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Usability and Accessibility in Virginia School Division Websites*

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Introduction

Today, since the Internet boom of 1995, the majority of Virginia schools are online. How do the websites that represent Virginia school divisions rate with regards to usability and accessibility? When developing new technology plans, Virginia school divisions should focus attention and resources to the maintenance of their websites. School divisions need to maximize the usability and accessibility of sites for Virginia's families, who use the Internet to access education-related documents and multimedia. While this is a trend in professional web development currently, it will be of concern to educators when considering technology initiatives and planning in their schools for the near future.

Usability is a scientific approach used to understand how something, such as a website, can be better designed to facilitate the goals of interaction. Usability assists in the production of a website that is easy to navigate and focuses on user interaction, helping visitors reach what they expect to discover. Since usability is not a mainstream concept, but rather a specialty area (Pearrow, 2000, p. 3), it is not surprising to find many school divisions that lack the resources to have professionally-designed, usable sites. Usability expert Jeff Johnson (2003) blames finances for some usability shortcomings: "Developing and maintaining a website can be expensive. Individuals and small organizations don't have much money to spend on Web development, so it isn't surprising when their sites contain bloopers" (p. 8).

Accessibility, in terms of the Web, is a measure of how much access different users have to the same document. One way a site can be less accessible is through the requirement of plugins, such as Adobe PDF and Macromedia Flash. Accessibility concerns, however, extend also to users

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of non-traditional browsers, blind and visually-impaired users, and users who have other disabilities such as motor impairment. Nielsen adds:

> The concept of disabilities needs to be defined relatively broadly when it comes to the Web. It is not a matter of whether a person uses a wheelchair; in fact, many wheel-chair users need no special considerations at all when browsing the Web. Rather, the question is whether the user has some condition that makes it difficult to use traditional computer input and output devices in the way they were intended. In the U.S. alone, there are more than 30 million people who have some such problem. (Nielsen, 2000, p. 298)

The results of research on Virginia school division websites revealed that a majority of sites fail to follow the advice of usability experts and are inaccessible to users with disabilities and those using non-traditional browsers (and not simply because they use Flash or PDF). The experience of visitors to school division sites should improve if usability and accessibility concerns are included in the goals of schools that have gone "online."

Procedure

A random-sample consisting of thirty-four website homepages was examined. All homepages belong to Virginia school divisions, selected from a list provided by the Virginia Department of Education on their website. Among those sites examined, several common faults were identified, with regards to usability and accessibility. The individual analysis or "deconstruction" of each website examined is available on the author's website.

Common faults among the sites examined include:

1. the use of Javascript-enabled pull-down menu navigation systems (DHTML menus),
2. a lack of content on the front page,
3. a failure to meet accessibility guidelines, due to the use of non-standard HTML or dependence on graphics,
4. a failure to use or misuse of an "alt" attribute for inline images, and
5. methods used to link to people and e-mail addresses (not tabulated since every homepage did not include e-mail links).

Analysis of Common Faults

Menu Systems

Twenty-six percent of sites used a form of the original Macintosh graphical user

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interface (GUI) menu bar, today found in modern operating systems. While the concept of the menu is familiar to users of GUI computers, it is not well-suited for use in websites, despite its popularity. The menu bar fails for several reasons:

1. it many times requires the use of Javascript,
2. it covers up page content when activated,
3. it fails to mimic the click-states of a real GUI menu,
4. in some cases, it requires quick dexterity with a mouse,
5. it hides the visitor's current location within the hierarchy of the site's organization.

Among the experts, Nielsen (2000) frowns upon non-text versions of navigation: "Pull-down menus and graphics should be used for navigation only with great care because they don't behave in the standard manner of underlined text" (Nielsen, 2000, p. 195).

While forms of Javascript are standardized, differences in Javascript "flavors" introduce behavioral differences in different browsers, depending on the standardization and quality of the code. For example, text-based, PCS (webphone)-based, and PDA (Palm, PocketPC)-based browsers cannot access these menus because their browsers simply do not support Javascript. This includes the class of browsers upon which some users with disabilities rely.

When used, DHTML menus many times cover the content on the page. Beyond cluttering the appearance of the page, it hinders a user's ability to view the page while navigating the site. Many users scan a page and begin navigation simultaneously. The menu that covers content prevents users from scanning a page. Pearrow (2000) adds, "Instead of diving into chunks of text and trying to understand it all, Web site users look quickly for keywords, hyperlinks, and other important eye-catching features in order to progress to the next important page" (p. 184). This is impossible in sites that maintain a menu-metaphor navigation bar.

One problem with menu navigation is the unexpected behavior of some systems. In one site examined, each of their categories across the top is not a link but acts as a link header. Only the choices below each menu take us to a webpage, thus following menu bar GUI conventions. The last option, "Search," breaks the model by itself being an active link. In a true menu bar, the menu titles are not links. They are organizers of options. For menus with submenus, the menu item that expands is not itself a "link" or option. Many of the sites ignore these menu guidelines and introduce new behavior to the metaphor, thus confusing visitors to the site with an unnatural mapping of a user interface construct (Pearrow, 2000, p.171).

Nielsen (2000) states that "many users have difficulty with detailed mouse

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movements, and they may also have problems holding down multiple keyboard keys simultaneously" (p. 309). Some menus from this study required quick dexterity of the mouse. Some users do not have dexterity with a mouse, therefore they will find navigating a site with menu metaphor systems difficult, if not impossible.

Some sites use menu systems that require a significant amount of Javascript code. The amount of scripting required for the links inconveniences users with longer download times. Examination of code-length revealed that many sites would load significantly more quickly if DHTML-menus, requiring Javascript, were eliminated.

One site used slide-over menus that were difficult to execute until after several tries. As Nielsen (2000) states, "Websites should make the main things users want to do very simple.... People are extremely goal-driven on the Web. They have something specific they want to do, and they don't tolerate anything standing between them and their goal" (p. 380). One site offered menu links, and as one slides right, submenu options. Many of the submenu links are the same as the header links. Some sites linked twice to the same page with different link text, and in the same menu. "Duplicate links inflate the perceived size and complexity of a website or Web application." (Johnson, 2003, p. 100) Johnson (2003) also states, "At best, duplicate links force users to think about which of the duplicate links to click, distracting them from their task and taking time" (p. 98). An additional problem introduced with one website menu is mouse focus. While the menu options take up a generously-wide button shape, only clicking on the text (a much smaller area) engages the link. This is another dexterity issue that shuts-out users with reduced motor ability.

The ultimate problem with the menu bar metaphor as a navigational tool is that the navigation menus routinely do not indicate your current location within the hierarchy of the site's pages. In fact, the site as a whole is blocked out, until one navigates through each menu. At one site, some links take users to pages that do not use the menu bar. The concept behind the menu bar metaphor is that it is omnipresent. It is unnecessary to introduce a new navigation scheme on each section of your site. As Johnson (2003) states, "Unless your goal is for visitors to your site to wander aimlessly, which is the goal for some sites, you should minimize the number of navigation schemes the site presents...each scheme should have a clear, unique purpose" (p. 91).

Navigation is also confusing when pages link to themselves. There is no need to direct users back to a homepage when the same navigation system is in place on the current page. This problem—forcing users to re-choose the same page they are already browsing, or losing track of their place in the site—slows down the experience on a website. "An extremely common navigation blooper is for a Web page to include an active link to itself. Clicking on such a link merely reloads the page. At best, this wastes people's time as the page reloads. At worst, it can be very disorienting,

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because users may not recognize the redisplayed page as the same one they were on" (Johnson, 2003, p. 112).

Menu bar metaphors should be avoided as the main navigational block in websites of any kind. Nielsen (2000) recommends that "navigation interfaces need to help users answer the three fundamental questions of navigation: Where am I, Where have I been, and Where can I go?" (p. 188). Menu bars do not work, ultimately, because they serve a different function in GUI-based software.

No Content

Another common problem among Virginia websites was a lack of content on the front, or home page. Several categories of "content" were examined, and are color-coded on the author's website. Among them were: identification information (name, title, copyright information) in green, links to other areas of the site in blue, and text-based content (orange). It was this ultimate form of content that was missing on many sites. Johnson (2003) considers, among the essential ingredients of a home page, that the "organization name is placed prominently, [the] organization name is fairly self-explanatory, [a] brief textual summary of the organization's purpose is presented, picture(s) illustrate the organization's product or service, [and] labels of links to other pages provide good overview of site contents" (p. 17).

Despite the fact that a site's homepage is the most frequently accessed page, thus making it the most valuable of all a site's pages, many do not include real content in the form of a summary, news, or current events. Only fifty-six percent of sites examined contained front-page content (text providing information beyond the school division's address and copyright information).

Too many sites that did offer content provided visitors with static information. Without fresh content on a homepage, visitors will not find a compelling reason to return, thus negating the need for the homepage altogether. When late-breaking news is offered, it ought to be placed on the site's front page. One site in particular was littered with graphic-based, download-intensive links, but saved itself with a section of news called "e-Facts." The confusing nomenclature of "e-Fact" may cause some visitors to glance over the section. Pearrow (2000) warns, "Stick with names that the user knows and uses regularly; save the clever ideas for greeting cards" (p. 142).

Two sites examined offered visitors current events, but these events required a click away from the homepage. Johnson (2003) suggests that "[a] home page may need to highlight or explain certain site content, even though the site's ever-present navigation bar provides links to it" (p. 101). The front page of a website ought to contain content beyond links to other areas of the site.

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Designers are cautioned regarding control of font size. "What's wrong with tiny text? People who have impaired vision can't read it. That is a significant portion of the population" (Johnson, 2003, p. 246). While not widespread, some sites contained content or links that were difficult to see due to font size. At least one website contained small-text in their graphics, which is impossible for many users to see or change. As Johnson (2003) states, "Even knowing how to adjust the browser's font settings may not help, because many websites render browser controls impotent by embedding text in images" (p. 249). In this case, a JPEG file was used for text in a banner graphic. The compression artifacts around each letter make the text more difficult to read than necessary. When text must be presented graphically, GIF and PNG files are the preferred formats.

One site examined offered a DHTML menu plus small text. Adjusting text-zoom in the Mozilla browser made reading the text easier, but made the menu system impossible to use, a precarious result for visitors with less-than-ideal vision. Content that cannot be read might as well not be there at all.

Accessibility

There should be no argument that sites should cater to as wide a population as possible. Watchfire Corporation's *Bobby* allows web developers to test their sites for both WAI content accessibility and U.S. Section 508 guidelines. The analysis it provides requires careful reading, for it is not as lucid as the errors found for pages testing against HTML standards.

Section 508 of the Rehabilitation Act requires federal agencies to adhere to accessibility standards for electronic, computerized documents. While some states have adopted these standards for state websites, Virginia currently has not. One tenet of these standards requires access to information, regardless of medium or format. This includes transcribing, in text, the content of video presentations, and including alterative descriptions of photographs with text. In HTML parlance, these alternative text descriptions are called "ALT" attributes, which appear in the tags for displaying images in hypertext. Many Virginia school division websites have significant accessibility problems. None of the sites examined passed the Watchfire Bobby test. One method used to improve accessibility is detailed in the next section, which is to use alternate text for images and image maps. In addition, sites should use standard HTML organized structurally, and use text-based links when possible, avoiding image maps, frames, and graphical representations of text. To some of these, Zeldman (2003) writes: "Frames, Applets: Just say no." And to flashing and blinking elements: "Just say no. Not just no, he** no" (p. 352).

Many sites used presentational HTML tags, such as <FONT>. Others used the preferred method of Cascading Style Sheets (CSS), but also used <FONT> or

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<CENTER> tags, which are unnecessary with the use of CSS. The latest recommendations from the World Wide Web Consortium recommend the separation of presentation from structure with the use of Cascading Style Sheets. Other sites misused <B> (bold) and <I> (italic) tags, with no structural function. Pearrow (2000) suggests reserving the use of emphasis for truly important items (p. 149).

Many sites examined declared they would use web standards through the use of a <!DOCTYPE> tag in their code. Among the sites examined, only one (Arlington County) passed validation. While many browsers are forgiving of errors, the display results across different browsers are not consistent—another accessibility issue. Badly-coded HTML produced different results for one site, depending on which browser was used. The HTML and XHTML used in websites can be verified for free by using the World Wide Web Consortium's validator.

One last accessibility issue addresses the presentation of information in graphical form. One website provides a logo and address at the top of their page using a JPEG image. On their homepage, it is the only location for the address and phone number. Users of text-based browsers will not see this information. The dependence upon graphics also increased download times for the site's front page. The redesign makes no strides in better accessibility. Nielsen (2000) sums-up the accessibility issue that plagued many sites in Virginia: "Any time you use any format other than plain text and standard HTML, you risk depriving users with disabilities from being able to use your site. This is one more reason to restrain the use of multimedia to cases where it adds substantial value to a site" (p. 155).

Alternate Text Untapped

Within the standards for HTML 4 and XHTML is an attribute that one can add to the tag for an image, called "alt." This attribute holds a text-string that describes what a picture illustrates. For visitors who cannot see graphics, this alternative can be read as text or read to them using a voice synthesizer. Some browsers will display this string of words before an image loads, on slow connections.

If an image is purely decorative, and has no value, assigning a null value to "alt" results in the image being ignored by some browsers. "If an image is purely decorative and has no meaning other than to make the page look better, then there is no reason to slow down blind readers with having to hear an explanation" (Nielsen, 2000, pp. 305-6).

Seventy-nine percent of pages examined had issues with "alt" attributes, resulting in alarmingly inaccessible site scenarios, while using the text-based browser Lynx. Accessibility for users of text-based browsers would increase if images included "alt" attributes. One county's school division website, with no real title on the page, does not

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allow users with non-traditional browsers to see anything except a "state.gif" as the second item on the page (after being told they cannot use the menu system). Any site should have functionality, despite its generous use of graphics. The federal government's website on Section 508 provides more information on other ways websites can be made more accessible for users with disabilities, including avoiding the use of color alone to distinguish elements on the page.

Linking People

"the personal page should list all those contact mechanisms that the person is willing to make publicly available" (Nielsen, 2000, p. 66).

Sometimes, a website visitor's goal is to find out how to contact someone—perhaps a principal, teacher, or board member within a school division. A number of sites examined made finding personnel difficult, specifically with the way they have linked names to spawn e-mail programs. The usability error is creating a link to a name that includes a "mailto:" in the link's code. This causes the visitor's browser to defocus and the mail application to spawn for sending the e-mail. Nielsen (2000) takes issue with what text is linked to the e-mail address. "I recommend against making a person's name into a link to email that person. Doing so violates expectations on the Web because a link normally takes you to information about the thing you clicked to rather than making you communicate with the thing" (p. 66).

Albemarle County Public Schools' website solves the linking problem by listing the webmaster's e-mail address separate from the word "webmaster." By making the e-mail address the link itself, users are more likely to guess the result from following the link. One website included e-mail links, sprinkled among links to pages, in a drop-down menu-metaphor navigation system. Such a navigation system is confusing to visitors who do not know what to expect when trying to find their way around the site.

Conclusion

By citing five common faults of websites belonging to school divisions within Virginia, this article has attempted to reveal the usability and accessibility concerns raised by experts in web development. While school divisions lack the resources, and sometimes expertise to create truly first-class web experiences, a shift in the way websites are developed could attain usability and accessibility while keeping costs low. One possible solution is through the use of templates with a content management system.

None of the sites examined adhered stringently to web standards established by the World Wide Web Consortium. "Accessibility and standards have much in common.

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They are both about ensuring that our work will be useable and available to the largest possible number of readers, visitors, and customers" (Zeldman, 2003, p. 327). A number of popular websites do conform to standards, eliminating a roadblock for users with disabilities, including ESPN, Macromedia, Fox-Searchlight Pictures, and the homepage of the Virginia Department of Education.

Regardless of how it is done, school divisions need to improve their electronic publishing, with attention on catering to all users, despite disabilities or choices in operating systems or web browsers.

Resource Links

VA Department of Education School Division Website List - http://www.pen.k12.va.us/Div/#Schl

Author's website - http://hendron.is-a-geek.net/operation_deconstruction.html

Watchfire Bobby website - http://bobby.watchfire.com/

W3c Validator - http://validator.w3.org/

World Wide Web Consortium - http://w3.org/

U. S. Section 508 website - http://www.section508.gov/

ESPN - http://msn.espn.go.com/

Macromedia - http://www.macromedia.com/

Fox-Searchlight Pictures - http://www.foxsearchlight.com/

Virginia Department of Education - http://www.pen.k12.va.us/

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