

GEORGE MASON UNIVERSITY

Accessibility Testing

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Introduction

I chose George Mason Volgenau School of Engineering <http://volgenau.gmu.edu/> website for my testing.

Testing for accessibility requires looking at the webpage from different angles and perspectives. Ideally webpage should be tested manually by people with disabilities but often it is not feasible. Taken into consideration the large number of types and levels of disabilities web developers are often left to using automated testing tools and personal knowledge and experience. In order to test the website for accessibility I used a variety of tools both provided by the instructor and mentioned in Chapter 24 of Interact with Web Standards. Thus I used Manual Accessibility Checklist to go through the webpage manually and get the feel of the website accessibility before going deeper into the automated testing. During my manual testing I extensively used browser add-ons mentioned on pages 438-441 of Interact with Web Standards. Particularly I used Web Developer's Toolbar, HTML Tidy extension and WCAG Contrast checker. Finally I used three recommended testing tools: Deque Worldspace, Functional Accessibility Evaluator , and WebAIM's WAVE. The overview of the results revealed by the testing as well as my conclusions and recommendations on how to improve accessibility is given below.

Manual Accessibility Testing

Using the checklist for manual accessibility testing and Firefox extensions mentioned above I examined the website of Volgenau School of Engineering and noticed several accessibility issues. Only categories where accessibility problems were found are described.

Keyboard Access

Navigation through the website <http://volgenau.gmu.edu/> exclusively via keyboard revealed that however all areas of the screen are accessible the user has to tab all the way through top and side navigation to get to the main content. After inspecting several webpages of the site such navigation caused fatigue and frustration. The issue could be corrected by creating "Skip navigation" links. According to WebAIM <http://webaim.org/techniques/skipnav/> there are more than one way to create "Skip navigation" links such as:

1. Providing visible links at the top of the page
2. Providing visible links elsewhere on the page
3. Making the link invisible
4. Making the link invisible until it receives keyboard focus.

WebAIM recommends technique #1.

Logical Heading

Not only home page volgenau.gmu.edu but many other pages of the site (e.g. <http://volgenau.gmu.edu/undergraduates/>, <http://volgenau.gmu.edu/admissions/index.php>) does not employ <h1>, <h2> heading tags but uses images instead. This practice will make it harder for screen reader users to navigate through the website. Writing logical HTML with the appropriate <h1>, <h2> heading tags is recommended to improve accessibility.

Font Size

Firefox allows the user to enlarge the font size of the site by hitting Ctrl++. While setting the Largest text font in Internet Explorer does not change the font of the page. Setting the font-size in relative values instead of absolute values (e.g. em instead of px) is recommended to make the page more accessible to users with poor vision.

Color

Disabling the colors in the browser did not present any difficulties for readability. Color contrast for the overall website was then assessed with the help of Firefox WCAG Color Checker. While left side bar navigation passed WCAG1 validation, the top navigation links failed such assessment.

The screenshot shows the ColorChecker tool interface with the following data tables:

Normal vision		
WCAG 2	WCAG 1	
Umbral	Obtenido	
Brillo (125)	130	✓
Color (500)	408	✗

Discromatopia		
WCAG 2	WCAG 1	Cod. color
Protanopia		
Umbral	Obtenido	
Brillo (125)	123	✗
Color (500)	359	✗
Deuteranopia		
Umbral	Obtenido	
Brillo (125)	144	✓
Color (500)	419	✗
Tritanopia		
Umbral	Obtenido	
Brillo (125)	109	✗
Color (500)	359	✗

Snapshot 1 Color Checker analysis of the top navigation link

Images

Display Alt Attributes option in Web Developer allows the tester to see all *alt* attributes associated with images. After visually examining the page it was noted that the majority of the images are supplied with *alt* attributes with either alternative text or an empty attributes if the image is decorative. However few *alt* attributes were not appropriate, e.g. on the page http://volgenau.gmu.edu/corporate_community_partners/ the logos of the partners are presented in an image but the *alt* attribute only summarizes the information available on the image.



Snapshot 2 Alt attribute gives significantly less information than the image does

The given *alt* attribute does not provide the same information as the image does. This could be fixed by adding *longdesc* attribute to the image and listing the sponsors in text format.

Links

Page volgenau.gmu.edu has one hundred thirty-eight links. Only one link (Twitter) has *title* attributes. Lack of *title* attributes is justified in majority of cases since most of them make sense out of context. However there were instances when links neither had *title* attributes nor made sense out of the context. For example the page has one link named “here”, four “For more information” links, nine “Join us” links, nine “RSVP required” links. The links have the

same name however they lead to different locations which could be confusing for screen reader users. Providing *title* attributes will let the user distinguish between the links with the same name and will let them know where the link will take them. It is especially relevant to “RSVP required” links since they take the user to an inaccessible form (there are no labels in the form) on a different website (surveymonkey.com).

Also links are inconsistent in terms of opening new windows. While some links open new page in the same window others open the page in new windows which makes it impossible to navigate to the previous page using the keyboard (Alt+Left). The recommendation would be either to be consistent with opening new pages in the same window or informing the user via title attribute or otherwise that the new window will be open.

Tables

The home page of the website tested employs layout tables which is a deprecated practice. Use of CSS is recommended to control the layout.

According to HTML Dog there are at least three accessibility considerations with tables: summaries, associating headers to cells, associating cells to headers (p. 164-166). Examining the source of the page with the data table

http://volgenau.gmu.edu/about_ite/departments_contacts.php showed that none of the abovementioned recommendations were followed.

Automated Accessibility Testing

A combination of three testing tools was used to assess the homepage of the site for accessibility.

Deque Workspace

Deque Workspace found 58 total accessibility issues and 32 violations.

Report for Web Page: <http://volgenau.gmu.edu/>

Summary Report

Accessibility Issues

Total Issues: 58 Accessibility Standard: Section 508 & WCAG 2.0 - Level AA

Violations Summary

Category	# of Violations
Level A	32
Total	32

Violations: 32

Error/Warning	# of Files	# of Violations
Guideline 1.1: 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	1	9
Guideline 1.3: Create content that can be presented in different ways (for example simpler layout) without losing information or structure	1	3
Guideline 2.4: Navigable: Provide ways to help users navigate, find content and determine where they are	1	1
Guideline 3.1: Make text content readable and understandable	1	1
Guideline 3.3: Input Assistance: Help users avoid and correct mistakes	1	1
Guideline 4.1: Maximize compatibility with current and future user agents, including assistive technologies	1	17
Total	1	32

Potential Violations Summary

Category	# of Violations
Level A	26
Total	26

Snapshot 3 Deque report summary for <http://volgenau.gmu.edu/>

Full report is available in Appendix A.

32 violations can be grouped into five categories. The table below summarizes the report and provides recommendations on how to address the revealed issues.

Violation	Recommendation
Deprecated HTML elements (e.g. <u>, </u>),	Keep HTML and CSS separated. Use HTML for content and CSS for presentation
Absence of links to the accessible plug-ins	Provide the link to the appropriate, accessible plug-in
Failure to follow Document Object Model	Use functions of the DOM to add content to a page
Missing titles for the frames and alt attributes for the objects and images	Add titles and alt text to images, tables, frames, forms
No specifications of primary language	Specify the primary language for better rendering by the screen readers

WAVE

WebAIM's WAVE found 7 accessibility errors (shown in red) and 14 alerts (yellow) and 13 "features" (green). Most of them such as missing plug-ins, labels, and alternative text were discussed earlier. Compared to Deque WAVE presents the information more visually. However WAVE report is not as comprehensive as report generated by Deque Workspace.

The screenshot displays the WAVE web accessibility evaluation tool interface. At the top, the URL <http://volgenau.gmu.edu/> is entered. Below the URL bar, a red banner reads: "Uh oh! WAVE has detected 7 accessibility errors". Underneath this, it states: "The following are present in the head section or apply to this page in general:". The main content area shows the website's header with "VOLGENAU SCHOOL OF ENGINEERING" and the "GEORGE MASON UNIVERSITY" logo. A search bar contains the text "*George Mason University*". The page content includes sections for "NEWS AND ANNOUNCEMENTS" and "EVENTS". A "Summer 2012 Newsletter" is featured, along with a "MASON PEOPLE FINDER" and "Mason News" sections. A "New Graduate Orientation" event is listed for Wednesday, August 22, 2012. A tooltip on the right side of the page displays an error message: "ERROR: Missing alt text. Alternative text is not present for an image." The bottom of the screenshot shows the browser's address bar and search results.

Snapshot 4 Sample of WAVE report for <http://volgenau.gmu.edu/>

Both Deque and WAVE reports pointed to the missing alt attributes however close manual examination of the code showed that it has empty *alt* attributes for decorative image. It shows imperfections of automated testing.

Full report is available in Appendix B.

Functional Accessibility Evaluator

The summary of FAE report is in the snapshot below. Full report is available in Appendix C.

The screenshot shows the FAE Summary Report interface. The header includes the 'fae' logo, 'Functional Accessibility Evaluator 1.1', and 'University of Illinois at Urbana-Champaign'. Navigation links for 'About FAE', 'Register', and 'Log In' are present. A sidebar on the left contains links for 'Run FAE', 'Summary Report', 'Sitewide Report', 'Page Report: 1', 'Previous | Next', and 'List of Pages: 2'. The main content area is titled 'Summary Report' and shows report details: 'Untitled Report', 'Pages: 2', 'Depth: Top-level', 'Ruleset: 1011-1 (current)', and 'URL: http://volgenau.gmu.edu/'. The report date is '2012-07-04 10:32'. Below this is a table titled 'Evaluation Results by Best Practices Main Category' with columns for Category, Status, % Pass, % Warn, and % Fail. The categories and their results are: Navigation & Orientation (Partially Implemented, 72% Pass, 12% Warn, 14% Fail), Text Equivalents (Partially Implemented, 37% Pass, 37% Warn, 25% Fail), Scripting (Complete, 100% Pass, 0% Warn, 0% Fail), Styling (Almost Complete, 66% Pass, 33% Warn, 0% Fail), and HTML Standards (Partially Implemented, 50% Pass, 25% Warn, 25% Fail). A note states: 'Note: % Pass includes N/A results.' Below this is another table titled 'Evaluation Results by Best Practices Subcategory' with columns for Category/Subcategory, % Pass, % Warn, and % Fail. The subcategories and their results are: Titles (title & h1) (28% Pass, 42% Warn, 28% Fail), Subheadings (h2..h6) (66% Pass, 0% Warn, 33% Fail), Navigation Bars (83% Pass, 16% Warn, 0% Fail), Form Control Labels (90% Pass, 0% Warn, 10% Fail), Data Tables (100% Pass, 0% Warn, 0% Fail), Default Language (50% Pass, 0% Warn, 50% Fail), and Access Keys (100% Pass, 0% Warn, 0% Fail). The bottom of the screenshot shows a search bar with 'font' and navigation buttons for 'Next', 'Previous', 'Highlight all', and 'Match case'.

Category	Status ¹	% Pass	% Warn	% Fail
Navigation & Orientation	Partially Implemented	72	12	14
Text Equivalents	Partially Implemented	37	37	25
Scripting	Complete	100	0	0
Styling	Almost Complete	66	33	0
HTML Standards	Partially Implemented	50	25	25

Category/Subcategory	% Pass	% Warn	% Fail
Navigation & Orientation			
Titles (title & h1)	28	42	28
Subheadings (h2..h6)	66	0	33
Navigation Bars	83	16	0
Form Control Labels	90	0	10
Data Tables	100	0	0
Default Language	50	0	50
Access Keys	100	0	0

Snapshot 5 Sample of FAE report for <http://volgenau.gmu.edu/>

FAE report presents the accessibility issues discussed earlier in a more general form, grouped into five big categories: Navigation and Orientation, Text Equivalents, Scripting, Styling and HTML Standards. Another difference from Deque and WAVE reports is that FAE gives us percentages of pass or fail, not the number of errors.

Conclusion

As Derek Featherstone states in *Interact with Web Standards* “there is too much to know” about accessibility. It is a complicated concept that involves overarching and often conflicting issues. Consequently testing accessibility requires various tools as well as knowledge, experience to correctly interpret the information that those tools provide. As seen from the current report accessibility testing requires a combination of both automated and manual techniques to locate the biggest number of mistakes and imperfections to be corrected in order to make the webpage more accessible.