string “ist331” for Username

Method for goal: find correct page

Step 1: Mental preparation to find information

Step 2: Accomplish goal: move to information

Step 3: Check information with memory

Step 4: Accomplish goal: verify information

Step 5: Accomplish goal: type in string

Step 6: Return with goal accomplished

Selection rule set for goal: verify information

Step 1: If information is not correct, then accomplish goal: locate link

Step 2: If information is correct, then return with goal accomplished

Method for goal: move to information

Step 1: Check to see if the information is on the page
Step 2: If information is correct, then return with goal accomplished

Step 3: Goto 1

Method for goal: locate link

Step 1: Look for the link that likely contains information

Step 2: Point to link

Step 3: Click on link

Step 4: If link is incorrect, press back button and goto 1

Step 5: Accomplish goal: find correct page

Method for goal: type in string

Step 1: Click in the text box

Step 2: Type in string “ist331”

Step 3: Return with goal accomplished

Task 2: Point to e-mail addresses of members Andrew Mescolotto and Stevie Gould

Method for goal: find member information

Step 1: Mental preparation to find information

Step 2: Accomplish goal: move to information
Step 3: Check information with memory

Step 4: Accomplish goal: verify information

Step 5: Accomplish goal: point to e-mail addresses

Step 6: Return with goal accomplished

Selection rule set for goal: verify information

Step 1: If information is not correct, then accomplish goal: locate link

Step 2: If information is correct, then return with goal accomplished

Method for goal: move to information

Step 1: Check to see if the information is on the page

Step 2: If information is correct, then return with goal accomplished

Step 3: Goto 1

Method for goal: locate link

Step 1: Look for the link that likely contains information

Step 2: Point to link

Step 3: Click on link

Step 4: If link is incorrect, press back button and goto 1
Step 5: Accomplish goal: find member information

Method for goal: point to e-mail addresses

Step 1: Scan the page for e-mail addresses

Step 2: Point to one e-mail address

Step 3: Point to the other e-mail address

Step 4: Return with goal accomplished
REFERENCES


