

Usability Study of chem.pitt.edu

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I. Abstract

This report discloses research of www.chem.pitt.edu. We used heuristic evaluation, a tool that guides analysis along different standards. The report also applies empirical research methods which prioritizes critical thinking and derives knowledge from direct observations rather than theory or belief. These results will provide important findings in usability studies. This report will discuss the purpose and methodology behind our research, present findings, and offer feedback on the University of Pittsburgh's Chemistry site. Our findings suggest that adding alt text images, simplifying navigation, and minimizing homepage features will greatly improve the website.

II. Introduction

This research examines the Department of Chemistry website at the University of Pittsburgh, which includes information on undergraduate and graduate resources, research, different facilities, faculty, alumni, news, and events and seminars.

The site's main goal is to attract undergraduate and graduate students looking to study chemistry at the University of Pittsburgh. However, the site also incorporates features for current students, particularly the intranet accessible via the safety tab. Here students can find a multitude of forms and documents, safety and accident procedures, and information on materials and chemicals.

III. Purpose

This report details a usability study of chem.pitt.edu and provides recommendations based on the results. We emphasized an accessibility analysis to assess if the site is usable for the target audience. Additionally, the heuristic methodology and user testing reveals strengths and shortcomings that will be presented in this report.

IV. Heuristic Methodology

Neilsen's Design Heuristic and accessibility tools aided in the completion of this report. The accessibility tools included three Chrome Extensions: **ChromeLens**, to simulate blindness and color-blindness, **ScreenReader**, to read aloud text on the screen, and **Lighthouse**, to generate a report on performance, accessibility, and best practices.

V. Heuristic Findings

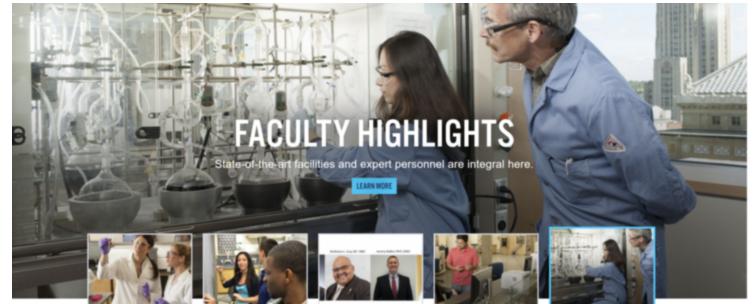
Design Heuristic

1. Visibility of system status
 - The website loads very quickly and there isn't a need for feedback
2. Match between system and real world

- The website needs updated faculty images and pages.
3. User control and freedom
 - The "facilities" and "safety" tabs bring users to different domains. For a user who didn't mean to do this, it is confusing and there is no clear way to get back. We suggest opening it in a new tab or having a quick escape option.
 4. Error Prevention
 - The website doesn't give any warning before sending users to another site.
 5. Recognition rather than recall
 - The top half of the site remains even after navigating to a specific tab; it allows for easy and fast navigation because users can look at tabs and menus at any point.
 6. Aesthetic and minimalist design
 - Explain different kinds of faculty for prospective students; modernize top half of site- change the color scheme of the site to match current Pitt colors.

Accessibility Heuristic

1. Layout
 - The content fits the screen and does not require the user to pan to see additional content.
2. Design Elements
 - White, gold, and shades of blue keep the design consistent and aesthetically pleasing.
 - Mild blindness (pictured top) and medium blindness (pictured bottom), simulated by ChromeLens, can make text appearing over pictures difficult to read.
3. Color
 - Distinct colors differentiate topics, subtopics, and body text, helping guide the user through the site.
 - Color-blindness simulated with ChromeLens does not have an impact on site readability.



- The site does not utilize flashing content or stripes that might negatively affect users with epilepsy or other sensitivities

4. Writing

- The language level is appropriate for the audience.

5. Font and Text

- Sometimes light blue text appears on a blue background which may prove hard to read, especially for those with vision issues.

FACILITIES

Mass Spectrometry

Chemistry Computer Classroom

Crystallography

- Font and font size are readable and big enough.

6. Images

- The site does not provide alt text for images.

7. Keyboard Navigation

- The site passes the “tab test”, a test consisting of navigation via keystrokes. A visible indicator, the darkening of a selected box or menu item, aided in navigation.
- For an easier experience, the color of the box or menu could be distinguished even more.

8. Navigation

- Users can find content through the search bar or with the menu across the top of the screen, which ensures there are two forms of navigation.

9. Buttons and Links

- Buttons and links are typically large enough and give the user a good idea of where the tab will take them

10. Lighthouse Report

- Accessibility score: 89/100

- Background and foreground colors do not have a sufficient contrast ratio
- Images do not have alt text
- Links do not have a discernible name

- Best practices score: 80/100

- Serves images with low resolution

VI. Personas and Scenarios

Paisley Miles



Occupation: student

Family Income: \$120k annually

Interested in: joining the American Chemical society, part of a health co-ed fraternity

Bio/Background: Currently a Biomedical engineering student interested in switching to chemistry. Has previous experience in tutoring for organic chemistry

Family/Social Context: Oldest daughter attending Pitt

Available technologies/use: Uses her Windows laptop and iPhone frequently

Bryce Andrews



Occupation: student

Family Income: \$70,000 annually

Interests: research, biological chemistry, Vice President of American Chemical Society, his social fraternity

Bio/Background: Senior at Pitt, majoring in Chemistry. In the process of applying for different grad schools and Pitt is one of them.

Family/Social Context: Academics and extracurriculars take up a lot of time. Close to his family, middle child of 3

Available technologies/use: Frequent Apple laptop use, infrequent iPhone use, uses programs in the labs for collecting data

User 1 Scenario: Paisley is already a Pitt student but wants to switch her major from biomedical engineering to chemistry. She arrives on this site to learn more about the chemistry department at Pitt and its opportunities, major requirements, and more. She tried to find the major requirements but was brought to the Arts and Sciences department pages. She has to navigate back to the chem.pitt.edu homepage.

User 2 Scenario: Bryce is interested in pursuing a master's in Chemistry after graduating from undergrad. He browses the chemistry department website and clicks on "How to Apply" for the graduate program. He learns about how to apply to the program and other requirements needed to apply.

VII. User Research Methodology

To evaluate the usability of the site, we tested four people who fit the target audience. To determine if they fit this standard, we asked two screening questions. They were:

1. Are you over 18?
2. Are you a college or prospective college student at Pitt?
3. What is your occupation and/or what are you studying?

After evaluating the testers' relation to the target audience, we tested Pitt's Department of Chemistry website either via Zoom or in person. We chose Zoom for its ability to record, share screens, and create a live audio-transcript. We spoke from a script to maintain consistency across studies, but we built in flexibility to ask follow-up questions or revisit something the participant had said. Questions included introductory questions about their thoughts on the site as a whole and tasks to work through.

The testers also completed quantitative research where they filled out a System Usability Scale, or SUS, using Google Forms. Testers could answer each of the questions on a scale from 1-Strongly Disagree to 5-Strongly Agree.

We used the questionnaire, the recordings, and the transcript to take a closer look at the findings of the results, detailed below.

VIII. User Research Findings

Testers 1, 2, and 4's initial reactions found the site well-organized, easy to navigate, and easy to understand. On the other hand, Tester 3 thought the homepage confusing and that it presents too much information. As for understanding labels, Testers 3 and 4 voiced confusion about the content of the "Safety" tab.

Task 1 asked Testers to find the Undergraduate Major Requirements. We appointed this task because clicking on the "Undergraduate" tab, then "Major Requirements" brings the user to the list of majors on the Arts and Sciences Undergraduate website. Then, when clicking "Chemistry," it brings the user back to the chem.pitt.edu homepage. To find major requirements, users must go through "Prospective Students," where then they can click on major requirements. As for the testers, they all found the major requirements easily.

Task 2 required Testers to find the Faculty page of George Bandik, the Director of Undergraduate Advising and Student Services. We asked Testers to refrain from using the search bar, as we wanted to test the usability and organization of the "People" tab. All Testers found this task very difficult. They all clicked on several tabs, unsure of Bandik's title. Tester 2 only realized the page's location because of previous knowledge. Tester 3 found his page through the "Undergraduate" tab. Tester 1 couldn't complete the task and gave up.

Task 3 asked Testers to find information about Facilities on campus. Accomplishing this brings the users to another website, so the second part of the task then requires them to navigate back to chem.pitt.edu. Testers 1 and 4 felt fine with the jump to another site, however, they both noted the difficulty of finding their way back without using the back button. Tester 4 mentioned the possibility of a warning before leaving the site. Tester 2 described the experience as "a little bit scary," annoying, and confusing, however, she felt fine once she uncovered the way back. Tester 3 felt "super frustrated and angry," expressing confusion at how to find her way back.

Task 4 consisted of an examination of the "Graduate Timeline" page. Tester 1 described the page as "confusing, a lot, and in your face" at first, but upon looking closer she said it made sense. Tester 2 thought a smaller, shorter key redesigned with clearer colors could make the page more accessible. Tester 3 described the images as "blurry," and expressed confusion as to their meaning. She noted the abundance of text and suggested a redesign of timelines and omitting green and yellow zones. Tester 4 also voiced confusion about the Zones area, but she liked the list at the bottom of the page.

After finishing the 4 Tasks, we asked the Testers a few follow-up questions about their overall feelings, thoughts on colors and font, and navigation of the site. All testers expressed satisfaction with the colors and font. Testers 1 and 2 specifically noted their approval of the background image with molecules on it. Tester 3 found images unhelpful and that overall, the site has too much text. Testers 1 and 2 found the website self-explanatory and easy to navigate.

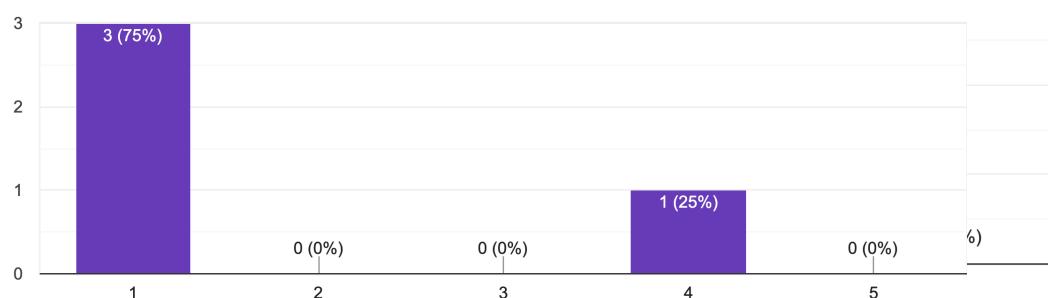
Read more notes from our user testing [here](#).

SUS Results

Question 1: “I think that I would like to use this system frequently”

I found the system unnecessarily complex.

4 responses

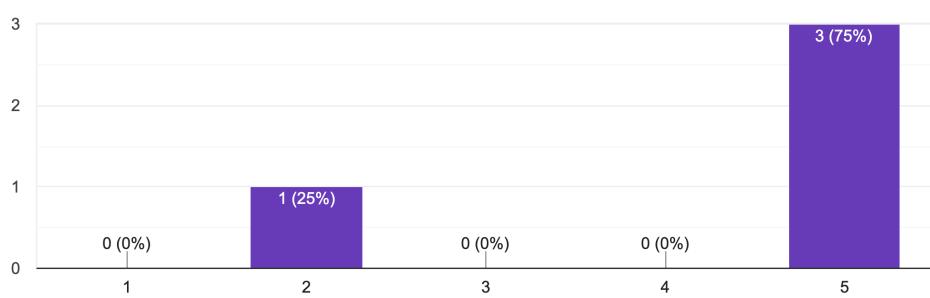


Question 2: “I found the system unnecessarily complex.”

Question 3: I thought the system was easy to use.

I thought the system was easy to use.

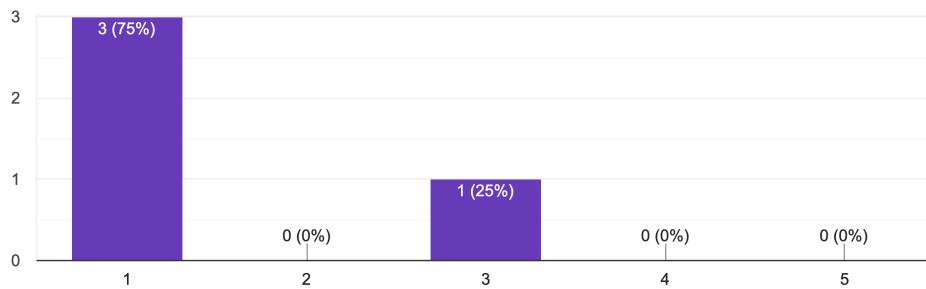
4 responses



Question 4: “I think that I would need the support of a technical person to be able to use this system.”

I think that I would need the support of a technical person to be able to use this system.

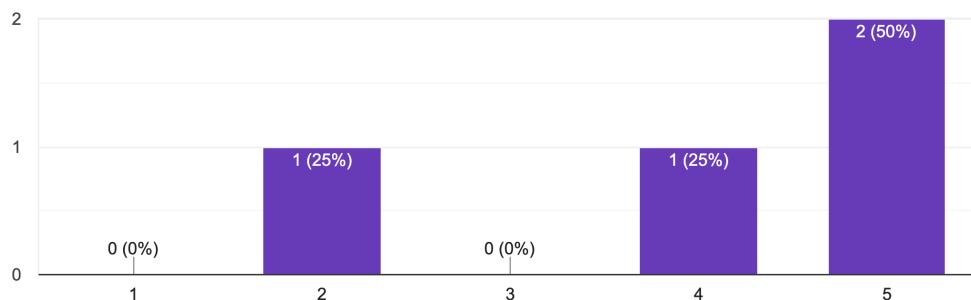
4 responses



Question 5: “I found the various functions in this system were well integrated.”

I found the various functions in this system were well integrated.

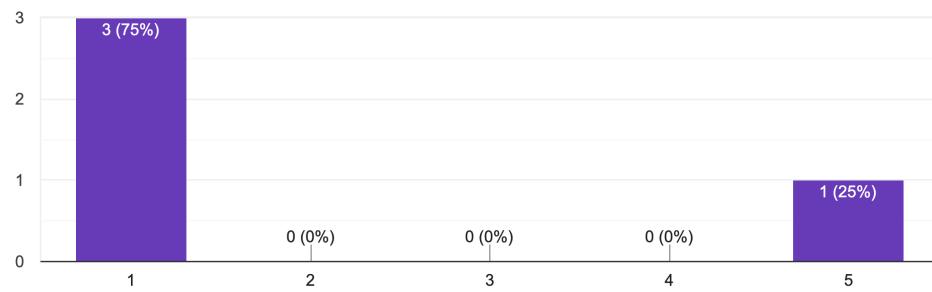
4 responses



Question 6: “I thought there was too much inconsistency in this system.”

I thought there was too much inconsistency in this system.

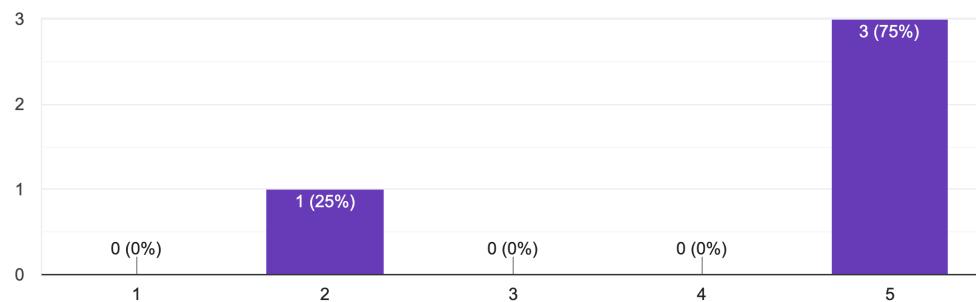
4 responses



Question 7: “I would imagine that most people would learn to use this system very quickly.”

I would imagine that most people would learn to use this system very quickly.

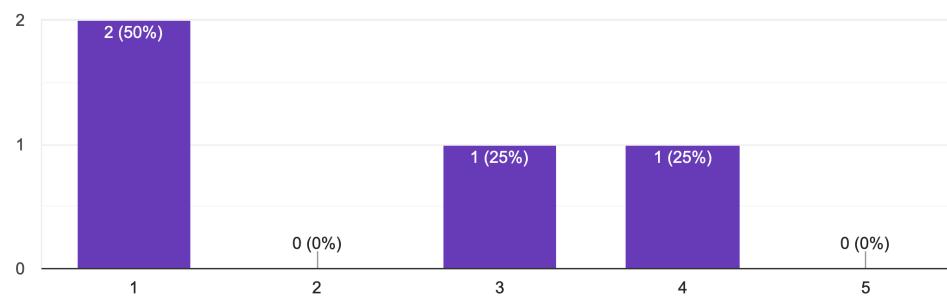
4 responses



Question 8: “I found the system very cumbersome to use.”

I found the system very cumbersome to use.

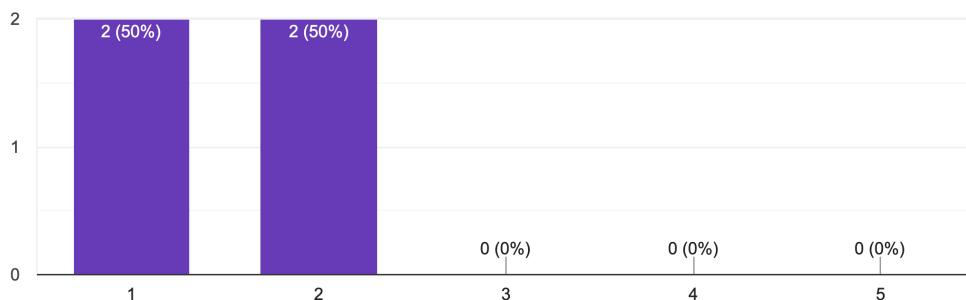
4 responses



Question 9: “I needed to learn a lot of things before I could get going with the system.”

I needed to learn a lot of things before I could get going with this system.

4 responses



IX. Recommendations

A. High Priority

The highest priority for the Chemistry Department website should be to **improve the faculty portion** of the site and to **add alt text** for images. During testing, users found it difficult to find a certain faculty member. Integrating a search bar directly into this section and keeping faculty member information relevant could help guide the user to their desired destination. Additionally, accessibility of the site could be improved with the addition of alt text on informative images. Alt text aids people with assistive technology, like a screen reader, or those with low levels of vision, and it is important that chem.pitt.edu serves these users as well.

B. Medium Priority

Medium-priority issues surround **user control and freedom**. Certain tabs take the user to a different University of Pittsburgh site where there is no immediate, clear path back to the chemistry site, forcing the user to navigate via the undo/redo buttons. These redirects disorient the user and can feel slightly jarring. The introduction of a blurb, or an indication that certain clicks will move the user from their current site, would alleviate this issue.

C. Low Priority

Some **aesthetic issues** fall into the lowest priority issues, as they do not hinder the overall functionality, but could enhance user experience in the future. Some users found the homepage **overwhelming** and the site contains some images with **low resolution** or text is **hard to read** because it is over images. The homepage could be trimmed to only include the most pertinent

and relevant information. The use of images on the site keeps the user engaged, but a few pictures in testing appeared blurry, especially in the ‘graduate timeline’ section. Updating these images with increased quality, and making the font on text over images stand out more, helps users obtain the information they need, especially users with low vision.

X. Conclusion

Chem.pitt.edu provides an informative resource for those interested in the Chemistry Department at Pitt. It accomplishes its goals through cohesive design elements, organized tabs, and an abundance of information. However, through heuristic evaluation and user testing and analysis, the site should improve accessibility, improve its faculty portion, and allow user control and freedom through easier navigation. We suggest the developers undertake these recommendations immediately as it will lead to more participation and awareness of the Chemistry Department.

XI. Appendix

- A. [Heuristic Evaluation Tool](#)
- B. [Screening Criteria](#)
- C. [User Research Script](#)
- D. [SUS](#)
- E. [Oral Presentation](#)
- F. [User Testing Notes](#)
- G. [Zoom Transcript](#)