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W3C'S Web Content Accessibility Guidelines Report

Technical Communication Requirements: B.S. (or Minor) webpage

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1. Executive Summary

This report describes the conformance of the Technical Communication Requirements: B.S. (or Minor) webpage with the W3C'S Web Content Accessibility Guidelines (WCAG). The review process is described in Section 5 below.

Based on this evaluation, the Technical Communication Requirements: B.S. (or Minor) webpage is close to meeting WCAG 2.1, Conformance Level AA. Detailed review results are available in Section 6. Recommended actions are listed in Section 7.

2. Background about Evaluation

Conformance evaluation of web accessibility requires a combination of semi-automated evaluation tolls and manual evaluation by a reviewer. The evaluation results in this report are based on an evaluation conducted between Wednesday April 1, 2020 and Saturday, April 4, 2020.

3. Scope of Review

The goal of the Technical Communication Requirements: B.S. (or Minor) webpage is to provide a simple overview of the technical communication major and persuade prospective students to add technical communication as a major or minor.
The Technical Communication Requirements: B.S. (or Minor) webpage is located at https://engl.iastate.edu/undergraduate-students/majors/technical-communication-b-s-or-minor/. It is built on an Iowa State WordPress template and uses HTML, CSS, JavaScript, jQuery, and PHP. The text is written in US English.

4. Reviewer

Hannah Monk, a senior in technical communication, conducted this review for English 505: User Experience Architecture and Testing for Advanced Communication.

5. Review Process

This website was reviewed for a variety of A, AA, and AAA success criteria. In the first stage of the review process, the website was checked programmatically by PowerMapper and WAVE.

PowerMapper is a web crawler that creates a site map of a website and analyses the code errors, accessibility, compatibility, searchability, and usability of a website.

WAVE is a collection of evaluation tools that helps make web content more accessible.

After the initial run-through, relevant WCAG 2.1 success criteria were manually checked by the researcher with guidance from the PowerMapper and WAVE.

NVDA and Apple VoiceOver, screen readers for Windows and OS X respectively, were used to test the readability of the website from an automated voice.

Readabilityformulas.com was used to evaluate the reading level of the text on the website in accordance with section 3.1.5.

The HTML code of the website was checked using a feature from PowerMapper to ensure the accuracy of elements in the HTML, CSS, JavaScript, and ARIA elements. The structure of the webpage was looked at with and without the attached CSS using a function from WAVE.

6. Results

The Technical Communication Requirements: B.S. (or Minor) webpage is close to meeting WCAG 2.1, Conformance Level AA. Between the different A, AA, and AAA success criteria, 23 accessibility tests were performed. Eight tests were done in the perceivable category. Seven tests were done in the operable category. Four tests were done in the understandability category. Two tests were done in the robust category. These four test categories were predetermined by the WCAG 2.1. Two tests were done to test cross-device compatibility. This category was created to check the usability of this website on different devices.

Sixteen tests were passed, and seven tests were failed, which gives the websites about a 70% success rate for the number of accessibility tests done.

Perceivable

Pass	4
Fail	4

Operable

Pass	5
Fail	2

Understandable

Pass	3
Fail	1

Robust

Pass	2
Fail	0

Cross-Device Compatibility

Pass	2
Fail	0

6.1 Perceivable

Content on all webpages must be presented in ways that all users can perceive. The only image on the webpage, Image 1 to the right, may cause accessibility problems. According to section 1.1.1 of the WCAG 2.1 standards, non-text content needs alternative text. This image does not have alternative text. Images can be exempt if they are pure decoration or primarily intended to create a sensory experience. Debatably, this image is not purely decoration or adding to a sensory experience since it only contains text and icons which are not included anywhere else on the page. Another problem with this image is that it is an image of text. According to section 1.4.5 of the WCAG 2.1 standards, images should not be used to display text.

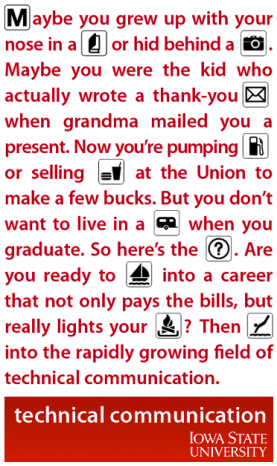


Image 1: Image on the Webpage

Using color poorly can cause perceivable problems for users who have vision problems. All elements should have high contrasting colors its background, especially text. Color also should not be the sole indicator of conveying information. The Technical Communication Requirements: B.S. (or Minor) has no problems with solely using color to display information. All links become underlined or highlighted when hovered over and the cursor changes to indicated that the text is interactable.

However, the webpage does have a few problems with contrast. The donate button fails both the enhanced contrast tests (section 1.4.6). It only passes the minimum test (section 1.4.3) when the text is larger. The page title in the breadcrumb menu also passes and fails the same tests. To meet the minimum requirements an element's color contrast must be at least 5:1, but the donate button's contrast level is 4.37:1 and the page title's contrast level is 4.1:1.

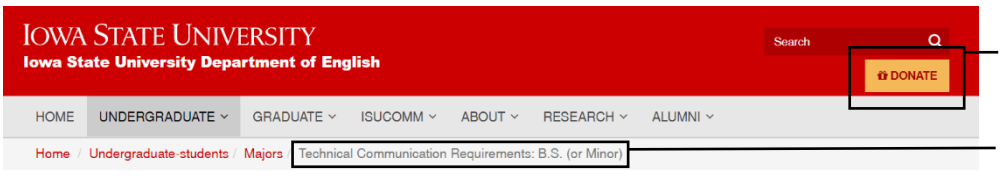


Image 2: Top Navigation of the Technical Communication Webpage

Making text resizable with proper spacing and the webpage zoomable will also help users that have vision problems. For the text and webpage to be resizable, the page content must be scalable without needing for two-dimensional scrolling (vertical and horizontal) and not cause a loss functionality for the webpage (section 1.4.10). The text should be readable at up to a 200% increase (section 1.4.4). The webpage easily

resizes without losing any functionality. To read more about this, go to section 6.6 Cross-Device Compatibility Tests**.** The webpage is also still very readable at up to a 400% increase. For text to be accessible, it must also have good spacing. The letter-spacing is set to .5rem, and the lowest line-height is set to 1.5. Both settings are at or above minimum requirements in section 1.4.12 of the WCAG 2.1 success criteria. The WCAG 2.1 success criteria that are most related to perceivable content on this website are:

- 1.1.1 Non-text Content (Level A) – fail
- 1.4.1 Use of Color (Level A) – pass
- 1.4.10 Reflow (Level AA) – pass
- 1.4.12 Text Spacing (Level AA) – pass
- 1.4.3 Contrast, minimum (Level AA) – fail
- 1.4.4 Text Resize (Level AA) – pass
- 1.4.6 Contrast, enhanced (Level AAA) - fail
- 1.4.5 Images of Text (Level AA) – fail

6.2 Operable

All users must be able to operate the navigation and user interface elements. Certain users navigate the internet using a keyboard rather than a mouse. Accessible websites need to be keyboard-friendly, especially for users with a motor impairment or users who rely on screen readers. The Technical Communication Requirements: B.S. (or Minor) webpage has all links, including navigation, sub-navigation, and a “skip to main content” option, clickable from just the keyboard. The "skip to main content" link allows users who are navigating the webpage using a keyboard to skip past the navigation links. The user can go backward or forward within the page without getting trapped. This functionality passes the 2.1.1 and the 2.1.2 section of the WCAG 2.1 success criteria. The “skip to main content” passes section 2.4.1.

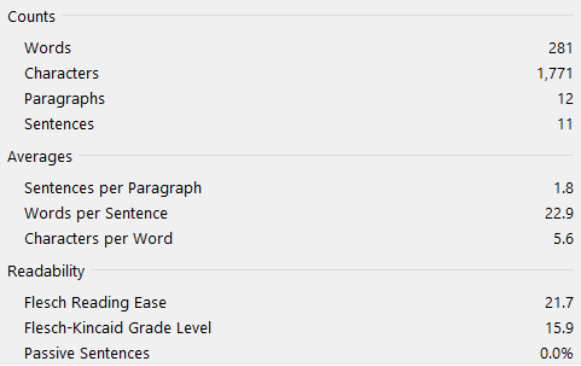


Image 2: Analysis of Text in the body of the page

Users can easily predict where the link they are clicking on leads to within the context (section 2.4.4) of the text surrounding it and when the link is being read by itself without the surrounding text (section 2.4.9)

All but one of the clickable navigation elements becomes obvious that the keyboard has navigated to it by using a blue boarder as a visible focus element. The hamburger menu

to open the navigation links when the screen is narrower has no visible focus element. The hamburger menu button violates section 2.4.7.

The title of the page, The Technical Communication Requirements: B.S. (or Minor), creates problems for this webpage. The title is supposed to accurately describe the content of the webpage. The title includes the word minor, but it only links to the technical communication minor page. This could confuse users who are looking to learn more about a technical communication minor. The page title is also very long. Bing, Yahoo, and Google recommend that the page title link be under 67 characters. When the page title it too long, it can become wrapped text in emails or cut off on search results which make the page title very difficult to read.

The WCAG 2.1 success criteria that are most related to operability on this website are:

- 2.1.1 Keyboard (Level A) – pass
- 2.1.2 No Keyboard Trap (Level A) – pass
- 2.4.1 Bypass Blocks (Level A) – pass
- 2.4.2 Page Titled (Level A) – fail
- 2.4.4 Link Purpose, In Context (Level A) – pass
- 2.4.7 Focus Visible (Level AA) – fail
- 2.4.9 Link Purpose, Link Only (Level AAA) – pass

6.3 Understandable

For a webpage to be accessible, it must be readable and understandable by people and accessible technology. Every passage and phrase should be able to be programmatically determined, excluding proper nouns, technical terms, and the vernacular of the surrounding text (section 3.1.2). The free screen readers NVDA and Apple VoiceOver pronounced every work correctly.

Currently, the reading level of the webpage is set at a college reading level based on the Flesch Reading Ease level, the Flesch-Kincaid Grade Level, and the Gunning Fog reading level. It has a similar score after the removal of proper nouns. The WCAG 2.1 success criteria recommend that text has a reading level no more advanced than a lower secondary education level or it has an alternative version of the text.

Instructions can also impact the understandability of a webpage, especially with user interface elements. Instructions need to be included when requiring user input (section 3.3.2). The only element that requires user input is the search bar. Before clicking on the search bar, the bar has the word “search” as filler text, which is also the instruction on what to do with the bar.

The WCAG 2.1 success criteria that are most related to understandability on this website are:

- 3.1.1 Language of Page (Level A) - pass
- 3.1.2 Language of Parts (Level AA) - pass
- 3.1.5 Reading Level (Level AAA) - fail
- 3.3.2 Labels or Instructions (Level A) - pass

6.4 Robust

Robust webpages are interpretable by a wide variety of users and assistive technologies. For websites to be accessible, website code should be written correctly without missing or duplicating code elements and tags (section 4.1.1). Websites must also have user interface elements that are programmatically determinable (section 4.1.2). All the elements in the code have their start and end tags, are nested accordingly, are not duplicated, and have unique IDs when needed. There were also no ASP, ASP.NET, or PHP script errors found. The only minor problem with the parsing is the lack of a meta description tag. Meta description tags are a 160-character summarization of the page content; a well-written meta description attracts more clicks in search results. It isn't required to pass the 4.1.1 parsing section, but it is still useful to have. Not all search engines support this tag anymore, but for those that do metadata may assist users in finding content most suitable for their needs. Meta descriptions are also readable by screen readers when they are found on search engines.

The webpage currently has one interactive form element: the search bar at the top of the page. It currently uses an ARIA-label and role element correctly. Overall, it is a functional, interactive interface element and helps the webpage pass the WCAG 2.

The drop-down menus also follow the W3C suggestions well. In the code, each drop-down uses "aria-haspopup= "true" " and aria-expanded= "false" " to ensure users know that the drop-down menus contain a submenu.

Another factor to note is that the H2 tag was skipped. Heading level tags provide a structure to the webpage and assist users who navigate with a keyboard or other assistive technology. When heading levels are skipped, users could become confused or have trouble navigating the webpage.

The WCAG 2.1 success criteria that are most related to robust on this website are:

- 4.1.1 Parsing (Level A) – pass
- 4.1.2 Name, Role, Value (Level A) – pass

6.5 Browser Compatibility Tests

The only CSS property that is not supported by all browsers is the box-shadow on the top navigation. The box-shadow is not compatible with older versions of Internet Explorer and Safari. However, this is not an issue because on these browsers, the shadow simply does not show up and it is not an essential function of the website.

6.6 Cross-Device Compatibility Tests

With various types of devices, namely desktops, tables, and mobile phones, there are many screen sizes and screen resolutions that need to be considered when thinking about the accessibility of a website. Responsive web design allows websites to be flexible across a wide range of devices. Effectively building responsive websites is important in creating accessible websites because it alleviates some scrolling, navigation, and readability issues for many users. Because of the usage of bootstrap in the Technical Communication Requirements: B.S. (or Minor) webpage, the screen adapts to different screen sizes very well. Mobile phones and tablets can be rotated, their screen orientation can also be changed. The webpage also adjusts well to the different screen orientations.

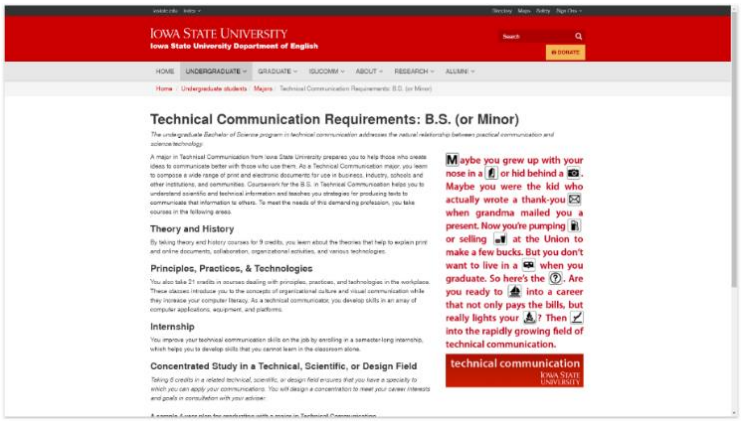
However, cross-device compatibility does not just deal with the size or orientation of the screen. It also deals with the context within which a device is used. The one problem with the Technical Communication Requirements: B.S. (or Minor) webpage is the telephone link in the bottom navigation of the webpage. This link works well for IOS and android devices; however, on some desktops, laptops, and devices without a mobile SIM or Skype, the device displays an error message or the link is not usable.

The WCAG 2.1 success criteria that are most related to cross-device compatibility on this website are:

- 3.2.3 Consistent Navigation (Level AA) – pass
- 3.2.4 Consistent Identification (Level AA) – pass

Most Common Desktop, Tablet, and Mobile Device Screen Resolution in America in May of 2020

Browser: Chrome, Version 80.0.3987.149 (Official Build) (64-bit)

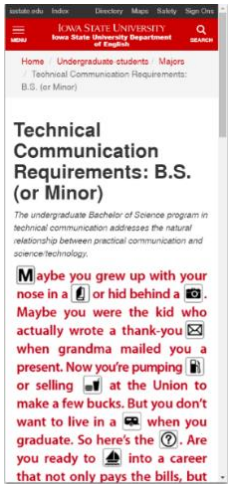


Desktop

Screen Resolution: 1920 x 1080
Percentage of Users: 19.57

Tablet

Screen Resolution: 768 x 1024
Percentage of Users: 55.64



Mobile

Screen Resolution: 414 x 896
Percentage of Users: 19.44

Screen resolution and percentage of users results were found using GlobalStats' Statcounter.

7. Recommended Actions

This section suggests solutions for solving all seven of the fail accessibility tests and four solutions to improve some of the passed tests. Solutions were ranked in priority based on severity of the problem and the level of criterium affected.

7.1 High Priority for Failed Tests

Replace the image

The image on the page, see Image 1 in section 6.1, caused two failures. Removing the image and replacing it with a non-text based, purely decorative image.

This will solve:

- 1.1.1 Non-text Content (Level A)
- 1.4.5 Images of Text (Level AA)

Darken the page title in the bread crumb

Darken the page title in the bread crumb navigation element from hex code #777777 to hex code #4F4F4F. This will not affect ability to tell which text is the page title because of the color of the other links in the bread crumb navigation and the way this element is structured.

This will solve:

- 1.4.3 Contrast, minimum (Level AA)
- 1.4.6 Contrast, enhanced (Level AAA)

Add a focus element around hamburger menu

When the screen is narrower, the hamburger menu in the top navigation does not have a visible focus element to indicated that it can be opened or it is selected when a user is using a keyboard to navigate a website. Adding a visible focus element, like the blue box boarder, will solve this problem.

This will solve:

- 2.4.7 Focus Visible (Level AA)

7.2 Medium Priority for Failed Tests

Increase the text size in the donate button

The donate button text has low contrast with its background. Text that is larger is has winder character strokes, so it is easier to read in low contrast. This will increase the readability will keeping the Iowa State brand colors.

This will solve:

- 1.4.3 Contrast, minimum (Level AA)

7.3 Low Priority for Failed Tests

Rewrite some of the content in simpler terms

The reading level of the text is college level. This is determined based on an algorithm based on the total words in sentences and the total syllables in words. Rewriting some of the sentences so they are simpler could lower the reading level to the recommended reading level.

This will solve:

- 3.1.5 Reading Level (Level AAA)

Make the page title shorter

Changing the title to “Technical Communication Requirements” will make the tile of the webpage shorter and cause less confusion about what the webpage content is explaining. It will also make it more consistent with the other English Department majors’ webpages.

This will solve:

- 2.4.2 Page Titled

7.4 Improvement Suggestions for Passed Tests

Restructure the page headings

Restructuring the page so that H2 tags (heading level 2) are included, as well as H1 tags (heading level 1) and H3 tags (heading level 3), will make the page flow better for users that use technology assisting devices that can detect heading levels.

Search Bar Suggestions

Keeping the filler text, “search”, in the search bar until something is typed will keep the instructions on what to do with the search bar there until it is used. Currently the filler text goes away when the search bar is hovered over which may confuse some users. When the search bar is hovered over, it is just an empty white box. It may not be obviously clickable to some users because the cursor has a typing indicator instead of a click indicator. Keeping the filler text until something is typed could also help solve this problem.

Keep the phone link

In section 6.6, it was noted that the phone link does not work on all devices. This was included to maintain a record of all findings. Despite the fact the it does have some minor problems, the link should be maintained on all screen sizes and devices. With current technology, some desktop computers can use phone numbers to call others and it is not possible to tell which devices can and can’t do this. Adding script to remove the

link from desktop screen size, will not allow some desktop users to use the automatic phone number. It will also add to the load time, affects search engine optimization, and makes the website less accessible for users that disable CSS or JavaScript because two phone numbers will be shown.