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# There is a Method to the Madness: Understanding the Benefits and the Usage of Usability Methodologies in a Website Life Cycle

Rachael Winterling  
University of North Carolina at Charlotte, USA

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## Introduction

The University of North Carolina at Charlotte's (UNC Charlotte) J. Murrey Atkins Library (Atkins) is an academic research library that supports more than 29,000 students, faculty members, alumni, and community borrowers. Atkins is the center of intellectual life for the university; therefore, its role is to provide users with tools and services that will encourage and support their academic endeavors. A library website is an essential gateway to provide information and services to its users; therefore, a site must be efficient, effective, easy to learn, error tolerant, and engaging. Libraries must constantly analyze their websites to stay up-to-date on emerging technologies, tools, services, and user needs.

The usability coordinator conducted several usability methodologies to test, influence, and support the redesign of the website's homepage, navigation, and secondary pages. Four types of usability testing (exploratory, assessment, comparison, and validation) were referred to as the usability coordinator planned and executed the different methodologies throughout the website redesign development cycle. The usability methodologies utilized included card sorting, tasks-based testing, focus groups, first click testing, surveys, and heuristic evaluations. Each methodology produced quantitative and qualitative data to support recommendations to ensure efficiency, functionality, and desirability of the website. In addition, data analytics and visualization tools such as Google Analytics, HTML\_CodeSniffer, Optimal Workshop, and Tableau were utilized to support the quantitative and qualitative data. Four different audiences (teaching faculty, library staff, graduate students, and undergraduate students) participated in the different methodologies of the study.

## Background

Atkins has had several full website redesigns as well as three homepage redesigns. A new dean

of J. Murrey Atkins was hired in summer 2015, and one of her first initiatives was to analyze and update the website. To start the discussion, Atkins reinstated the Web Advisory Group (WAG), which includes volunteers from every library department to discuss the website changes and other web-related information.

Atkins decided a website redesign would be the most beneficial option. The redesign of the website was decided for two reasons, those being that the site platform needed to be migrated from Drupal 6 to Drupal 7 and that prior usability studies and evaluations on the site recommended updates and changes to the site's content and design.

In the fall of 2014, Atkins performed a usability study of the website with its main focus on the homepage. The study utilized the following methodologies and tools: tasks-based testing, focus groups, paper prototyping, Google Analytics, and HTML\_CodeSniffer. Qualitative and needs-based data were gathered from the tasks-based testing, paper prototyping, and focus groups, quantitative data was gathered from Google Analytics, and accessibility issues were gathered from HTML\_CodeSniffer. The study recommendations that supported the redesign are the following: add a rotating banner to the homepage; consistently label features throughout the website; turn off the old mobile site; redirect the old group study application to the new group study application; reevaluate current navigation menu item labels. Then, in summer 2015, a website audit was conducted that uncovered hundreds of unpublished webpages as well as hundreds of hidden webpages that could still be accessed through Google site searches but not through the homepage, secondary pages, or the navigation. The hidden/unpublished pages mainly included duplicate information from accessible published webpages. With the recommendations from the usability study and the findings of the audit, Atkins decided that a full redesign would be more efficient than a migration.

## Redesign Planning and Preparation

After the decision was made to redesign the website, WAG began a one-year journey to redesign the website. The goal of the redesign was to create a patron-centered website that can sustain minor changes as Atkins introduces new services and as new technologies emerge. The usability coordinator used the data from previous usability studies, a website audit, a heuristic evaluation, and Google Analytics to initiate the planning process. In addition, WAG meetings were treated as internal focus groups to discuss usability findings, the redesign process, and website desires. The usability coordinator collaborated with WAG and the library's Graphic Designer/Software Developer throughout the study's planning and execution. The usability coordinator gave updates throughout the study, presented on findings for each methodology, and gave recommendations for next steps. Before any usability methods began, the usability coordinator researched the UNC system and UNC Charlotte's peer institutions' library websites, as well as analyzed Google Analytics, to analyze the top hit webpages and the least hit pages. This allowed the usability coordinator and the graphic designer/web developer to produce several homepage mock-ups. In addition, the usability coordinator identified redundant items on the homepage and homepage items that were not located in the navigation on the current library website. A plan was developed to successfully complete the website redesign: homepage mockups, navigation, secondary page layout, content gathering, quality assurance, and tasks-based testing.

## Navigation

The usability coordinator started the redesign study with a focus on the navigation. A navigation is the map of a website; if it is not usable, users will not access desired content easily. The fall 2014 homepage usability study recommended evaluating the labels of the current navigation menu items to improve and support an effective, efficient, engaging, error tolerant, and easy to learn website for users. The goal of a label is to communicate information efficiently. To determine navigational items and subitems, the card sorting methodology was planned and utilized. Card sorting is a method used to help design or evaluate the information architecture of a site. In a card sorting session, participants organize topics into categories that make sense to them, and they may also help with labeling these

groups. Card sorting helps researchers organize information from the user perspective. Three types of card sorting can be utilized: open sort, closed sort, and hybrid sort. A closed sort provides participants with predefined top-level categories, an open sort requires participants to label top-level categories, and a hybrid sort has predefined top-level categories as well as an option to create and label categories.

The usability coordinator used Optimal Workshop's "Optimal Sort," a digital card-sorting tool. The tool analyzes the results and produces standardization grids, similarity matrixes, and dendrograms. Teaching faculty, library employees, graduate students, and undergraduate students partook in the website redesign card sorting methodology. The participants first completed an open sort with thirty cards, and then completed a hybrid sort that utilized four predefined categories (*research help, services, about, library spaces*) and the same thirty cards from the open sort. The 31 participants' hybrid and open sorts were compared and analyzed. The results were visualized in Tableau to showcase the common card groupings and category names. The visualized data was presented at WAG to support a recommended top-level navigation. After the top-level navigation was discussed and approved by the group, the usability coordinator recommended subcategories to organize the large amount of items listed under each top-level category. After the navigation was finalized, a responsibility sheet was created to delegate content for secondary pages to subject matter experts. After content was created, it was transferred into a Drupal 7 sandbox to be tested before the hard launch.

## For You Survey

When the homepage and navigation were being researched and discussed, "for you" user groupings were popular. WAG (internal focus groups) made the decision to include a "for you" category on the homepage and within the navigation. The usability coordinator took advantage of the WAG members and developed a survey that asked members to list information that should be listed under the following audiences: undergraduate students, graduate students, faculty and staff, alumni and retirees, and community borrowers. A list for each audience was aggregated and shared at the next WAG meeting to discuss and review. After the list for each audience was finalized, a responsibility sheet was created to delegate content for secondary pages to subject matter experts.

### **Quality Assurance**

In the summer of 2016, Atkins' Usability Lab conducted a quality assurance (QA) study of the website redesign prior to the July 1, 2016 hard launch. Atkins' website plays a primary role for its services to its audience. The study included an assessment of the site, an analysis of tasks-based testing, an employee feedback survey, and an HTML\_CodeSniffer homepage report to identify errors prior to the redesign's hard launch. The objectives for the website redesign QA report were as follows: conduct a usability assessment of the redesign, identify content errors prior to the hard launch, and conduct analysis of the design and functionality of the redesign. The study identified issues that were addressed by members of the Technology and Digital Strategies Department prior to the hard launch to ensure the interface's functionality.

#### *Study Design*

The study included an assessment of the site, an analysis of tasks-based testing, an employee feedback survey, and HTML\_CodeSniffer to identify errors that affect the functionality of the interface prior to the hard launch.

#### *Redesign Assessment*

Usability best practices were incorporated to complete the assessment. Members of the assessment team and the Digital and Technology Strategies Department reviewed the site for content errors, broken links, and functionality. The assessment identified several opportunities to improve the redesign that would result in a more efficient, effective, and desirable web interface.

#### *Tasks-Based Testing*

The study utilized tasks-based usability testing, an approach that relies on representative user groups' attempts to perform relevant tasks to uncover design and functional issues with the interface. The tasks-based testing consisted of 30 participants that represented nine undergraduate students, three graduate students, ten library employees, three teaching faculty, and five Atkins Fellows.

The study utilized three tasks lists to accommodate the needs of the different participant groups. This approach allowed the researcher to compare data across common benchmarks based on the participant groups' ability to complete each task.

Participants' performances as they attempted to complete the tasks exposed usability issues and informed recommendations. During the test session, participants were encouraged to articulate their thoughts and actions aloud as they worked through the tasks. The think-aloud protocol allowed researchers to understand the context for user actions and decisions while completing a specific task, making it easier for the researchers to determine the underlying causes of usability issues. In addition to the task list, participants completed a pretest survey. The pretest survey captured demographic information, including year in school, major/field of study, frequency of catalog use, and an explanation of use. The posttest survey captured participants' thoughts about the kiosk. The test sessions were conducted on a Dell desktop computer running Morae Recorder. Morae Recorder captures the desktop activities and the participants' facial expressions via a web camera. The test sessions ranged from 15–30 minutes and involved the test facilitator, a note taker, and the participant. The usability coordinator acted as the facilitator. The facilitator greeted participants upon arrival, guided participants through the informed consent, presented the participants with the tasks, answered participants' questions, and prompted the participants for responses. The assessment assistant and assessment fellow acted as note takers.

Participants were recruited through e-mail and posters throughout the building. The e-mails included the purpose of the testing, the testing timeframe, the participation incentives, and contact information. The 30 participants read and signed an informed consent form to participate in the test session. The university's Institutional Review Board approved the consent form. Student participants were incentivized with a \$5 Starbucks gift card for their participation. Student participants received the incentive regardless of whether they completed the session or not.

#### *Employee Feedback Survey*

A feedback survey was shared with the entire library to gather content errors, broken links, design errors, and general commentary about the redesign. The survey asked participants to provide his/her department, length of employment, current website usage, bookmarked secondary pages, broken links, and content errors on the redesign, as well as general feedback on the redesign.

### *HTML\_CodeSniffer*

HTML\_Code Sniffer detects accessibility violations and potential violations on behalf of W3C's Web Content Accessibility Guidelines (WCAG) and the US Section 508 regulation. HTML\_CodeSniffer is a client-side script that checks HTML source code and detects violations of a defined coding standard. The US Section 508 regulation standards define the types of technology covered and set forth provisions that establish a minimum level of technology and information based on access guidelines developed by the Web Accessibility Initiative of the World Wide Web Consortium. The standards aim to ensure that information, like website graphics or animation, is also available in an accessible format.

WCAG is a wide range of recommendations for making web content more accessible. Content will be more accessible to a wider range of disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these. These guidelines cover a range of issues, but they are not able to address the needs of people with all types, degrees, and combinations of disabilities. In addition, WCAG's guidelines make web content more usable by older individuals with changing abilities due to aging and often improve usability for users in general.

### **Findings**

Findings were found through an assessment of the site, an analysis of tasks-based testing, an employee feedback survey, and an HTML\_CodeSniffer homepage report. The findings were shared with the Technology and Digital Strategies Department as they were discovered. The type of error organized

the findings: broken links, content errors, design and layout errors, inconsistent labeling, accessibility issues, and user suggestions.

Broken links are a connection in an HTML document to a URL that is not working properly, especially because it goes to a web page that is no longer available or which has moved to another server. Content errors provide users with misleading information. Inconsistent labeling identified throughout the redesign highlights services that are labeled in more than one way. Design and layout errors highlight organization, hierarchy, readability, and functionality of the redesign. Accessibility issues findings are based on the data produced by the HTML\_CodeSniffer on the homepage redesign. HTML\_Code Sniffer detects accessibility violations and potential violations on behalf of WCAG and the US Section 508 regulation. Participants gave user recommendations during and from observations of the tasks-based testing sessions or in the employee feedback survey.

### **Hard Launch**

After the hard launch, testing of specific sections of the website began. First, the Special Collections and University Archives website was analyzed because its content is more than a single web page. After the Special Collections and University Archives website was tested, it was tested with the adult and evening services audience. The task list was identical to the task list used in the quality assurance phase; this allowed researchers to analyze the differences between phases. Testing will continue iteratively to ensure the efficiency, functionality, and desirability of the website.

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