A USER-CENTERED APPROACH FOR DESIGNING WEB SITES IN THE REALM OF HEALTH CARE WITH AN EMPHASIS ON WEB-BASED INFORMATION FOR BREAST CANCER PATIENTS

A Thesis
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ABSTRACT

With the consumer desire for the use of information technology in the realm of health care, and the compliance of health care professionals to use information technology to manage their patients, we can expect an onslaught of health care focused Web sites in the near future. When users are seeking information regarding their health care, it is important that they find the information quickly and effortlessly, without anxiety.

A user-centered design process can improve a Web site's visual style, organization, and content, among other things. This thesis explores the use of the Web for women with breast cancer, and defines preliminary design principles and direction for use in health-based Web sites. These preliminary explorations are conducted using a user-centered design process that includes heuristic reviews, surveys, prototyping, and focus groups.
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Finally, to my husband, Charles Novek, for laughter, always.
VITA

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Major Field: Industrial, Interior, and Visual Communication Design

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CHAPTER 1

INTRODUCTION

"Good design means that beauty and usability are in balance. An object that is beautiful to the core is no better than one that is only pretty if they both lack usability."

- D. A. Norman

With more than 50 percent of the U.S. population having Internet access, the World Wide Web has become an important channel for providing information (Stanford, How Do People). A recent survey conducted by Herris Interactive evaluated consumer receptivity to health care technologies as basic as online access to medical records and as advanced as remote devices to monitor vital signs.

The study found that:

58 percent of people surveyed agreed that information technology gives them a sense of control and empowerment in managing their health
63 percent believe information technology will save them from making unnecessary visits to the doctor.

A majority of those surveyed identified two information technologies that could potentially improve health care: Internet-enabled remote monitoring and personalized health management technology (Sabicer and Gardiner). The results of this survey indicate that the American population is ready to use the Internet to monitor and manage their health care.

With the consumer desire for the use of information technology in the realm of health care, and the compliance of health care professionals to use information technology to manage their patients, we can expect an onslaught of health care focused Web sites in the near future. Consumers will have a choice between resources, both credible and questionable. How will users choose between them?

Many researchers have conducted studies on consumers to understand various aspects of Web site credibility. These evaluations are increasingly important as people use the World Wide Web today for vital tasks and research. Consumers are faced with important decisions about the information sources that they choose to believe for making important health decisions (Stanford, Experts).

In a recent study by Stanford University, researchers found that consumers tended to rely heavily on overall visual design when assessing Web sites, including layout, typography, and color schemes (Stanford, Experts). The data showed that the average consumer paid far more
attention to the superficial aspects of a site, such as visual cues, than to its content. For example, nearly half of all consumers in the study assessed the credibility of sites based in part on the appeal of the overall visual design of a site, including layout, typography, fonts and color schemes. Participants seemed to make their credibility-based decisions about the people or organization behind the site based upon the site’s overall visual appeal (Stanford, *How Do People*). Therefore, designers need to be patently aware of the visual cues of their product, and create Web sites that are visually appealing as well as intuitive and usable. This is especially true of health-based Web sites, when users may have a heightened need for sensitive and reliable information.

Designs intended for stressful situations need to pay special attention to matching the needs of the users. The principles of good human-centered design are especially important in stressful situations. In pleasant situations, users are much more likely to be tolerant of minor difficulties and irrelevancies (Norman).

Tools that are meant to support serious, concentrated efforts, where the task is specified, are most successful when the design emphasizes function. The design should not get in the way; it must be carefully created for the task (Norman).

Therefore, when creating tools such as health care Web sites, designers need to be aware that users quickly make decisions about the credibility of the information presented based on the visual appeal of the
site, and that because the information that users are searching for is important and sensitive, ease of use is of the utmost importance.

This study will result in preliminary design exploration and direction for use in health–based Web sites. These preliminary explorations will be conducted using user–centered design principles to create a visually credible and easy to use Web site.
CHAPTER 2

PROJECT ORIGINS

2.1 AIMS OF THE PROJECT

The quality of communication between patients and health care professionals is vitally important to the health care process. Diagnostic assessment, decision-making, and treatment are often based on what patients communicate to health care professionals about their symptoms and health care concerns. Communication needs are particularly important for women diagnosed with breast cancer who are undergoing chemotherapy treatment. These patients face both physical and emotional problems.

The health care system is driven by an episodic approach to communication, by the patient’s assessment of the need to access care, and by their willingness to do so. This type of health care delivery can easily lead to negative patient outcomes. Testing the effectiveness of a different approach to health care communication with breast cancer patients can lead to a significant improvement in health care delivery and health outcomes for breast cancer patients (Post 37).

The long-term objective of this project is to develop an Internet-based patient communication system for women with breast
cancer who are undergoing chemotherapy treatment. This system is designed to increase the amount of data provided by patients to clinicians and improve the quality of patient–healthcare provider data exchange by teaching patients to ask more effective questions and to provide more medically relevant information to the clinician (Post 42).
2.2 DESIGN PHASES

The design team for the overall project is charged with developing sequential internet-based prototypes that are evaluated and modified by a core group of women. The system will be comprised of two integrated components: 1) a data monitoring system that focuses on common symptoms associated with chemotherapy treatment; and 2) a patient communication skills training intervention. Women will be taught to communicate symptomatic profiles to their health care providers over the Internet during their chemotherapy treatment cycles on a schedule. Health care providers of these women will respond to symptomatic data if necessary (Post 32).

The design team will achieve this in three phases (See Appendix A). However, this thesis is solely concerned with phase one of the design development process: conducting focus groups to identify and develop preliminary design principles for the collaborative design of a prototype of the patient communication system.

The design process begins by gathering information from the user base using user-centered design principles. User-centered design is an approach to the assessment, design, and development of technological and organizational systems that places a premium on the active involvement of potential users in the design and decision-making process.
With the user feedback from the user-centered design process, the researcher will determine design direction by analyzing and defining the design problem and identifying preliminary design principles. These principles include:

- Visual design
- Basic information architecture
- Page layout
- Navigation

Using the data established in this study, the design team will construct a design framework and develop prototypes. To ensure user-centered design, user groups will then evaluate these prototypes throughout the development process.
CHAPTER 3

METHODS AND PROCESS

3.1 USER-CENTERED DESIGN

User-centered design is an approach that places the user at the center of the design process. This approach, representing the techniques, processes, methods, and procedures for designing usable products, has been around for decades under different names such as human factors engineering, ergonomics, and usability engineering (Rubin 10).

In a user-centered design process, the user is the center of all product development (See Figure 3.1). A product’s goals, objectives, context and environment are all derived from the user’s viewpoint (Rubin 10). According to Wesley Woodson, user-centered design is “...the practice of designing products so that users can perform required use, operation, service, and supportive tasks with a minimum of stress and maximum of efficiency (qtd. in Rubin 10),”
Figure 3.1: A user–centered design process.

User–centered design consists of three principles:

An early focus on users and tasks that requires a systematic approach to the collection of information from and about users.

Behavioral measurements of ease of learning and ease of use early in the design process, through the development and testing of prototypes with users.
An iterative design process (Rubin 12).

A thorough user-centered design process includes a protocol of usability testing. Usability is the measure of the quality of a user’s experience when interacting with a product. Research by User Interface Engineering, Inc. shows that users cannot find the information they seek on Web sites about 60 percent of the time. This can be easily avoided by employing a state of usability testing to find flaws in, or verify use of, a product (Usability.gov, Usability).

Usability testing is a methodical approach to producing a Web site or other user interface. It is a practical and systematic way to produce a product that works for users (Usability.gov, Usability). Usability testing consists of empirical and inspection methods. A methodical usability plan will include tests based in both methods.

Empirical methods are those that obtain data directly from users through observations and interviews. Usability tests that use empirical methods may include focus groups, paper prototype tests, or surveys. Inspection methods allow the design team to obtain data indirectly, including by expert reviews, or heuristic evaluations (Usability Consulting Services).

Usability testing is an iterative process. This allows a product to be designed, modified, and tested repeatedly. The goal of usability testing is to ascertain what will help users accomplish their tasks and what may impede them (Usability.gov, Usability).
3.2 HEURISTIC EVALUATION

A heuristic evaluation is an inspection method of usability in which an expert, or team of experts, reviews a product. These experts systematically apply a set of user-centered heuristics, or rules, to the product (Usability Consulting Services). The viewpoint of the evaluator is that of the target user base for which the product is intended (Rubin 22).

Heuristic evaluations are a quick and easy way to identify usability problems within a product, or to obtain data regarding competitors and best practices. Because these evaluations are so inexpensive and fast, they are sometimes known as "discount" usability (Nielsen, Heuristic). A heuristic evaluation not only produces usability metrics, but also aids the design team in setting goals and planning the design (Myer). The goal of these evaluations is to find usability problems in the product so that they can be resolved as part of an iterative design process (Nielsen, Heuristic).

Heuristic reviews are constrained by the evaluator's knowledge of usability and of the audience for which the product is designed. Therefore, these reviews are not sufficient on their own, but work well when applied as a part of a complete usability study that includes other means of testing the product (Usability Consulting Services).

The evaluator performs his or her review according to accepted usability principles from the body of research and human factors literature.
(Rubin 22). The evaluator can take two different approaches: competitive review and best practices, or evaluation of an in-house product.

3.2.1 COMPETITIVE ANALYSIS AND BEST PRACTICES

To review a competitor’s product, the evaluator analyzes a wide array of Web site components. Figure 3.2 includes a list of items important to the overall success of a Web site. This list, developed with guidelines by Thomas Myer and Jakob Nielsen, should be applied to competitors and similar Web site products. This will aid the design team in establishing best practices for comparable products.

The evaluator should provide a rating for each item in Figure 3.2. This rating system should be established by the design team to fit their needs. One example of a rating scale, used by Myer, is “1=bad, 2=poor, 3=fair, 4=good, 5=outstanding.” This allows each product to be rated individually and then compared (Myer).

The output of this type of heuristic evaluation is a written report of the standards for comparable products. This allows the design team to elevate their product above these standards, giving the user the best possible resource.
<table>
<thead>
<tr>
<th>Category</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homepage</td>
<td>How informative is the home page? Does it set the proper context for visitors? Is it just an annoying splash page with multimedia? How fast does it load?</td>
</tr>
<tr>
<td>Navigation</td>
<td>Is the global navigation consistent from page to page? Do major sections have local navigation? Is it consistent?</td>
</tr>
<tr>
<td>Site Organization</td>
<td>Is the site organization intuitive and easy to understand?</td>
</tr>
<tr>
<td>Links and Labels</td>
<td>Are labels on section headers and content groupings easy to understand? Are links easy to distinguish from each other? Or are they ambiguous and uninformative (&quot;click here&quot; or &quot;white paper&quot;)? Are links spread out in documents, or gathered conveniently in sidebars or other groupings?</td>
</tr>
<tr>
<td>Search and Search Results</td>
<td>Is the search engine easy to use? Are there basic and advanced search functions? What about search results? Are they organized and easy to understand? Do they give relevance weightings or provide context? Do the search results remind you of what you searched for?</td>
</tr>
<tr>
<td>Readability</td>
<td>Is the text easy to read? Are line lengths acceptable? Is the site easy to scan, with chunked information, or is it just solid blocks of text?</td>
</tr>
<tr>
<td>Performance</td>
<td>Overall, do pages load slowly or quickly? Are graphics and applications like search and multimedia presentations optimized for easy Web viewing?</td>
</tr>
<tr>
<td>Content</td>
<td>Is their sufficient depth and breadth of content offerings? Does the content seem to match the mission of the organization and the needs of the audience? Is the site developing its own content or syndicating other sources? Is there a good mix of in-depth material (detailed case studies, articles, and white papers), versus superficial content (press releases, marketing copy)?</td>
</tr>
<tr>
<td>Design</td>
<td>Do graphics show content and not just decorate the page? Are graphics used judiciously? Is background color appropriate for the text color? Are all text elements legible? Are the most critical page elements visible &quot;above the fold&quot;?</td>
</tr>
</tbody>
</table>

Figure 3.2: A list of heuristics developed with guidelines by Thomas Myer and Jakob Nielsen (Homepage 23) for use in competitive analysis and establishing best practices.
3.2.2 IN-HOUSE PRODUCT EVALUATION

An outside evaluator can assist the design team in reviewing the current design for a product. It is important the evaluator not be close to the product so that the evaluation is not unintentionally biased.

During this type of evaluation session, the evaluator uses the interface and inspects various elements. These elements are compared with a list of recognized usability principles (See Figure 3.3). These heuristics are general rules that describe common properties of usable interfaces (Nielsen, How to Conduct).

Jakob Nielsen, known as the “king of usability,” (Gilmour) has developed a list of heuristics commonly used for Web site evaluation (See Figure 3.3). The output from using the heuristic evaluation method is a list of usability problems in the interface (Nielsen, How to Conduct).
<table>
<thead>
<tr>
<th>Visibility of system states</th>
<th>The system should always keep users informed about what is going on, though appropriate feedback within a reasonable time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match between system and the real world</td>
<td>The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.</td>
</tr>
<tr>
<td>User control and freedom</td>
<td>Users often choose system functions by mistake and will need a clearly marked &quot;emergency exit&quot; to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.</td>
</tr>
<tr>
<td>Consistency and standards</td>
<td>Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.</td>
</tr>
<tr>
<td>Error prevention</td>
<td>Even better than good error messages is a careful design that prevents a problem from occurring in the first place.</td>
</tr>
<tr>
<td>Recognition rather than recall</td>
<td>Make objects, actions, and contexts visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.</td>
</tr>
<tr>
<td>Flexibility and efficiency of use</td>
<td>Accelerators — unseen by the novice user — may often speed up the interaction for the expert user. The system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.</td>
</tr>
<tr>
<td>Aesthetic and minimalist design</td>
<td>Dialogues should not contain information that is irrelevant or rarely needed. Every extra unit of information in a dialogue costs the user valuable time, and diminishes the relative visibility of other units.</td>
</tr>
<tr>
<td>Help users recognize, diagnose, and recover from errors</td>
<td>Error messages should be expressed in simple language (no codes), precisely indicate the problem, and constructively suggest a solution.</td>
</tr>
<tr>
<td>Help and documentation</td>
<td>Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user’s task, list concrete steps to be carried out, and not be too large.</td>
</tr>
</tbody>
</table>

Figure 3.3: A list of heuristics developed by Jakob Nielsen for use on in–house product evaluations (Ten).
3.3 SURVEYS

Surveys are an empirical method of usability that allow us to gather data from many users quickly. During a survey users are asked a standard set of questions on paper, in person, by telephone or online (Usability Consulting Services).

The design team can use surveys to understand the preferences and opinions of a broad base of users about an existing or potential product. Surveys can be used at any time in the design process, but are best used in the early stages to better understand the user (Rubin 20).

Survey planning involves two critical early steps: establishing goals and selecting a sample group. The goals of the project may include learning more about the potential market for a new product or ratings of current products. The next step is to select a sample group. This includes the target population, or user group, and the sample, or number of users. Generally, the larger the sample, the more precisely it reflects the target group. It is critical that these decisions are made early in the process because they have tremendous effect on the outcome of the survey (Creative Research Systems).

Surveying makes use of a variety of different methods for accumulating information. These methods include personal interviews, telephone surveys, mail surveys, email surveys, and Web site—based
surveys. Each of these methods has advantages and disadvantages. The design team should weigh these carefully and choose a design method that will obtain the most valuable usability information from their sample group (Creative Research Systems).

Surveys can also employ a number of different types of questions. There are three basic types of questions: multiple choice, numeric open end, and text open end (See Figure 3.4), also known as "verbalims" (Creative Research Systems).

<table>
<thead>
<tr>
<th>Multiple Choice</th>
<th>1. What is your yearly income?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$76,001 or more</td>
</tr>
<tr>
<td></td>
<td>$10,001-$76,000</td>
</tr>
<tr>
<td></td>
<td>$0-$9,999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numeric Open End</th>
<th>2. How much is your monthly mortgage payment?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Text Open End</th>
<th>3. How can this class be improved?</th>
</tr>
</thead>
</table>

Figure 3.4: An example of question types for surveys.

A survey can be very beneficial because it allows the team to gather a large amount of data from a population group, however it can be very challenging to develop a reliable survey. The language of a survey must be clear and understood in the same way by all users. Also, the survey is dependent on user behavior, and self-reporting by users may not be an accurate representation of that behavior (Usability Consulting Services).
3.4 FOCUS GROUPS

For the designer, user needs should be paramount, and considered as early in the design process as possible. Designers often find themselves designing products for use outside their own experience, understanding and expertise. Direct contact with users can provide an important resource for the design process. Focus groups easily provide this direct contact, so necessary in the design process (Bruseberg and McDonagh-Philp).

A focus group is an empirical method of usability, and is a collection of individuals that have been brought together to discuss a particular topic (Bruseberg and McDonagh-Philp). Focus group research is typically employed at the very early stages of a project in order to evaluate preliminary concepts using representative users. All focus group research employs the involvement of more than one participant, or user, simultaneously, to promote discussion about a product (Rubin 20). During this discussion, users share their ideas and opinions about a product (Usability Consulting Services). A facilitator provides a framework and structure to the meeting, integrating open-ended questions to promote discussion. The method relies upon the interaction between the users and the facilitator (Klitzinger). Focus groups assist in qualitative data collection, providing insights into users' experiences and perceptions, rather than statistically secured facts (Morgan).
Focus groups are particularly useful to the design team. Often times, users raise objections and insecurities regarding a product that might not be discovered through other means. Also, focus groups can generate large amounts of qualitative data in a relatively short time (Usability Consulting Services).

An experienced facilitator is required for a successful focus group. Often times, these groups are subject to "domination effect" in which one user sways the discussion to a single point of view. It is important that the facilitator is aware of these sorts of issues and strives to keep the group structured and focused (Usability Consulting Services). Ultimately, the facilitator is responsible for all preparations for the focus group, including test design, materials, and subject recruitment. The facilitator also compiles and communicates the end results of the focus group to the rest of the design team (Rubin 62).

The concepts that users evaluate and discuss can be presented in the most preliminary form, such as paper-based or screen-based prototypes. The objective is to identify how acceptable the concepts are to the user group, in what ways they may be unsatisfactory, and how they might be made more acceptable. The greatest benefit of a focus group is the ability to explore a few users' experiences and opinions in great depth, and in so doing learn how end users think and feel about a product (Rubin 20).
3.5 PROTOTYPING

The design, or "look and feel," of a Web site is very important because of the statement it makes to users. According to a study done by the Stanford Persuasive Technology Lab in 2002, "...people quickly evaluate a site by visual design alone. Layout, typography, images, consistency issues..." (Stanford Guidelines). Because of this the visual design should be treated as an extension of the purpose of the site, and should match that purpose. It is therefore very important that the design team tests possible designs with users early in the design process.

Prototyping is an empirical method of usability testing that is a valuable tool for gathering information on possible Web site designs (Snyder). This method features the use of simple materials in order to create a paper-based or screen-based simulation of a design interface. These simulations are then presented by a facilitator to a group of users for feedback. This test can be run to compare design alternatives or functionality. It allows the design team to detect usability problems and make design recommendations at a very early stage in the design process before the team has committed the product to code. Thus it supports iterative design and multiple evaluations of the product (Rettig).

A prototype is a mock-up or draft of a Web site or part of a Web site. The prototype usually does not include the actual content, but is more concerned with design and navigation of the site. Usually the design team
creates different design prototypes, using greening, or false text, as placeholders for actual content on the site. This process allows the design team to gather feedback on the visuals without distracting users with actual content (Fucellia and Pizzolato). The prototypes usually include the home page and two to three levels below the home page (Usability.gov, Usability).

The purpose of a prototype is to have enough of the information architecture, navigation, and page design to gather feedback from a user group. Prototypes aid the design team in confirming that the design meets users' needs before too much time, cost, and effort is invested in building the site. The ideal prototype can be changed easily based on the results of usability testing (Usability.gov, Usability).

The prototype tested can be paper-based or screen-based. A paper-based prototype can be as "low-fidelity" as a pencil-and-paper sketch, which will allow the design team to test where the user expects things to appear on the page, or how a navigation system will work. Paper prototypes can also be more defined prints of the site so that users can "interact" with the paper and get a sense of the visual style of a site.

Paper prototypes provide a valuable and cost-effective means to evaluate and iterate design options before a team gets committed to one implementation. Paper prototyping is appropriate for the early stages of the design cycle where changes can be readily made, and it is normal for interfaces to undergo substantial changes between the initial concept and the finished product (Rettig).
Paper prototyping contributes to creating high-quality user experiences. The biggest improvement in user experience comes from gathering usability data as early as possible (Nielsen, Paper). The evaluation of paper prototypes provides an opportunity to collect early design feedback. This results in recommendations for the refinement of the initial prototype, which can form the basis for the evaluation of further prototypes (Pettig). Another benefit of paper prototyping is that users feel more comfortable being critical of a paper prototype, rather than a digital prototype, because it has a less polished look (Klee).

A screen-based prototype allows the design team to test high-end visual design with the user. A paper simulation of the design is not always representative of the product, and screen prototypes allow the design team to display the product in its intended medium. The prototype does not need to be a working model of the final product, but should include enough information to allow the user to follow a path through the product. This will be facilitated by the use of "scenarios," or guided tasks, that lead the user through the working parts of the product.

Prototyping is best for testing concepts and terminology; navigation and workflow; page layout; and basic functionality. This method does not work well for testing technical feasibility, download or response time, or scrolling (Snyder).

The success of these exercises relies on the presence of a facilitator. The main role of this person is to ensure that the group stays focused upon the prototypes and ensuring that every member of the group is given the
opportunity to voice his or her opinions and ideas. Another role is to summarize all ideas after the session for presentation to the design team (Rettig).

The outcome of a paper prototyping test will be a series of ideas for screens layouts and navigation structures that can be evaluated by the design team to assess their technical feasibility and usefulness. This will serve as the first draft of design specifications. Further redesign can be carried out on paper, or the design can be developed onscreen to test interactive features (Rettig).
CHAPTER 4

FINDINGS

4.1 BEST PRACTICES

The following sites were reviewed by the researcher to establish best practices in health and cancer-related Web sites. These sites were reviewed based on homepage effectiveness, navigation and organization, links and labels, content, and visual design. See Figure 3.2 for a complete list of heuristics used. All sites were viewed using Microsoft® Internet Explorer 5.2 for Mac® and a cable modem connection.

4.1.1 VIRTUAL HOSPITAL

The Virtual Hospital (http://www.vh.org) is a digital health sciences library created in 1992 at the University of Iowa to help meet the information needs of health care providers and patients. The goal of the Virtual Hospital digital library is to make available general medical references and health promotion tools for health care providers and patients.

Homepage: The homepage of the Virtual Hospital (See Figure 4.1) is very text heavy. There are so many links on the page that it is hard to know where to start. There is no introductory text, so the user knows nothing about the product on first sight.
Figure 4.1: A screenshot of the homepage of the Virtual Hospital Web site.

Navigation & Organization: Navigation is consistently located across the top of the page (See Figure 4.2). It is hard to tell the difference between the main navigation in the banner (top-of-page graphic with logo) at the top of the page and the text links also listed at the top of the page. Content is organized by visitor's role: provider or patient.
Health Topics A-Z

Topic Index - Adult Provider Topics

All Topics | Adult Patient Topics | Adult Provider Topics | Pediatric Patient Topics | Pediatric Provider

Figure 4.2: A screenshot of the navigation of the Virtual Hospital Web site.

Links & Labels: Labels are very confusing (see Figure 4.2). The content is divided by user role, but the labels for links under each role are the same. It is therefore very easy to click on the link for the wrong role and not realize the content is not what the user wanted.

Content: This site's greatest asset is its breadth of information. There are articles on all types of health-related issues, but in many cases these articles are not prefaced or linked to more information about that particular issue. Therefore information can be one-sided or incomplete.

Design: This site begins with a library graphical metaphor that does not carry throughout the rest of the site. All pages are very text heavy and pages that include articles, or the actual content, can be hard to scan for major points. The typeface can sometimes be hard to read onscreen, especially in the longer articles. This site would better serve its users by making articles easy to print and read on paper.
4.1.2 AMERICAN CANCER SOCIETY

The American Cancer Society (http://www.cancer.org) is a nationwide community-based voluntary health organization dedicated to eliminating cancer as a major health problem through research, education, advocacy, and service. One of the primary goals of this not-for-profit organization is to provide the most accurate, up to date information on all types of cancer.

Homepage: The American Cancer Society homepage (See Figure 4.3) looks very professional and is easy to scan. The graphics are relevant and well placed, although there are some spacing issues depending on how the browser font size is set. The branding, very important for a well-known and trusted organization, is prominent but not overwhelming.

Figure 4.3: A screenshot of the homepage of the American Cancer Society Web site.

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Navigation & Organization. Navigation is consistent and easy to use. Because of the breadth of information available it took six clicks to get to actual content about a type of cancer. This could be very daunting for a user looking for specific information quickly. Also, once the users are sixclicks deep into the site it becomes difficult for them to remember where they are. This could be remedied with a "breadcrumb-trail navigation," in which the path the user takes is displayed on the page.

Links & Labels: Information is divided once again by user role, but in this case the site is successful because labels are clear and distinct.

Content: The content of the site varies from the basics of cancer to specifics on treatment, and is very thorough but also easy to read. Text is broken up often with pertinent diagrams (See Figure 4.4).

Design: The design of this site is clean and easy to scan. The color palette, blue and green, is calming but not boring. Graphics are used judiciously, but some pages seem to load slowly. Important information is highlighted well.
4.1.3 JHU BREAST CENTER

The Johns Hopkins Breast Center (http://www.med.jhu.edu/breastcenter) is a comprehensive, multidisciplinary breast care program, offering a full spectrum of clinical and support services, from screening and diagnosis to treatment and counseling. The JHU Breast Center provides patients access to a team of caregivers who collaborate in their consultation and care. For the patient, this integrated approach means fewer office visits, centralized records, and reduced cost.

Homepage: The homepage for the JHU Breast Center (See Figure 4.5) is informative about the purpose and mission of the site, but is text
heavy and not well organized. The user is forced to scroll to find information about patient care, as well as other information. The left side of the page, used for main navigation, is also very text heavy, and this text extends beyond the length of the rest of the page. Because of its length and small font size it is difficult to read.

Welcome to the Johns Hopkins Breast Center

The Johns Hopkins Breast Center is a comprehensive, multidisciplinary breast care program offering a full spectrum of clinical and research services. The center specializes in diagnosis and treatment of breast and related conditions. The Center provides information, support, and services to help you with your care.

As part of the world renowned Johns Hopkins Health System, the Breast Center enjoys all the benefits of a large university hospital and research institute. The Center's state-of-the-art technology and highly skilled team of specialists are continuously recognized.

The Breast Center is a leader in the latest breast cancer research and treatment approaches.

Navigation & Organization: The left side navigation is consistent, but never offers the user information about where she is beyond the first level. The hierarchy of navigation seems inappropriate for the type of information for which a user may be looking. For example, a user has to scroll on the homepage to find "Support Services" in the navigation.
Links & Labels: The labels for links in the navigation are not always clear. On the homepage some links have accompanying text or descriptors, but this is not consistent.

Content: This site is obviously a recruitment and information tool for women interested in undergoing treatment at Johns Hopkins. Most content about breast cancer is offered as an external link. The user is offered information about treatment at JHU, but not information about making treatment choices. The site is heavy with testimonials and other information about this specific treatment hospital.

Design: The design of this site is very feminine, making use of the color pink and the breast cancer ribbon. The site has a varied color palette, ranging from pink and purple to blue. There is no clear branding; a sketch of a woman from behind serves as the logo and main link back to the homepage.

4.1.4 BREASTCANCER.ORG

Breastcancer.org (http://www.breastcancer.org) is a nonprofit breast cancer website, with a professional advisory board of more than 50 breast cancer experts. The breastcancer.org mission is to help women and their caregivers make sense of the medical, personal, and practical information on breast cancer.

Homepage: The homepage of Breastcancer.org (See Figure 4.6) is very appealing. The color palette is soft, but not boring, and graphics work within the organization of the content. A tab system is used for the main
navigation, and though the text is somewhat hard to read because of the drop shadow, the intent is clear.

Figure 4.6: A screenshot of the homepage of the BreastCancer.org Web site.

Navigation & Organization: The main navigation (see Figure 4.7) for this site is a tab system across the top of the page. The tab system is easy to use, and gives the user good visual feedback for her location on the site. The sub-navigation (or second level) is nested below the tabs, and again gives good visual cues to the user. Overall the navigation is easy to use.

The site is organized in a timeline of sorts: Prevention, Symptoms and Diagnosis, Treatment, and Recovery and Renewal. Two extra tabs seem
out of place: Research News and Ask the Expert, and Pictures of Breast Cancer. These sections may serve the user better as subsets of the main navigation.

![BreastCancer.org](image)

**Figure 4.7:** A screenshot of the navigation of the BreastCancer.org Web site.

**Links & Labels:** The labels are clear, and easy to read. Information and resources are easy to find.

**Content:** The content of this site seems conclusive and easy to find. Articles are broken up into sections, making them easy to scan for important points. The division of content makes topics easy to find.

**Design:** This site is very well designed. Graphics never compete with the content, and load quickly. Pages are easy to scan and the layout is consistent.

### 4.1.5 PATIENT-CENTERED GUIDES: BREAST CANCER CENTER

Patient-Centered Guides (http://www.patientcenters.com/breastcancer/) are a mix of medical, practical and emotional information told by people who have experienced...
the illness. This resource center has been created especially for those with metastatic breast cancer; individuals who have been initially diagnosed with Stage IV cancer or who are facing a recurrence.

Homepage: The homepage (See Figure 4.8) for Patient-Centered Guides: Breast Cancer Center is a clearinghouse for resources about breast cancer. Most of the links lead to external sites, and there is no main navigation for the Breast Cancer Center. The homepage is text heavy, and only exists to scaffold users into other resources.

Figure 4.8: A screenshot of the homepage of the Breast Cancer Center Web site.

Navigation & Organization: There is no true navigation system for this site; users are simply directed to other resources from this site. On
resource pages, links at the top of the page anchor link to information farther down on the page. This can be confusing for the user, who can get lost among all the information.

Links & Labels: The labels are clear, resources are divided by subject and each label is descriptive.

Content: There is very little content on this site, but the resources seem comprehensive and kept up to date.

Design: This site is simple and straightforward, but a bit too simple. The only graphics on the page are the banner, with the site name and a photograph, and two book covers that serve as links for purchase. The pages are text heavy, but well divided for easy scanning.

4.1.6 BREASTCANCERHEALTH.ORG

Healthology, parent of BreastCancerHealth.org (http://www.breastcancerhealth.org), is a producer and distributor of physician-generated health and medical information on the Internet. With a large library of original, streaming health programs and physician-authored articles, this site provides patients with first-hand health information. The site is funded through an educational grant from a pharmaceutical company.

Homepage: The homepage (See Figure 4.9) is very graphics intensive. BreastCancerHealth.org includes photos and graphical links, as well as logos on the homepage. They offer a brief description of the site, which is difficult to read due to the small font size.
Figure 4.9: A screenshot of the homepage of the Breast Cancer Health Web site.

Navigation & Organization: This site has five major sections and the navigation consistently appears on the left hand side of the screen. The navigation lacks visual cues to let the user know where she is within the site.

Links & Labels: One of the biggest faults of this site is its use of underlined headlines that look identical to links. Users could easily struggle to figure out where they should click on a page.

Content: The content for this site seems narrow, focusing on chemotherapy and hormonal treatments only, but it succeeds in the different media it offers. Some articles are video-based, and are helpful to users who process and learn visually. Most videos also include a quiz.
which will help users retain the information they have learned. Download time for the video-based content is long, and when a user tries to close a video window, she is forced to sit through a series of pop-up windows. Text-based articles are broken into smaller sections, making them easy to scan.

Design: The page design for this site is very clear and consistent. The graphics are a bit gratuitous, especially the photographs, which serve no real purpose and take up valuable download time. The background color is questionable, as reds tend to provoke urgency and danger.

4.1.7 BREASTBIOPSY.COM

Breastbiopsy.com (http://www.breastbiopsy.com) is a site produced by Ethicon, a division of Johnson and Johnson, to market their Mammotome product. The site provides patients with information about finding tumors and biopsies related to breast cancer.

Homepage: The homepage for Breastbiopsy.com (See Figure 4.13) is very well designed. The content is well designed and easy to read, and graphics are subtle and well integrated. The color palette is particularly pleasing, and is calming without being too feminine. The navigation is across the top to the page, and blends into the background slightly. Although this is a site for a pharmaceutical company, there are no gratuitous logos.
Figure 4.10: A screenshot of the homepage of the BreastBiopsy.Com Web site.

Navigation & Organization: This site uses a tab-like navigation across the top of the page, with sub links under the main navigation for each section. Visual cues are obvious and easy to read, and the user always has a sense of place within the site.

Links & Labels: The labels for this site are clear and links are clearly delineated from the rest of the text by color, font and underline.

Content: The content for this site is very specific due to the nature of the drug they produce, but content is well-divided and easy to read. Each page uses bullet points or horizontal rules to divide information and users are given quick links to the top of the page intermittently throughout the content.
Although the content is narrow in spectrum, there is a resources page with external links to other breast cancer and breast care sites.

Design: The design of this site is its real strong point. Each page is easy to read and informative without being cluttered. The design is consistent and easy to navigate.

4.1.8 SUMMARY

The preceding reviews aided in the design process by providing an outline of what current related Web sites achieve (See Figure 4.11). The results of these reviews provided the design team with an initial benchmark for the site, and, along with the survey results, a framework for the creation of the paper prototypes tested in the focus group.
<table>
<thead>
<tr>
<th>Homepage Effectiveness</th>
<th>Navigation &amp; Organization</th>
<th>Links &amp; Labels</th>
<th>Content</th>
<th>Visual Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Hospital</td>
<td>Text heavy, Overwhelming amount of links, No introductory text</td>
<td>Consistent, Difficult to tell difference between two separate navigations</td>
<td>Very confusing, Uses same labels for different content</td>
<td>Excellent breadth of information, Hard to scan through large amounts of content</td>
</tr>
<tr>
<td>American Cancer Society</td>
<td>Professional looking, Easy to scan</td>
<td>Consistent, Content buried behind too many link choices</td>
<td>Clear and distinct</td>
<td>Thorough and easy to read</td>
</tr>
<tr>
<td>JHU Breast Center</td>
<td>Text heavy, Badly organized</td>
<td>No visual cues for location within site, Poor hierarchy</td>
<td>Descriptors inconsistent</td>
<td>Recruitment tool, not &quot;true&quot; content about cancer</td>
</tr>
<tr>
<td>Breastcancer.org</td>
<td>Very appealing, Good color palette</td>
<td>East to use tab system, Good visual cues</td>
<td>Clear and easy to read</td>
<td>Conclusive, Articles are easy to scan</td>
</tr>
<tr>
<td>Patient-Centered Guides: Breast Cancer Center</td>
<td>Text heavy</td>
<td>No true navigation, all external links</td>
<td>Clear</td>
<td>External resources kept up to date and well organized</td>
</tr>
<tr>
<td>Breast Cancer Health</td>
<td>Graphics intensive, Small font size</td>
<td>Consistent, Lacks visual cues</td>
<td>Underlined headlines look like links</td>
<td>Narrow, multi-modal content types</td>
</tr>
<tr>
<td>Breastbiopsy.com</td>
<td>Well designed and easy to read, calming color palette</td>
<td>Tab system, Good visual cues</td>
<td>Clear</td>
<td>Too specific, but well-divided</td>
</tr>
</tbody>
</table>

Figure 4.11: The results of the Heuristic Reviews.
4.2 SURVEY RESULTS

A survey was employed to determine how the audience expects a Web site for breast cancer patients to look. There were two versions of the survey: one for breast cancer survivors (See Appendix B) and one for health care professionals who work with breast cancer patients (See Appendix C). The survivors have a great deal of experience with which to approach the survey, while the health care professionals deal with breast cancer information and resources on a daily basis. Both surveys used identical questions, but from a different perspective.

The breast cancer survivors group was comprised of four women. Each woman is a current Internet user, but may not have used the Web for more information during her treatment. These women answered the survey on their own time at home, before the focus group meeting. The health care professionals group was comprised of six health care workers, mostly nurses who work with cancer patients on a daily basis. These health care workers answered the survey during work hours at their office.

The survey consisted of questions about Web designs, based on screen shots of current breast cancer Web sites. The survey opened with a description of design terminology, including “Imagery,” “Colors,” and “Layout.” Each participant was asked to look at a screen shot, list what she liked or disliked about the image, and rate the image in the above categories on a scale of one (low) to 10 (high). Sites were chosen based on
the diversity of the overall examples. Color, layout, imagery, and the amount of text on the page were all taken into consideration.

There was a divide between the survivors' and the health care professionals' opinions. The health-care professionals thought that their patients would like realistic imagery (photographs) and bright colors. The survivors preferred ambiguity and diversity in the imagery and muted, calming colors.

4.2.1 BREASTBIOPSY.COM

Breastbiopsy.org (See Figure 4.10) scored higher with the survivors than with the health care professionals (See Figure 4.12). Although the two groups agreed that the text was too small, the survivors found the colors calming, and the site seemed clean and easy to use. The health care professionals found it "boring."

<table>
<thead>
<tr>
<th></th>
<th>Survivors Total/Average*</th>
<th>Staff Total/Average</th>
<th>Totals Total/Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>31/7.75</td>
<td>27/5.4</td>
<td>58/6.44</td>
</tr>
<tr>
<td>Color</td>
<td>34/8.5</td>
<td>44/7.33</td>
<td>78/7.8</td>
</tr>
<tr>
<td>Imagery</td>
<td>27/6.75</td>
<td>40/6.67</td>
<td>67/6.7</td>
</tr>
<tr>
<td>Overall</td>
<td>29/7.25</td>
<td>36/6</td>
<td>65/6.5</td>
</tr>
</tbody>
</table>

*scale: 1="hate it"-10="love it"

Figure 4.12: The results of the survey for Breastbiopsy.com.

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4.2.2 BREASTCANCER.ORG

Again, a divide existed between the two groups about Breastcancer.org (See Figure 4.6). The survivors liked the graphic representation of the woman and the tab navigation, but found the homepage "impersonal" and "jarring," mostly because of the color. On the other hand, the health care professionals thought the color called attention to the site and made it visually interesting (See Figures 4.13).

<table>
<thead>
<tr>
<th></th>
<th>Survivors Total/Average*</th>
<th>Staff Total/Average</th>
<th>Total% Total/Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>19/4.75</td>
<td>40/6.67</td>
<td>59/5.9</td>
</tr>
<tr>
<td>Color</td>
<td>9/2.25</td>
<td>38/6.33</td>
<td>47/4.7</td>
</tr>
<tr>
<td>Imagery</td>
<td>8/2</td>
<td>42/7</td>
<td>50/5</td>
</tr>
<tr>
<td>Overall</td>
<td>12/3</td>
<td>39/6.5</td>
<td>51/5.1</td>
</tr>
</tbody>
</table>

*Scale: 1="hate it"—10="love it"

Figure 4.13: The results of the survey for Breastcancer.org.

4.2.3 PATIENT-CENTERED GUIDES: BREAST CANCER CENTER

The groups were closer to agreement about the Patient-Centered Guides: Breast Cancer Center homepage (See Figure 4.8). They agreed that the site was clear and seemed informative, but that visually the site was uninviting (See Figures 4.14). Both groups commented on the imagery used, and again agreed that it was depressing.

44
<table>
<thead>
<tr>
<th></th>
<th>Survivors Total/Average</th>
<th>Staff Total/Average</th>
<th>Totals Total/Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>21/6.79</td>
<td>28/4.67</td>
<td>55/5.5</td>
</tr>
<tr>
<td>Color</td>
<td>22/5.5</td>
<td>29/4.83</td>
<td>51/5.1</td>
</tr>
<tr>
<td>Imagery</td>
<td>15/3.75</td>
<td>31/5.11</td>
<td>46/4.6</td>
</tr>
<tr>
<td>Overall</td>
<td>19/4.75</td>
<td>31/5.17</td>
<td>50/5</td>
</tr>
</tbody>
</table>

*Scale: 1="hate it"-10="love it"

Figure 4.14: The results of the survey for Patient-Centered Guides: Breast Cancer Center.

4.2.4 BREASTCANCERHEALTH.ORG

The groups disagreed again about the design of Breastcancerhealth.org (See Figure 4.9). The survivors liked the diversity in the imagery, but found the colors distracting and too bold. The health care professionals found the bright colors "happy" and enjoyable, but thought the imagery was not indicative of their patient population (See Figure 4.15).
<table>
<thead>
<tr>
<th></th>
<th>Survivors Total/Average*</th>
<th>Staff Total/Average</th>
<th>Totals Total/Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout</td>
<td>28/7</td>
<td>34/8.8</td>
<td>62/6.89</td>
</tr>
<tr>
<td>Color</td>
<td>14/3.6</td>
<td>29/5.8</td>
<td>43/4.78</td>
</tr>
<tr>
<td>Imagery</td>
<td>29/7.25</td>
<td>37/7.4</td>
<td>66/7.33</td>
</tr>
<tr>
<td>Overall</td>
<td>20/5</td>
<td>34/6.1</td>
<td>54/6</td>
</tr>
</tbody>
</table>

*scale: 1=“hate it”-10=“love it”

Figure 4.15: The results of the survey for Breastcancerhealth.org.

4.2.5 SUMMARY

The survey findings aided in the design process by providing information about what users want and expect. The results of the survey affected the design of the paper prototypes used in the focus group. These prototypes were attuned to the needs of the user based on the results of the survey.

During a user-centered design process it is necessary to get feedback from the user. Health care professionals were surveyed in this case to supplement the results, because they work one on one with breast cancer patients on a daily basis. However, the discourse in interpretations and opinions between the two groups makes an excellent argument for the use of only the user group during the user-centered design process, and not related groups. In this case, the health care professionals felt that a cheery, fun interface would make the user happy. The survivors, however, found
the bright and bold designs to be disconcerting, and in some cases disrespectful to their feelings. This is something that a health care professional could not relate to without having the experience of having the disease.
4.3 FOCUS GROUP RESULTS

A focus group was held to ascertain the opinions of the user population. The goals for this focus group were two-fold: confirm the timeline of information delivery, and determine how the user expects the site to look and function.

The participants for this focus group were all breast cancer survivors. Because they all had completed treatment, they each had a total experience from which they could draw conclusions. Four women volunteered to participate. The group was intentionally kept small to allow each participant a certain comfort level in sharing her treatment story, and to allow each patient enough time to speak.

Each participant was asked to complete a design survey (See Appendix B) and a workbook (See Appendix D) before the focus group meeting. The workbook is a tool used to aide the participant in remembering her treatment and the important points to be discussed during the focus group meeting. It is also a collection device for background information about the participant.

The focus group began with introductions of those present, and an explanation of each participant's communication timeline from the workbook. During this time, the participants were encouraged to discuss
communication during their treatments, including thoughts about when they would have liked more information and how they commonly obtained information.

The participants were surprisingly similar on the surface, middle-aged Caucasian woman from a middle to upper-middle class background. Despite this, the women all had very disparate experiences with treatment. One participant wanted as many options as possible, and therefore did large amounts of research, another felt overwhelmed by the many choices presented her. One participant told very few people of her diagnosis, another sent mass mailings to everyone she knew explaining her prognosis.

Although each woman had a very different approach to her disease, and a very different treatment plan, the participants were able to come to a conclusion about when information should be presented to breast cancer patients. After hearing from each woman about her treatment, the participants worked together to create a timeline of important information points regarding breast cancer (See Figure 4.16). Each point on the diagram represents an event when information becomes necessary. Each star represents an important decision point or communication stage.

During the second half of the focus group meeting, the participants were presented with two different design options for a breast cancer Web sites. The participants were asked to study each design and give their opinions regarding the visual style, layout, and architecture (See Appendix E).
The two prototypes were designed using feedback gathered from the heuristic reviews and surveys. Design one (See Figure 4.17) uses a drawing rather than a photograph, a calming color palette, and a tab-style navigation. Design two (See Figure 4.18) uses photography, bright colors with abundant white space, and a navigation that changes from the homepage to subpages. The differences between the two designs were deliberate, and allowed for discussion about the extreme disparities between the two designs. The structural organization and labels were kept the same so the users would focus on the design rather than the content and organization.

* MAJOR DECISION/INFORMATION POINTS

Figure 4.16: A timeline of information points during breast cancer treatment.
The participants stressed ambiguity in the design of Web sites for patient use. When the participants were shown design one (See Figure 4.17), their comments were all positive. The participants particularly liked the use of a drawing rather than photography because of its ambiguity. One participant commented that it is impossible to find a photograph diverse enough to represent every type of woman that would visit this site. They also found the colors calming, and one woman stated that the gray tones would symbolize the "gray zone" she was in during treatment.

The participants found the navigation to be straightforward and easy to read, and particularly liked the ability to search the site from the first page. Also, one participant commented on the importance of branding the site with a well-known name or logo. It is crucial to patients to know the information they obtain from the site is accurate and dependable.
Figure 4.17: Design example one used in the focus group.

The focus group participants found an emotional difference between designs one and two. When asked about design two (See Figure 4.18), participants made statements such as “stark,” “too much white space,” and “kid-like.” They did not like the photograph, complaining that it was not diverse enough. Although they thought the site would be as easy to use as the first design, they did not feel it was representative of how a patient undergoing treatment for breast cancer feels.
Figure 4.18: Design example two used in the focus group.
CHAPTER 5

PRELIMINARY DESIGN CRITERIA AND PRINCIPLES

5.1 INFORMATION ARCHITECTURE AND NAVIGATION

By using the timeline (See Figure 4.16), the basic information architecture for a site for breast cancer patients can be easily surmised. The information should be divided by major information points or events. This will aid the user in easily finding the information she needs simply by knowing where she is in her treatment. The following categories should be used for such a Web site, and copious amounts of accurate, and easy to understand, information should populate each category: Prevention, Warning Signs (and/or Biopsy), Diagnosis/Surgery, Chemotherapy and Radiation, Lifestyle Changes, and Glossary. The information could be used in a circular fashion; once a patient has completed treatment and is making Lifestyle Changes she can move back into the Prevention section to help reduce her chances of reoccurrence.

Both in the focus group and in the survey results, participants mentioned how easy to use they found a tab-style navigation. This style navigation (See Figure 4.17) works well when the user is given visual feedback. This can include font and color changes to indicate the selected tab. The navigation needs to be consistent throughout each page to keep
the user aware of where she is within the site architecture. A search function should be utilized and both easy to use and easy to find. Both participants in the focus group and participants in the survey stated that they always like to see a search option from the first page of a site. If they scan the first page and cannot find the information they need they will immediately search, rather than click around the site.

A text version should also be included for printing purposes, and for those who have trouble reading onscreen. Many participants print information from the Web and take it to their doctors for corroboration.
5.2 VISUAL DESIGN AND PAGE LAYOUT

The cancer survivors who participated in the focus group and the survey were adamant that the visual style of a site needs to represent the feelings of the user. Indeed, it is very important that the user in this case feel at ease, and that using the site does not add stress to her situation. This can be accomplished through color and imagery, as well as well organized architecture and navigation.

The color palette utilized for this site should be calming and tasteful. Participants in the study preferred soft pastels and gray tones. Reds were found to be too aggressive, and bright tones too "upbeat." There also should be enough contrast between background color and text color so that the page is easy to scan.

Imagery was a major issue with study participants. All of the cancer survivors who participated in the focus group agreed that a graphic representation of a woman is preferable to a photograph. Photographs do not represent all types of women, and it is important that the imagery be ambiguous enough to embody all possible users. Participants especially liked the graphic representation of the woman in Figure 4.17 because she is ambiguous and non-assertive. One participant mentioned she found the image to be "compassionate."
The page layout of the site needs to be easy to scan and consistent. The navigation should be prominent, making the site easy to operate, and visual cues should be added whenever possible to direct the user through the site. Also, the branding should be prominent, to reassure the user that the information contained on the site is accurate. Scrolling is not an issue for users, as long as information is well-divided and easy to browse for keywords.

<table>
<thead>
<tr>
<th>Information Architecture</th>
<th>Divide information by major event or role during treatment (i.e. Prevention, Diagnosis, etc)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content should be technically accurate but easy to understand</td>
</tr>
<tr>
<td></td>
<td>A Glossary should be included in the content</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Navigation</th>
<th>A tab-style navigation is easiest to use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visual cues should be used to tell the user where she is within the site (Color, Font, etc)</td>
</tr>
<tr>
<td></td>
<td>A search function should be available beginning at the homepage</td>
</tr>
<tr>
<td></td>
<td>A text version should be available for printing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visual Design</th>
<th>The visual style of the site should represent the case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All graphics should be ambiguous, all users must see themselves represented in the imagery</td>
</tr>
<tr>
<td></td>
<td>(Graphics are preferred over photographs because of the lack of diversity in the imagery)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page Layout</th>
<th>Easy to scan, information &quot;sectioned&quot; into small portions or bulleted lists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Branding should be prominent to give the user a sense of authority behind the content</td>
</tr>
<tr>
<td></td>
<td>Navigation should be consistent on each page</td>
</tr>
</tbody>
</table>

Figure 5.1: Preliminary design principles for health-based Web sites.
CHAPTER 6

CONCLUSION

A user-centered design approach, or involving the intended user in the design process, is most favorable when creating a new product. In the realm of health care, involving the user becomes paramount. Patients searching for information regarding their ailments, especially those as serious as cancer, need to be reassured that they will find accurate information quickly. Because data shows that users make decisions about the credibility of a site based on its visual style, and because the information users are searching for is of such consequence, the health care industry should be especially vehement in the use of user-centered design.

In this study, we have gathered qualitative data about breast cancer patients and their use of the Web to create a set of design principles. These principles can now be applied to the development of a site that offers patients more information about their treatment options and preventative medicine, as well as connecting them to their health care professionals and other patients. By gathering this data with a user-centered design process, the audience has provided input that will make the site visually appealing and easy to use, as well as sensitive to the user's needs.
The data gathered in this study will be used in the continuing effort to establish such a site. Now that these design principles have been established, a framework for a possible site can be built by the design team, and further tested by possible users. In the near future a Web site will be produced that will offer a breast cancer patient the information she needs to make educated decisions about her treatment.
APPENDIX A

PROJECT TIMELINE
Development process of an internet-based communication system for women with breast cancer who are undergoing chemotherapy treatment.

1. Conduct focus groups to develop a prototype of the communication system.
2. Conduct usability testing of the prototype, modify the system based on user feedback, and create the final product.
3. Conduct a feasibility trial to elicit patients' reactions to use of the communication system.
Development process for this study.

- Develop Preliminary Content
  - Develop Design Framework
  - Develop User Interaction and Design Application Scenarios
  - Develop Preliminary Design Criteria

- Intentional Sampling

- Construct Paper-based Prototype(s) (V1)

- Evaluate Prototype(s) V1

- Data Collection and Analysis
APPENDIX B

DESIGN SURVEY — BREAST CANCER SURVIVORS
Dear Sarah, [Name is Censored]

My name is Seth Hansen and I am a graduate student in the Department of Industrial Design and
Visual Communications Design at the City College University. I am working with the three Cancer
Hospital designers in the project about Web design concept and design solutions.

This brief survey will help us in the design process. Please look over the following web pages
designs and answer the following questions: Can you remember the name of the first and last of the following design and have you noticed any design issues such as these?

We will be developing content at a later time, so please do not become involved with the information displayed on the Web pages.

I agree with this form.

[Signature]

Seth Hansen

Key Design Terms

Layout: The positioning of elements on the page, including text, images, and illustrations.

Colors: Do the colors work well together? Do they make the appropriate emotion?

Imagery: Representational images, text, graphs, photographs, etc.

Do you know of any related (anti) Cancer/AIDS Web sites that you have visited? __________________________

____________________________

64
What do you like best about this web page design?

What do you dislike about this web page design?

Please rate the following:

Layout: Excellent (5) 4 3 2 1 Poor (1)

Color: Excellent (5) 4 3 2 1 Poor (1)

Typography: Excellent (5) 4 3 2 1 Poor (1)

How do you respond to the results of the site search tool?

Why? 

65
What do you like best about this website design?

What do you like least about this website design?

Please rate the following:

- Layout (1-10): ______
- Colors (1-10): ______
- Images/Photographs (1-10): ______

How do you respond to the visual design of this website? (1-10)

What is your overall impression of this website? (1-10)
APPENDIX C

DESIGN SURVEY – HEALTH CARE PROFESSIONALS
Dear JamesCare Staff:

My name is Beth Novak and I am a graduate student in the Department of Industrial, Interior and Visual Communication Design at the Ohio State University. I am working with Dr. Shapiro and Holly Loughlin on the Communication System for Breast Cancer Patients project.

Part of my research concerns the design of an Internet tool for patient communication. This brief survey will help me in my design process. Please look over the following website designs and answer the coordinating questions. I am interested in your assessment of the "look and feel" of the following designs and how you think your patients will respond to designs such as these.

We will be developing concepts at a later time, so please do not be concerned with the information displayed on the Web pages.

I appreciate your time!

Beth Novak

Key Design Terms

Layout: The positioning of elements on the page, treatment, sizing, and placement of text, images, and illustrations.

Colors: Do the colors used work well together? Do they evoke the appropriate emotion?

Imagery: Representative images such as photographs, drawings, icons.

Do you know of any related Breast Cancer/Health Web sites that you like or would recommend?

_____________________________________________________

_____________________________________________________

_____________________________________________________

70
Please rate the following:

**Layout (1 to 5):**
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐

**Colors (1 to 5):**
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐

**Imagery (1 to 5):**
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐

How would you rate the overall effectiveness of the design? (1 to 5)
1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ 10. ☐

Why?:


APPENDIX D

BREAST CANCER TREATMENT WORKBOOK

My Workbook on the breast cancer treatment experience

75
Hi,

Thanks for agreeing to participate in this research about the break-apart treatment experience.

Please fill out this workbook before you come to the workshop. Doing so will help you be better prepared for that weekend. You will see that there are a few pages of questions in the workbook and an exercise we call The Communication Timeline. The instructions for the exercise are in the workbook.

If you have any questions, you can call me at our office or you can email me at bovash@gmail.com.

Thank you!

Beth Novak
PS. Please bring your workbook with you to the workshop.

About me

The other people in my family (and their relationship to me) are:

My occupation:

My thoughts and feelings about my treatment experience:

Is there anything that you know now that you wish you had known before or during the chemotherapy experience?
My Communication Timeline

The arrow represents the communication process during your breast cancer treatment. The dot represents when communication began during your treatment. Decide what that point would be for you, and map your communication experiences from there. This may be communication with your health care professional or least once, or whatever you did to learn more. Feel free to write, draw or glue pictures onto the timeline.
Are there any sounds of information that you would recommend to others who are going through the chemotherapy experience? What are they?

When do you think these sounds of information would be most useful during the chemotherapy experience?

My communication style

Put an X on each scale to describe your communication style.

- Quiet
- Listening
- Assertive
- Verbal Phone

TV and PC

Which of the following do you have at home?

TV? __ yes __ no How many? ___

Computer? __ yes __ no How many? ___

WebTV? __ yes __ no Webcam? __ yes __ no

Who watches TV? (please list)

Do you use the computer? __ yes __ no

- E-mail? __ yes __ no
  - How often? ___ per day ___ per week

- Internet? __ yes __ no
  - How often? ___ per day ___ per week

- Other uses of the computer? (please list)

What are your favorite websites?

What type of Internet connection do you have?

- Broadband (DSL, cable, etc.)
- Landline

What type of computer do you have?
Thanks

Please complete the workbook and bring it with you to the workshop. Remember, if you have any questions you can call me or email me.

Thank you!

Beth
APPENDIX E

DESIGN EXAMPLES
Connecting you to what's important

Conventio nonummy tags duis caecus ludus abbas esset nibh at. Aliiis delenit, distineo henderit plaga vel distineo inhibeo acumsum lucidus epulae nulla repreh. Cui veniasus si dolore sed ea, ut feugait tation natis pecus et.

Meus et praesent in, opes refoveo vel venio consequatatt magna. Praesent nulla exerci elit exerci enim, ea, abbas metus vindico henderit.

Proprius haero delenit lbdem occuro opes nostrud duis demoreo nostrud elit, wisi. Pecus duis humo si antehabeo tation sit importunus praesitio rusticus meiler quod.'
**Treatment**

We can help you understand your cancer stage and appropriate options, so you and your doctors can arrive at the best treatment plan for you.

**Overview of Options**

What types of treatment are available and which might be appropriate for you.

**Surgery**

Lumpectomy, mastectomy, and lymph node dissection, and what to expect from each.

**Radiation Therapy**

What it is, who it's for, advantages, side effects, and what to expect when you get it.

**Herceptin**

How it works, who should get it, how it's given, side effects, and major studies.

**Hormonal Therapy**

The link between hormones and cancer and how different groups of drugs can affect that link.

**Tamoxifen**

The benefits and potential risks of this widely used hormonal treatment.

**Chemotherapy**

Who should get it, how it works, different types, side effects and how to manage them.

**Metastatic Disease**

The many treatment options for when the cancer comes back.

**Alternative Therapies**

A review of research on the potential benefits of holistic approaches to relieving symptoms.

**Coping with Fear of Treatment**

Important tips and advice on coping with fears of treatment.
Radiation therapy—also called radiotherapy—is a highly targeted, highly effective way to destroy cancer cells that may linger after surgery. This reduces the risk of recurrence. Despite what many women fear, radiation therapy is relatively easy to tolerate, and the side effects are restricted to the area being treated.

We will help you face the challenges of radiation therapy by:
- explaining how radiation works;
- dispelling some common myths or misperceptions;
- telling you what to expect each step of the way; and
- how to manage side effects.
<table>
<thead>
<tr>
<th>Forum</th>
<th>Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just Diagnosed</td>
<td>2212</td>
</tr>
<tr>
<td>Helping you go from feeling overwhelmed to feeling supported.</td>
<td></td>
</tr>
<tr>
<td>Help me get through treatment</td>
<td>4057</td>
</tr>
<tr>
<td>Making the decisions, getting the benefits and managing the side effects.</td>
<td></td>
</tr>
<tr>
<td>Moving beyond cancer</td>
<td>2509</td>
</tr>
<tr>
<td>Getting on with the rest of your life, from re-discovering intimacy to coping with hot flashes.</td>
<td></td>
</tr>
<tr>
<td>Recurrence and metastatic disease</td>
<td>720</td>
</tr>
<tr>
<td>Braving more treatment and managing the ups and downs with others who care.</td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>288</td>
</tr>
<tr>
<td>Whether single or with a partner, straight or gay, in treatment or after, breast cancer has probably changed the way you relate and the way others relate to you. This is the place to share your thoughts and feelings about re-defining and building supportive, intimate relationships with friends, family and loved ones.</td>
<td></td>
</tr>
</tbody>
</table>

Icon Legend
- New posts since your last visit
- No new posts since your last visit
breast cancer center
brought to you by James Care

**prevention**
We can help you understand your cancer stage and appropriate options, so you and your doctor's can arrive at the best treatment plan for YOU.

**diagnosis**
Overview of Options
What types of treatment are available and which might be appropriate for you.

**treatment**
Surgery
Lumpectomy, mastectomy, and lymph node dissection, and what to expect from each

Radiation Therapy
What it is, who it's for, advantages, side effects, and what to expect when you get it.

**resources**
Hormonal Therapy
How it works, who should get it, how it's given, side effects, and major studies

**contact**
Hormonal Therapy
The link between hormones and cancer and how different groups of drugs can affect that link.

Tamoxifen
The benefits and potential risks of this widely used hormonal treatment.

Chemotherapy
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Metastatic Disease
The many treatment options for when the cancer comes back.

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Treatment / Radiation Therapy

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• telling you what to expect each step of the way, and

• how to manage side effects.
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