Designing accessible websites is crucial for creating an inclusive online environment, as it enhances usability, ensures equal access to information and services, and promotes the principles of universal design.

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ABSTRACT

This paper outlines the author's proposal to create a responsive website showcasing their creative work and skills as a visual and information designer. The website adheres to the most recent Website Content Accessibility Guidelines (WCAG 2.0) and incorporates best website design practices.

The website includes a homepage and four main landing pages (Audio, Video, Image, and Text), displaying various content types cohesively through an emphasis on universal design principles. The author aims to achieve a high Signal-to-Noise Ratio, providing clear visual and textual hierarchy, while integrating various media elements effectively.

The paper conducts a literature review, exploring effective website design elements, usability, and future design trends. It highlights the significance of accessibility for individuals with cognitive disabilities and the importance of combining aesthetics with functionality.

The research outcomes discuss the evolution of WCAG, from version 2.0 to the upcoming version 3.0. It emphasizes the relevance of adhering to accessibility guidelines and incorporating alternative text, captions, and keyboard support to ensure an inclusive user experience. The paper concludes by stating the importance of ongoing improvements to meet evolving accessibility requirements and standards.
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I. INTRODUCTION

In anticipation of completing the SUNY Poly Information Design program, I will need a website to showcase my creative work and skills as a visual and information designer. I am proposing to create a responsive website that adheres to the most recent Website Content Accessibility Guidelines (WCGA 2.0) and best website design practices and principles.

This website will showcase new content created for this project, as well as some of the materials I have created over this program. Utilizing the digital programs and skills I have learned through the User Experience; Web Design; Graphic Design; Typographic Design; as well as general Information Technology courses, the final product will be a digital gallery of my work that I can build upon over time.

This website will consist of a Homepage, with four main landing pages included in the navigation that will structure the content: Audio, Video, Image, and Text. The topics of the content are as different as the mediums I like to work in, and can appear jarring as whole, so I am hoping to weave together the narrative of these pieces through the design of the site, blending together my “professional” work, as well as my creative work.

The website design will focus on Universal Design Principles such as Accessibility, Chunking, Layering, Modularity, and Readability to have achieve a high Signal-to-Noise Ratio and increase the strength of the message within the materials. There will be a clear visual and textual hierarchy, with an emphasis on white space while also showcasing an array of media such as images, audio, and video. I hope to achieve a balance of immersion and simplicity in how I display and integrate large hi-quality media and short to longform text, eliminating the “noise” in the design. “Minimizing noise means removing unnecessary elements and minimizing the
expression of necessary elements. Every element in a design should be expressed to the extent necessary, but not beyond the extent necessary. Excess is noise.” (Lidwell, Holden, Butler.) The project will include the creation of a “brand identity” with a focus on typography, logo, and iconography—using carefully selected font faces and a color scheme that will help navigation and differentiate the content of the pages.

The research conducted will explore website design best practices—how that is defined—as well as explore future website design trends and movements. The result of this research may influence the design, and the process will be tracked through multiple wireframes, and versions of page and content design. My objective is to create a catalog of disparate materials that are presented in a unifying way through information and visual design that everyone can access and interact with.
II. LITERATURE REVIEW

DEFINING BEST PRACTICES

When looking to quantify what elements make up an effective website and mobile application design, the authors of *A Literature Review: Website Design and User Engagement*, reviewed the top 100 Google search results for articles with the combination of keywords: design, usability, and websites. “Seven of the website design elements met our threshold requirement for review. **Navigation** was the most frequently discussed element, mentioned in 22 articles (62.86%). Twenty-one studies (60%) highlighted the importance of **graphics**. Fifteen studies (42.86%) emphasized **good organization**. Four other elements also exceeded the threshold level, and they were **content utility** (37.14%), **purpose** (31.43%), **simplicity** (31.43%), and readability (31.43%).” (Garett, Chiu, Zhang, Young.) Their review provides insight into the importance of having a well-planned structure of information, combining enticing visuals with clear navigation to keep the user engaged with the content.

In a study at the University of Zaragoza, the authors reviewed specialized literature focused on website design to find the key aspects of a successful e-commerce website. “More concretely, we have noticed that online users’ point of view has to be emphasized in every aspect of the website; thus, the dimensions identified in [Table One] establish the basis to influence online users’ perceptions and behaviors, and therefore to determine the website’s success.” (Flavian, Gurrea, & Orús.)
The authors conclude that there are four factors that can improve a website’s performance and provide guidelines to optimize each category: **Appearance**, **Navigation**, **Content**, and **Shopping Process**. They suggest “launching with a good appearance to get high levels of credibility which leads to user trust.” Another tip is to find an equilibrium between aesthetics and download speed. For Navigation they encourage the designer to include an internal search engine, backwards button, and a visible sitemap so the user can be in complete control of where they go. While for Content they propose using updated, comprehensible, and relevant content that is organized and managed in a clear way making the search for information easier. If you are including an e-commerce portion to your website, they suggest limiting the shopping process to no more than five stages (find item, customize/add another item, review, checkout) while letting

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<table>
<thead>
<tr>
<th>Dimension</th>
<th>Guidelines</th>
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| **Appearance**     | 1) Launch a good appearance is important for getting high levels of credibility in the website, which leads users to trust.  
                     2) Offer vividness in the website to get a positive response by the consumer.  
                     3) Find a well-balanced equilibrium between the aesthetic appearance and the download speed. |
| **Navigation**     | 4) Offer a navigation characterized by simplicity.  
                     5) Allow users to control where he/she is in every moment during the navigation and what he/she can do. |
| **Content**        | 6) Organize and manage the contents in a clear way making ease the search of information.  
                     7) Provide quality information/contents. |
| **Shopping process** | 8) Offer an efficient and easy shopping process.  
                             9) Provide quality information of the products and services offered.  
                             10) Emphasise privacy and security aspects. |

**Tools**

- **Visualization Tools**:  
  - Images  
  - Graphics  
  - Icons  
  - Animations  
  - Colours...

- **Information**:  
  - Updated  
  - Comprehensible  
  - Relevant  

- **Visualization tools**:  
  - Product images with proper size and quality

- **Shopping process step-by-step (no more than five stages)**

- **Links with useful information for the purchase (related products, overviews, additional information)**

- **Privacy and security information in all the stages of the shopping process**
the user know where they are in the process the whole time through clear navigation. Adhering to these standards will maximize the usability of your site across all devices and browsers, while leading your customer to complete their desired action.

**Appearance, navigation, content utility, and simplicity**—these elements combine to form a website’s Usability. The International Standards Organization defines usability as “the extent to which users can achieve desired tasks (e.g., access desired information or place a purchase) with effectiveness, efficiency, and satisfaction within a system.” (ISO.) When building a website, the goal should be to create something that as many people as possible can use and that has a responsive display that is functional on all devices.

A study of university students during the pandemic investigated the effect of responsive mobile design on the usability of university websites and found that 92% of respondents had smart phones and 38% had a daily Internet usage rate of 4–5 hours. “This shows that the participants, who were mostly mobile device users, were more sensitive in the responsive design dimension. Ease of Learning is one of the Usability dimensions that students find the most positive (73.4%). In the correlation, usability and responsive design ($r = 0.92$, $p < 0.01$) were found to be significantly correlated. The regression analysis shows that responsive design explains 91.5% of the usability and explains 74.7% of its effectiveness. In this study, 99.2% of university students were using smart phones and the level of user satisfaction with responsive design was 93% in terms of using responsively designed university web sites.” (Parlakkilic.)
For a website to truly be usable it must also be accessible to all. ADA Website accessibility standards break down to four basic principles: Perceivable, Operable, Understandable, Robust. “Users must be able to perceive the information being presented (it can't be invisible to all of their senses). Users must be able to operate the interface. Information and the operation of user interface must be understandable. Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.”

(Accessibility Works.)

For a great visual representation of the web content accessibility guidelines see Intopia’s WCAG 2.1 map that illustrates at a glance where each Success Criterion fits under the WCAG Principles, including its level of conformance. [See Figure 1.]

In The State of Web Accessibility for People with Cognitive Disabilities their main question was “what are the state-of-the-art of interventions that support web accessibility for citizens, 9 years of age and up, living with cognitive impairment?” They ran 50 search strings through three academic databases: SCOPUS, ProQuest, and Web of Science and reviewed 45 papers on the subject. They establish the difference between website usability and accessibility, “...related terms with overlapping components. Often web accessibility studies involve some usability testing. However, usability is not a full picture of accessibility…we focus on web accessibility, which “addresses discriminatory aspects related to equivalent user experience on the web” for all people. Web accessibility can include considerations of usability, which “is about effective, efficient, and satisfying design of websites and mobile applications.” Additionally, web accessibility is inclusive of websites, web apps, web-based tools and platforms, and other internet connected technologies.”
They also delve into how the studies were conducted and propose options to improve them. “Studies Involving People with Cognitive Disabilities Broadly Defined One subset of studies involved participants described as having “intellectual disabilities,” “learning disabilities,” “cognitive disabilities,” “cognitive impairment,” and “mild cognitive impairment.” These studies tended to involve information seeking and gathering through text-based websites. Taken together, these studies indicate that the field must devote more attention to non-text-based methods for sharing information and communicating and that PwCDs are indicating that they need more solutions anchored in real-life experiences. For example, Balasuriya, et al. presented people with cognitive disabilities with web articles in “simplified” and “summarized” form and found that the use of images, familiar words, and larger font sizes influenced participants’ understanding of the information presented. Although most participants found the information easier to read, some participants noted that the experience did not satisfy their desire for knowledge because less information was provided. Karreman, et al. also provided participants with two versions of a website (home page only) to pilot an easy-to-read website design, and results showed that the easy-to-read website being piloted seemed to improve participants’ efficiency in seeking and reading information. However, only a single webpage was used, which is typical of the studies reviewed and highlights the need to explore more complex situated in real-world contexts. Rocha, et al. also compared multiple types of webpage navigation, text-based and image-based navigation, and results indicated that image navigation increased the speed of task-completion.” (Gartland, Flynn, Carneiro, Holloway, Fialho, Cullen, Hamilton, Harris, Cullen.)

They found four themes that come across in the research—People, Technology, Space, and Process—and had recommendations for each. People: “ensure that participant(s) are co-
designers rather than subjects being tested or evaluated.” Technology: “select tool(s), platform(s), device(s), website(s), and/or web application(s) that are relevant to the target groups & provide training for whatever tools are selected.” Space: “for decisions related to lab settings or where the research is being conducted, consider using a space that participants are already familiar with.” Process: “consider using a phased approach to conducting research to allow time for introductions and training, testing, and refining of tools, and evaluation. A phased approach supports the inclusion of PwCDs as co-designers.”

**VISUAL DESIGN**

Looking to the future of website design Andrew Wang proposes using artificial intelligence algorithms to collect, analyze, and arrange the visual elements of a web page. “At present, the problems existing in the application of visual elements in web design are as follows: The stacking of visual elements and the lack of information content. When designing web pages, it is necessary not only to arrange the plane visual elements reasonably but also to arrange the unique elements reasonably. When designing some web pages, visual elements are randomly stacked without planning. This makes the web page lose its beauty. Elements such as animation, text, and color blocks have no design logic at all, making users easily bored. When designing web pages, new ideas must be matched with the content. Both are more important and are indispensable. Web pages need to be aesthetically pleasing, which increases page views. However, if there is only beauty and no content, it will make the web page tasteless and unable to retain users for a long time.” (Wang.) While they tested many algorithms one was found “suitable for the extraction of visual elements of web page design,” though it seems from their summary above that they are still looking to find a better way to merge the human-centered
aspects of design with AI learning.

In a 2022 study from Google, users were tested for their reaction to the visual complexity (VC) and prototypicality (PT) in design factors of websites. 119 screenshots of real websites varying in VC and PT were shown to users at quick and varying intervals and were rated on their perceived aesthetics. “Users prefer websites with low visual complexity and high prototypicality. Websites of low prototypicality are generally judged as being unattractive – in fact, this counts for websites of high as well as low complexity. Both factors already influence the aesthetic judgments after a very short presentation time of 17 MS. Designs that contradict what users typically expect of a website may trigger a suboptimal first impression and impair users’ expectations. Latest research shows that negative product expectations lead to lower satisfaction in product interaction. This may lead to a disadvantageous negative downward spiral that should be avoided.” (Tuch, Presslaber, Stoecklin, Opwis, Bargas-Avila.) Meaning the simpler the visuals and website design within a site the more likely a user will stay on the page and interact with its contents.
III. METHODS

I plan to create this website without the use of a content management system, using available plug-ins and hard coding the pages, displaying the HTML/CMS knowledge I’ve learned in this program. The website will consist of all original content—images, text, audio, video—some that are hosted on other platforms and that will need to be embedded in the page. The website will act as a calling card and include the created branding with contact information and short biography about myself. I will curate what content to include, with the aim to make the website easy to add or remove content.

Once I have a list of the individual content pieces that I want to include on each page I will build out a visual method of how to display each piece within the page. If there is content that I do not want included in home or landing pages, I can host as “unlinked” from the main website. Each content piece will have rigorous alt text and identifiers for screen readers and will follow current WCAG 2.0 standards.

The site will be created in Adobe Dreamweaver to customize the layout and design. I worked in the Graphic Design course to build and refine my brand identity and create graphic elements for the website. I will build on the skills I have learned in this program and continue research into and working with Adobe Illustrator, Photoshop, and InDesign to pull all the materials together for this project.

The research will compile the history of the current Web Content Accessibility Guidelines (WCAG 2.0) and focus on articles within the last two years to capitalize on timeliness and relevancy. The standards set in WCAG 2.0 will inform the design of the site. The research will also look forward to WCAG 3.0 principles and rating system.
IV. RESEARCH OUTCOMES

Web Content Accessibility Guidelines (WCAG) are a list of web accessibility guidelines first compiled and published in January 1995 by Gregg Vanderheiden. In 2008 the guidelines were updated by the World Wide Web Consortium (W3C) as WCAG 2.0. These set of recommendations work to make web content more accessible, primarily for people with disabilities, as well as users on mobile phones, tablets, and e-readers.

A draft of WCAG 3.0 (W3C Accessibility Guidelines) was released in 2021 with an update in May 2023. It is expected to be released in late 2023, though developers are already working towards these new requirements.

WCAG 2.0

The WCAG 2.0 guidelines are defined by four principles: Perceivable, Operable, Understandable, Robust; which are graded on three levels: “A”, “AA”, “AAA.”

“A” is the minimum level of requirement for all websites, apps, and electronic content.

“AA” is viewed as the average level of accessibility, where content should be easily interpreted by assistive technologies (screen magnification software, alternative keyboards and input devices, and voice recognition.)

“AAA” is the gold standard level of accessibility, providing a complete accessible experience.
"WCAG 3.0 (Yet to be Released)"

WCAG 3.0 measurability will shift from the “A” rating system to a rating system of “Bronze”, “Silver”, and “Gold”.

**Bronze** is the minimum conformance level. The scope claimed in the conformance statement must pass a subset of Outcomes and Assertions. The subset will require enough Outcomes and Assertions to improve equity across functional needs.

**Silver** incentivizes organizations to go further to improve accessibility. The goal is to encourage organizations to go beyond the minimum, especially where organizations want to be recognized for their efforts to go beyond minimum accessibility.

**Gold** identifies measures the W3C wants to include for those organizations that do achieve Silver so that some can stand out as exemplary, cutting edge, and role models. These ideas will be developed further once more of the conformance structure is solidified.

**WCAG 3.0 ACCESSIBILITY GUIDELINES**

“The following guidelines are an initial list that the working group will be exploring. They should be considered drafts and should not be considered as final content of WCAG 3.” ([W3C](https://www.w3.org/)). Definitions for each guideline will be released with the full report sometime in late 2023.

- Aid navigation: The website or app aids navigation
- Audio and video alternatives: Video and audio have alternatives
- Clear language: Content uses clear language
- Clear purpose: Controls have clear purpose
- Color and contrast: Contents use sufficient contrast and do not rely on color alone
- Consistent design: The website or app has a consistent design
- Content order: Contents are programmatically and visually ordered
- Control and focus: Appearance of controls and focus support keyboard/pointer use
- Control semantics: Controls have correct semantic markup
- Error notification: Controls notify users when making mistakes
- Error prevention: User processes prevent users from making mistakes
- Flexible views: Views are flexible
- Harm from motion: On-screen motion does not cause harm
- Keyboard support: The website or app supports the keyboard
Mobile and pointer support: The web site or app supports mobile and pointer inputs
Non-visual alternatives: Images and graphics have non-visual alternatives
Prevent harm: The web site or app does not cause harm
Process cognitive load: User processes do not increase cognitive load
Provide help: The web site or app provides help
Structured content: Views have structure that helps user orient and navigate
Text appearance and semantics: Text uses appropriate layout and semantics
Timing and interruptions: Minimize the impact of timing and interruptions
User control: Users have ability to control audio, movement, and auto updating

Working through the site and all the different types of media I have included, I revisited some of my videos and added in closed captions. I will need to add a text transcript for the audio pieces and the images will also have full descriptive alt text. Overall, the site has a clear purpose, consistent design, and is responsive for all devices. I also use high contrast for the navigation and links. After the site is initially published, I will go back and run an online accessibility check for any other issues and fix accordingly.
V. CONCLUSIONS AND FUTURE OUTLOOK

When building my website the Web Content Accessibility Guidelines I wanted to focus on were Perceivable (“Information and user interface components must be presentable to users in ways they can perceive.”) and Operable (“User interface components and navigation must be operable.”). The homepage has a clear structure (“2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.”) and focuses on guiding the user into one of the four interior pages. Once on the interior pages, the menu appears above the header as icons, leading you to explore all five pages. When resized to mobile view the items stack, and a hamburger menu appears making the website responsive to all sizes and devices. (“1.3 Adaptable: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.”)

The header font, Catamaran SemiBold, is highly readable against the images as it is used in a large size and in white for high contrast. When hovering over the linked image selection the opacity changes and a cursor appears, or when hovering over the icons they turn pink, distinguishing that the content is hyperlinked. (“1.4 Distinguishable: Make it easier for users to see and hear content including separating foreground from background.”)

Overall, the website provides robust text alternatives for images and icons, and the videos have closed captioning included. (1.1 Text Alternatives: Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.) To take this to a “Gold” level of WCAG 3.0 compliance, I would provide transcripts for the audio recordings for the hearing impaired. As I continue to work on the website, I will work to improve its contents and accessibility as requirements change and standards evolve.
Ryan Hugh McWilliams is a New York City-based writer, director, and designer, focusing on the intersection of physical and digital content.

Audio

Shoeless Wonder

When I was 8, I lived in Hawaii and competed in the Iron Kids Triathlon... and I lost a shoe. Somehow it made the news.
Images

Spec cover for "Tomorrow, and Tomorrow, and Tomorrow"

Spec advertisement for Taliz and Dollar General

Poster for the play Cartoon by Steve Yockey

Poster of the Metamorphosis process

Selection from my eraser collection. By type, shape, color, and evolution.

Spec poster for Central Park SummersStage

Spec album artwork for the compilation album "A Picture of Us in The Garden" by Devon Sproule.

Ryan Hugh McWilliams

Instagram, LinkedIn, YouTube
REFERENCES