SPRINT GOAL

07/27 - 8/02

0 days left!

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Original Summer Goal

In the beginning, we set out to…

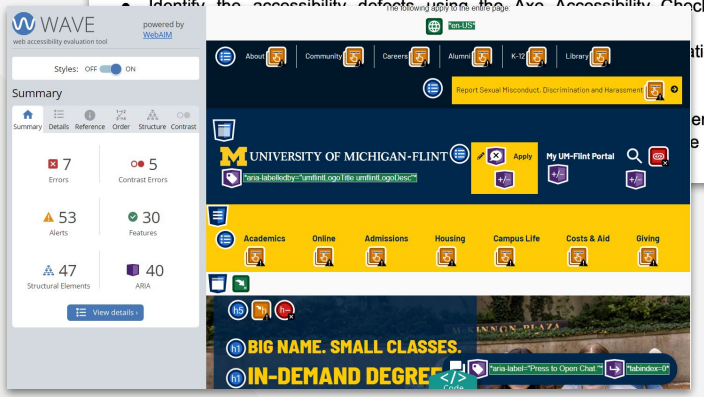
1. **Detect web accessibility issues utilizing WAVE Tool** across different fields of websites: *News & Media, Entertainment, Transportation, Finance & E-Commerce, E-Learning, E-Health.* ✅

Automatic detection of website and application accessibility issues

Mentor: Makram Soui (smakram.isgg@gmail.com)

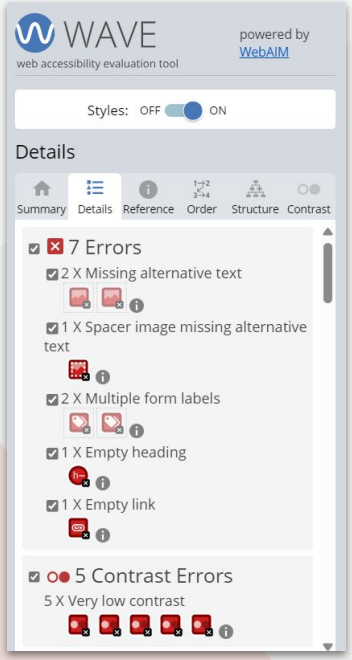
This project aims to automatically detect website and application accessibility issues that may prevent people with disabilities from using them effectively. The idea is to use accessibility testing automation tools such as Axe Accessibility Checker to identify and fix accessibility issues of the evaluated applications.

- Each student will select five applications or websites related to the following fields: E-Learning, Gaming, Finance, E-commerce, E-Health, and Transportation.
- Identify the accessibility defects using the Axe Accessibility Checker or Google



Progress - Our Work

Collect data on the *accessibility issues, types, occurrences, location, etc.* (2,674 entries) ✅



ISSUE #	USED TOOL	IMPACT	URL	Field Numbe	PAGE TITLE	PAGE AREA	ISSUE TYPE	ISSUE DESCRIPTION	ISSUE IMPORTANCE	ISSUE OCCURRE	WCAG LEVEL	WCAG CATEGORY	Guideli ne	WCAG CRITERIA
		Rate the severity of the issue.	*Provide a link to the page where the issue is occurring.*			*Describe the area of the page consistently throughout all of the pages.*		*Provide a concise description of the issue so that the person fixing the problem can understand it.*	*Provide a description of why this accessibility issue matters?*	*Provide the number of occurrence of this issue*	*Provide the conformance level (A-AAA) according to WCAG*	*Provide the WCAG category (POUR)*		*Cite the WCAG criteria (single or multiple) that this is in violation of. It might be easier to add these later on*
1	WAVE	Medium	https://discord.com/	1	Home Page	Home interface	Missing alternative text	Image alternative text is not present.	Each image must have an alt attribute. Without alternative text, the content of an image will not be available to	31	A	P	1.1	1.1.1 Non-text Content
2	WAVE	High	https://discord.com/	1	Home Page	Home interface	Language missing or invalid	The language of the document is not identified or a lang	Identifying the language of the page or page elements allows screen readers to read the content in the	1	A	U	3.1	3.1.1 Language of Page
6	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Missing alternative text	Image alternative text is not present.	Each image must have an alt attribute. Without alternative text, the content of an image will not be available to	7	A	P	1.1	1.1.1 Non-text Content
7	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Spacer image missing alternative text	A layout spacer image (which should have null/empty	Spacer images are used to maintain layout. They do not convey content and should be given null/empty alternative	3	A	P	1.1	1.1.1 Non-text Content
8	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	P	1.1	1.1.1 Non-text Content
9	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	p	1.3	1.3.1 Info and Relationships
10	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	AA	O	2.4	2.4.6 Headings and Labels
11	WAVE	Medium	https://imgur.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	U	3.3	3.3.2 Labels or Instructions
12	WAVE	High	https://imgur.com/	1	Home Page	Home interface	Empty button	A button is empty or has no value text.	When navigating to a button, descriptive text must be presented to screen reader users to indicate the function	1	A	P	1.1	1.1.1 Non-text Content
13	WAVE	High	https://imgur.com/	1	Home Page	Home interface	Empty button	A button is empty or has no value text.	When navigating to a button, descriptive text must be presented to screen reader users to indicate the function	1	A	O	2.4	2.4.4 Link Purpose (In Contex
14	WAVE	High	https://imgur.com/	1	Home Page	Home interface	Empty link	A link contains no text.	If a link contains no text, the function or purpose of the link will not be presented to the user. This can introduce	1	A	O	2.4	2.4.4 Link Purpose (In Contex
15	WAVE	High	https://imgur.com/	1	Home Page	Home interface	Very low contrast	Very low contrast between text and background colors.	Adequate contrast of text is necessary for all users, especially users with low vision.	5	AA	P	1.4	1.4.3 Contrast (Minimum)
16	WAVE	Medium	https://open.spotify.com/	1	Home Page	Home interface	Spacer image missing alternative text	A layout spacer image (which should have null/empty	Spacer images are used to maintain layout. They do not convey content and should be given null/empty alternative	2	A	P	1.1	1.1.1 Non-text Content
17	WAVE	Medium	https://open.spotify.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	P	1.1	1.1.1 Non-text Content
18	WAVE	Medium	https://open.spotify.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	P	1.3	1.3.1 Info and Relationships
19	WAVE	Medium	https://open.spotify.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	AA	O	2.4	2.4.6 Headings and Labels
20	WAVE	Medium	https://open.spotify.com/	1	Home Page	Home interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	1	A	U	3.3	3.3.2 Labels or Instructions
21	WAVE	High	https://open.spotify.com/	1	Home Page	Home interface	Empty button	A button is empty or has no value text.	When navigating to a button, descriptive text must be presented to screen reader users to indicate the function	1	A	P	1.1	1.1.1 Non-text Content
22	WAVE	High	https://open.spotify.com/	1	Home Page	Home interface	Empty button	A button is empty or has no value text.	When navigating to a button, descriptive text must be presented to screen reader users to indicate the function	1	A	O	2.4	2.4.4 Link Purpose (In Contex
23	WAVE	Medium	https://open.spotify.com/search	1	Search page	Search interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	2	A	P	1.1	1.1.1 Non-text Content
24	WAVE	Medium	https://open.spotify.com/search	1	Search page	Search interface	Missing form label	A form control does not have a corresponding label.	If a form control does not have a properly associated text label, the function or purpose of that form control may not	2	A	P	1.3	1.3.1 Info and Relationships
25	WAVE	Medium	https://open.spotify.com/sear	1	Search page	Search interface	Missing form label	A form control does not have a	If a form control does not have a properly associated text	2	AA	O	2.4	2.4.6 Headings and Labels

Progress - Our Work

Complete Literature Review & Propose Research Questions. ✅

Scanlon et al. International Journal of STEM Education (2021) 8:25
https://doi.org/10.1186/s40594-021-00282-3

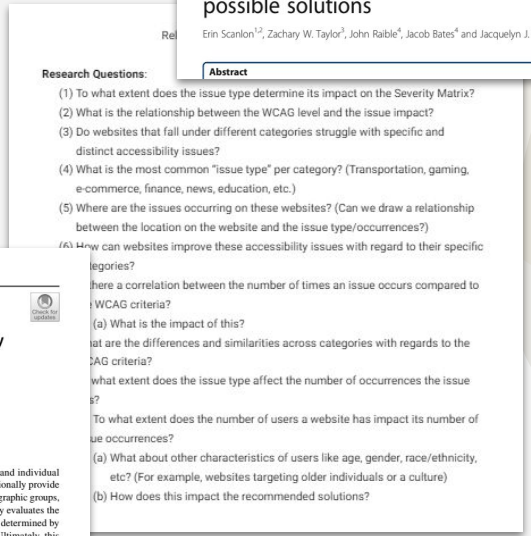
International Journal of STEM Education

RESEARCH Open Access

Physics webpages create barriers to participation for people with disabilities: five common web accessibility errors and possible solutions

Erin Scanlon[1,2], Zachary W. Taylor[3], John Raible[4], Jacob Bates[4] and Jacquelyn J. Chini[1*]

Abstract



Research Questions:

(1) To what extent does the issue type determine its impact on the Severity Matrix?
(2) What is the relationship between the WCAG level and the issue impact?
(3) Do websites that fall under different categories struggle with specific and distinct accessibility issues?
(4) What is the most common "issue type" per category? (Transportation, gaming, e-commerce, finance, news, education, etc.)
(5) Where are the issues occurring on these websites? (Can we draw a relationship between the location on the website and the issue type/occurrences?)
(6) How can websites improve these accessibility issues with regard to their specific
egories?
here a correlation between the number of times an issue occurs compared to
WCAG criteria?
(a) What is the impact of this?
at are the differences and similarities across categories with regards to the
AG criteria?
what extent does the issue type affect the number of occurrences the issue
s?
To what extent does the number of users a website has impact its number of
ue occurrences?
(a) What about other characteristics of users like age, gender, race/ethnicity, etc? (For example, websites targeting older individuals or a culture)
(b) How does this impact the recommended solutions?

Accessibility Issues in Android Apps:
State of Affairs, Sentiments, and Ways Forward

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ABSTRACT

Mobile apps are an integral component of our daily life. Ability to use mobile apps is important for everyone, but arguably even more so for approximately 15% of the world population with disabilities. This paper presents the results of a large-scale empirical study aimed at understanding accessibility of Android apps from three complementary perspectives. First, we analyze the prevalence of

Due to the increas
bile devices, ensuring
more important than
ity of apps has been
organizations facilita
veloper and design g
provide accessibility

Universal Access in the Information Society (2022) 21:771–789
https://doi.org/10.1007/s10209-020-00788-7

COMMUNICATION

Evaluating the accessibility of public health websites: An exploratory cross-country study

Nancy Alajarmeh[1]

Published online: 27 January 2021
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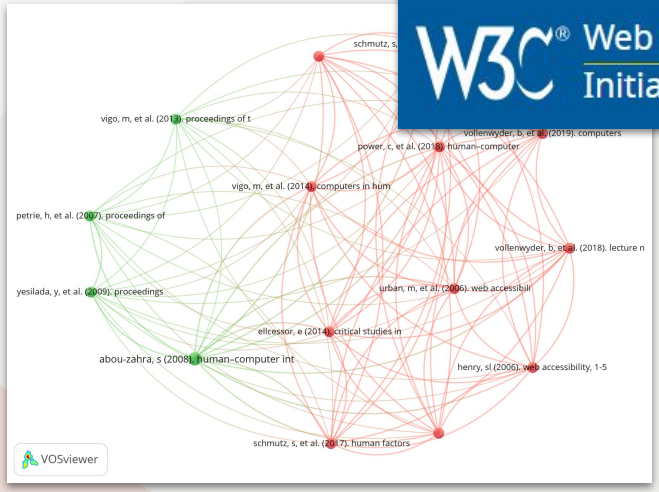
Abstract

Public health websites are regarded as official references that citizens of any country rely on for domestic and individual health affairs. For people with disabilities, public health resources are often of greater importance; they additionally provide disability context-specific information. However, to leverage the benefits of such resources for the widest demographic groups, Web accessibility requirements should be met at an acceptable level (e.g., WCAG 2.0, Level AA). This study evaluates the accessibility of a number of public health websites from 25 countries. The choice of the selected websites is determined by the extent of the COVID-19 outbreak in the corresponding countries and their rank as of late April, 2020. Ultimately, this study aims at shedding light on the current situation of accessibility to health information and pinpointing the aspects where

Progress - Our Work

Perform an empirical investigation with our data and questions.

½ completed–Introduction, Research Questions, Background, & Related Works are completed–in the middle of Methodology, Analysis, & Findings.



~~accessibility issues that could arise after translating the website into a different language. To absolve this issue, across all of the websites that we evaluated, we performed this evaluation after it was translated to English as to ensure consistency in the world's most commonly spoken language.~~

~~In a similar regard to the previous related work,~~ Similarity,

Merja Laamanen et al. (2024) conducted a study utilizing WAVE and Siteimprove automatic evaluation tools to assess the level of accessibility in ~~commonly accessed~~ Finnish higher education institution websites' landing pages. ~~Conducting research at this level of detail allowed the researchers to hone in on their focus and target population, analyzing the struggles that disabled individuals in this community commonly struggle with. Though, the level of detail tends to be this study's limitation in other respects. The article does utilize two different evaluation tools, WAVE and Siteimprove to allow for two different perspectives on the evaluation.~~ Though, the article found that with both evaluation tools, there were similar errors found. These studies limit the evaluation to the landing pages of all the studied education websites. In our work, we selected the homepage, and other widely visited web interfaces (1320 interfaces) of 115 different websites across over 6 different fields including education, transportation, healthcare, finance, news, social media, etc.

~~Furthermore, the article limits the evaluation to the landing pages of all of these websites, in that, most people need to have a clear understanding of the landing page in order to continue on to another interface. Though, by failing to evaluate other interfaces of the websites, there is a gap in the understanding of the main places where these issues lie. In this, developers and webmasters could set~~

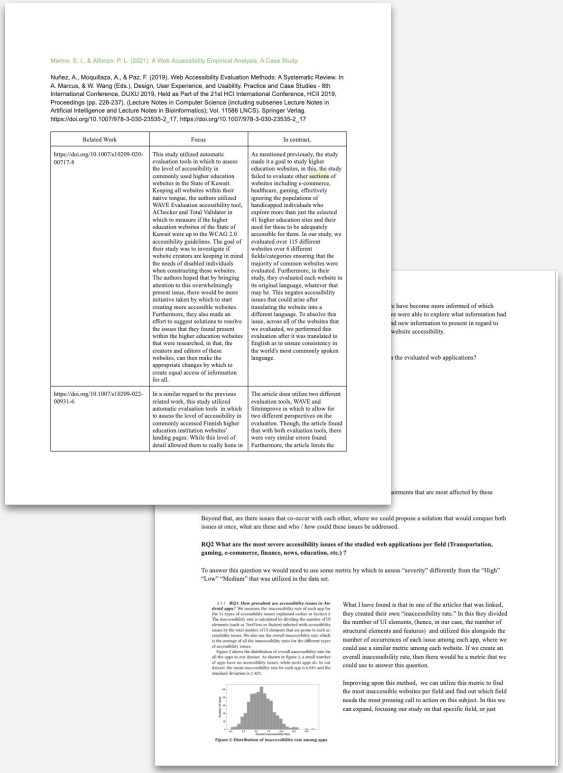
Documented: Looking Back

06/15 - 06/21	**Goal: Starting the writing process and researching related works**
	
	- Finalized inputted data with a final grand total of 1038 rows of data!
	
	- Completed reading related works and generated notes and came to meeting prepared with any resulting questions
	
	- Received a list of research questions
	  - Utilized Research questions in order to culminate a rough draft of three introductory paragraphs for our papers
	- Try to prepare rough draft paragraphs regarding each research question answering / addressing each research question
	- Searched different databases (google scholar, IEEE Xplore, Scopus)
	  - **Chi Chi:** With a focus on assessing related works and conducting empirical research that focuses on improvement and existing empirical research concerning improvement of accessibility defects

We kept track of responsibilities, progress, & notes!

- In summary:
  - We worked to gain an understanding of project goals and content
  - Analyzed the data and co-occurrences found within the data
  - Started the Writing Process!

“End” Product [1/2]



Marino, S. I., & Afonzo, P. L. (2021). A Web Accessibility Empirical Analysis, A Case Study.

Nuñez, A., Moquillaza, A., & Paz, F. (2019). Web Accessibility Evaluation Methods: A Systematic Review. In A. Marcus, & W. Wang (Eds.), Design, User Experience, and Usability. Practice and Case Studies - 8th International Conference, DUXU 2019, Held as Part of the 21st HCI International Conference, HCII 2019, Proceedings (pp. 226-237). (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); Vol. 11586 LNCS). Springer Verlag. https://doi.org/10.1007/978-3-030-23535-2_17, https://doi.org/10.1007/978-3-030-23535-2_17

Related Work	Focus	In contrast,
https://doi.org/10.1007/s10209-020-00717-8	This study utilized automatic evaluation tools in which to assess the level of accessibility in commonly used higher education websites in the State of Kuwait. Keeping all websites within their native tongue, the authors utilized WAVE Evaluation accessibility tool, AChecker and Total Validator in which to measure if the higher education websites of the State of Kuwait were up to the WCAG 2.0 accessibility guidelines. The goal of their study was to investigate if website creators are keeping in mind the needs of disabled individuals when constructing these websites. The authors hoped that by bringing attention to this overwhelmingly present issue, there would be more initiative taken by which to start creating more accessible websites. Furthermore, they also made an effort to suggest solutions to resolve the issues that they found present within the higher education websites that were researched, in that, the creators and editors of these websites, can then make the appropriate changes by which to create equal access of information for all.	As mentioned previously, the study made it a goal to study higher education websites, in this, the study failed to evaluate other sections of websites including e-commerce, healthcare, gaming, effectively ignoring the populations of handicapped individuals who explore more than just the selected 41 higher education sites and their need for these to be adequately accessible for them. In our study, we evaluated over 115 different websites over 6 different fields/categories ensuring that the majority of common websites were evaluated. Furthermore, in their study, they evaluated each website in its original language, whatever that may be. This negates accessibility issues that could arise after translating the website into a different language. To absolve this issue, across all of the websites that we evaluated, we performed this evaluation after it was translated to English as to ensure consistency in the world’s most commonly spoken language.
https://doi.org/10.1007/s10209-022-00931-6	In a similar regard to the previous related work, this study utilized automatic evaluation tools in which to assess the level of accessibility in commonly accessed Finnish higher education institution websites’ landing pages. While this level of detail allowed them to really hone in	The article does utilize two different evaluation tools, WAVE and Siteimprove in which to allow for two different perspectives on the evaluation. Though, the article found that with both evaluation tools, there were very similar errors found. Furthermore, the article limits the

Beyond that, are there issues that co-occur with each other, where we could propose a solution that would conquer both issues at once, what are these and who / how could these issues be addressed.

RQ2 What are the most severe accessibility issues of the studied web applications per field (Transportation, gaming, e-commerce, finance, news, education, etc.)?

To answer this question we would need to use some metric by which to assess “severity” differently from the “High” “Low” “Medium” that was utilized in the data set.

What I have found is that in one of the articles that was linked, they created their own “inaccessibility rate.” In this they divided the number of UI elements, (hence, in our case, the number of structural elements and features) and utilized this alongside the number of occurrences of each issue among each app, where we could use a similar metric among each website. If we create an overall inaccessibility rate, then there would be a metric that we could use to answer this question.

Improving upon this method, we can utilize this metric to find the most inaccessible websites per field and find out which field needs the most pressing call to action on this subject. In this we can expand, focusing our study on that specific field, or just

Figure 3: Distribution of inaccessibility rate among apps

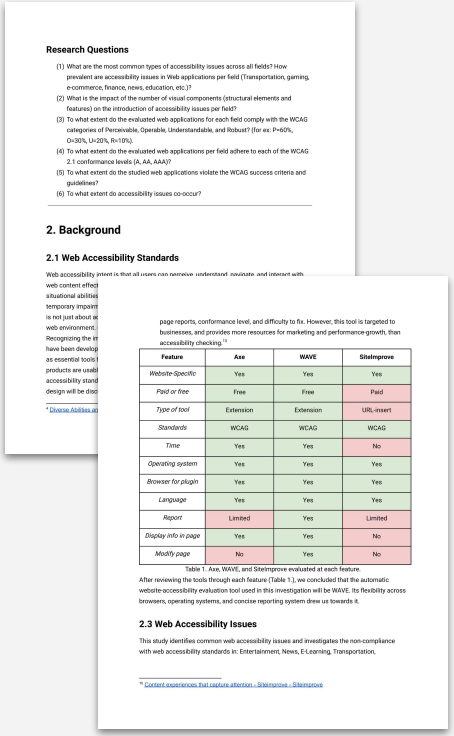
<u>Investigating severity of different accessibility issues and how / who we appoint to fix these issues</u>

→ Examine WGAC success criteria and figure who to fix these issues, and what the most ***effective*** strategies are to go about fixing these

→ Investigate the biggest **contributors** to these accessibility issues and how visual and structural elements can be modified to

→ Examine the relationship between different co-occurring accessibility issues

“End” Product [2/2]



Research Questions

(1) What are the most common types of accessibility issues across all fields? How prevalent are accessibility issues in Web applications per field (Transportation, gaming, e-commerce, finance, news, education, etc.)?
(2) What is the impact of the number of visual components (structural elements and features) on the introduction of accessibility issues per field?
(3) To what extent do the evaluated web applications for each field comply with the WCAG categories of Perceivable, Operable, Understandable, and Robust? (for ex: P=60%, O=30%, U=20%, R=10%).
(4) To what extent do the evaluated web applications per field adhere to each of the WCAG 2.1 conformance levels (A, AA, AAA)?
(5) To what extent do the studied web applications violate the WCAG success criteria and guidelines?
(6) To what extent do accessibility issues co-occur?

2. Background

2.1 Web Accessibility Standards

page reports, conformance level, and difficulty to fix. However, this tool is targeted to businesses, and provides more resources for marketing and performance-growth, than accessibility checking.[1]

Feature	Axe	WAVE	SiteImprove
Website-Specific	Yes	Yes	Yes
Paid or free	Free	Free	Paid
Type of tool	Extension	Extension	URL-insert
Standards	WCAG	WCAG	WCAG
Time	Yes	Yes	No
Operating system	Yes	Yes	Yes
Browser for plugin	Yes	Yes	Yes
Language	Yes	Yes	Yes
Report	Limited	Yes	Limited
Display info in page	Yes	Yes	No
Modify page	No	Yes	No

Table 1. Axe, WAVE, and SiteImprove evaluated at each feature.

After reviewing the tools through each feature (Table 1.), we concluded that the automatic website-accessibility evaluation tool used in this investigation will be WAVE. Its flexibility across browsers, operating systems, and concise reporting system drew us towards it.

2.3 Web Accessibility Issues

This study identifies common web accessibility issues and investigates the non-compliance with web accessibility standards in: Entertainment, News, E-Learning, Transportation,

[1] Content experiences that capture attention - Siteimprove - Siteimprove

Investigating Sectors/Fields for Web Accessibility

- ➔ Examining **patterns** of **accessibility issues** across all fields.
- ➔ Comparing the number of visual components (*structural elements & features*) to accessibility issues per field.
- ➔ Evaluating: **compliance** to the WCAG categories of *Perceivable, Operable, Understandable, & Robust* AND **adherence** to each of the WCAG 2.1 conformance levels (*A, AA, AAA*).
- ➔ Measure the level of violation of the WCAG success criteria & guidelines per field.
- ➔ Investigate co-occurrence of accessibility issues across fields.

NEXT STEPS

Research Questions, Data Collection, Literature Reviews

Introduction, Background, Related Works

Analysis & Findings

Compile, Revise, Edit, etc.

Submit Paper

The End.

(actually tho)
(thanks for everything y'all :’])