Assessing the accuracy of vendor-supplied accessibility documentation

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Abstract

Purpose – In an effort to ensure vendor compliance with Section 508, some libraries have begun requesting Voluntary Product Accessibility Templates (VPATs) or other documentation of accessibility compliance. The purpose of this paper is to assess the accuracy of vendor-supplied compliance documentation, and to identify common accessibility issues highlighted by the VPATs. A detailed discussion of vendor responses to each Section 508 checkpoint is provided in the Appendix.
Design/methodology/approach – Researchers compared 17 VPATs with the results of an automated accessibility scan to identify inconsistencies and common problems.
Findings – Vendors reported being fully compliant with 64 percent of the applicable VPAT items, and partially compliant with a further 24 percent. However, in 16 of 17 cases, there were discrepancies between the information on the VPAT and the results of the scan. Of the total 189 VPAT checkpoints the author scanned, 19.6 percent had errors (meaning the information on the VPAT was inaccurate 19.6 percent of the time).
Research limitations/implications – Several VPAT checkpoints could not be automatically verified by the scan. Instead they require manual/visual verification, which the author did not do. Because the author only scanned three pages of each resource, the author was not able to check all content.
Practical implications – Vendor-supplied accessibility documentation should not be taken at face value, but requires verification and follow up to ensure its accuracy. This study also identified some of the most common accessibility issues, which will help both librarians and vendors improve their products and services.
Originality/value – Other studies have analyzed the accessibility of library resources and specifically vendor databases, but none have assessed the accuracy of vendor-supplied Section 508 compliance documentation.

Keywords Academic libraries, Accessibility, Electronic information resources, Section 508, Voluntary product accessibility template (VPAT)

Paper type Research paper

Introduction

As part of a campus wide accessibility initiative, Western Kentucky University Libraries have begun requesting documentation of Section 508 compliance from all our vendors in the form of a Voluntary Product Accessibility Template (VPAT). We have compared the information on the VPATs with the results of a HiSoftware Compliance Sheriff scan of each platform in order to assess the accuracy of vendor-supplied accessibility documentation (for detailed results and comparison, see Appendix 1). Additionally, this project has helped us identify some of the most common accessibility issues across vendor platforms, based on both the results of the scan, and the issues identified in the VPATs.

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Accessibility in the library

As addressed by the World Wide Web Consortium (W3C), web accessibility refers to the ability of people with disabilities – visual, auditory, cognitive, physical, etc. – to use an online resource (Caldwell *et al.*, 2008). Several web design standards exist to guide developers in making accessible products. Section 508 of the Rehabilitation Act (1998, 29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), outlines accessibility standards for software and web products procured by the federal government, and is currently undergoing revision. Subpart B (Technical Standards) §1192.22 "Web-based intranet and internet information and applications" includes 16 standards for web accessibility. In 1999, the W3C released its Web Content Accessibility Guidelines (WCAG 1.0) which were then updated in 2008 to create WCAG 2.0. WCAG 2.0 includes 12 guidelines based on four principles: resources should be perceivable, operable, understandable, and robust.

Section 508 is a federal regulation in the USA, but is not an international standard. However, WCAG 2.0 is registered with the International Organization for Standardization (2012) (ISO/IEC 40500:2012) and according to WebAIM.org this standard is supported in countries around the world (WebAIM, 2014). Section 508 and WCAG 2.0 do differ from one another (and WCAG is more up to date; for a side by side comparison see Thatcher, 2012), but they share the same fundamental principles: in order to be accessible to users with disabilities, online resources must include text equivalents for all non-text resources (video, audio, images, etc.); all documents (including PDFs) must be readable by Assistive Technologies; the size and contrast of text should be adjustable; and the site (including all forms and widgets) should be navigable without vision and without a mouse. For a clear and concise overview of both sets of web accessibility guidelines, see McHale (2011).

Libraries are committed to providing equal access to resources for all patrons, regardless of their physical or cognitive abilities. With the help of Assistive Technologies, users with visual, auditory, and mobility impairments can use a wide range of online resources, provided they have been developed with some basic accessible design principles. However, especially with the rapid development of Web 2.0 technologies, many web sites and online products create (unintended) barriers for users of Assistive Technologies. Libraries can help overcome some of these barriers by working with our vendors to document and address the usability barriers our patrons encounter. For an excellent introduction on the importance of accessibility for libraries and their patrons, see Library Technology Reports 48(7), edited by Char Booth: Making Libraries Accessible: Adaptive Design and Assistive Technology.

Western Kentucky University's initiative

In 2013, the Western Kentucky University Library began assessing the accessibility of its online resources, including databases, journal platforms, discovery tools, and other online products. We have gradually been requesting documentation of Section 508 compliance in the form of a VPAT from all our vendors. We chose this document because it is based directly on the Section 508 checkpoints, and because it is a standardized document, developed by the Information Technology Industry Council (United States Department of State, 2012b) and used in modified form in the Federal Government's procurement process as a Government Product Accessibility Template (GPAT) (United States Department of State, 2012a). Our hope was that in requesting a standardized document vendors might already have one on hand, and therefore would

not have to create a custom document for each customer. Accessibility standards are evolving more quickly than federal law, so Section 508 and the VPAT do not thoroughly address some of the more recent advances in accessibility standards, such as Web Accessibility Initiative – Accessible Rich Internet Applications (WAI-ARIA) (World Wide Web Consortium (W3C), 2014).

Simply acquiring the VPATs was a challenge unto itself. Only one vendor (out of 17), Project Muse, had a publically available VPAT on their web site, though nine others supplied this documentation upon request in under a week. The longest turnaround time (from the date the request for a VPAT was sent to the date one was received) was nine months, not counting one vendor who has still not complied with our request at ten months and counting. A common problem was customer service representatives who did not know where to look for this kind of information. In one case, the vendor had a defunct e-mail address accompanying their online accessibility statement and did not return phone calls over several months (though a VPAT was finally obtained after a meeting at the ALA Annual Conference). One vendor explicitly prohibited us from scanning their platform (despite such a provision not being present in the license agreement, and despite the fact that we are legally liable for the accessibility of any product linked to on our library web site). A few vendors, notably EBSCO, Gale, and Thompson Reuter's Web of Science team responded encouragingly and expressed an active interest in improving the accessibility of their products.

Literature review

There have been relatively few studies on the accessibility of library-licensed materials, but their results are consistent with what we found in our study: users with disabilities continue to face substantial hurdles when using library databases and other online materials, and vendors are not as knowledgeable about the accessibility of their products as one might hope.

Only one other study has documented vendor response to questions about their products' accessibility. In 2007, researchers surveyed 12 vendors and asked if their products met current accessibility standards, if their sales representatives were trained to address questions about accessibility, and if they tested their products with disabled users. In total, 11 of 12 gave themselves high (though not perfect) ratings on accessibility, and almost all said they were planning to improve in this area; only half had sales representatives trained to discuss accessibility, and fewer than half had actually tested their products with users with disabilities (Byerley *et al.*, 2007).

While the vendors in Byerley's study gave themselves relatively high ratings on accessibility, studies which tested their products found numerous problems. Two studies have looked at the accessibility of library-licensed resources, with similar findings. In 2010, researchers used an accessibility checklist very similar to the VPAT and Section 508 guidelines to assess 32 library databases. They found 44 percent to be inaccessible; the rest were "moderately" or "marginally" accessible, and they found no databases to be "largely accessible" (Tatomir and Durrance, 2010). In 2011, researchers recruited ten students with print disabilities who had at least one year of experience using a screen reader to assess three library-licensed databases. They were asked to complete three basic tasks: conduct a search, locate a relevant article, and read one full text page of the article. While students had difficulty completing this task for a variety of reasons familiar to many librarians (e.g. incorrect search terms resulting in zero results), in almost one-third of the instances in which they were unable to complete the task it was due to accessibility barriers. One common

issue was encountering an inaccessible PDF or being unable to located the link to a full text article (Dermody and Majekodunmi, 2011).

Library web sites themselves are not exempt from these problems, though this is an area we can rectify more easily. A study published in 2013 used a (now discontinued) automated web validation tool to assess the accessibility of 56 North American academic library web sites and found that while a majority had approval percentages of over 80 percent, one-quarter had approval percentages of below 10 percent (Comeaux and Schmetzke, 2013).

Method

This paper assesses the accuracy of vendor-supplied accessibility documentation by comparing the information supplied on each VPAT with the results of an automated scan of that interface. It also identifies common Section 508 compliance issues based on both the VPATs and the results of the scans.

HiSoftware's Compliance Sheriff allows the user to audit web sites against a variety of accessibility standards, including WCAG 2.0 and Section 508. Based on its automated scans, it generates reports that provide an overall accessibility score, as well as a list of all compliance issues for each platform sorted according to Section 508 checkpoint. Instead of attempting to scan every page of every database, we conducted sample searches on each platform. We scanned the main page of the platform, did a simple search and scanned the first page of results, and navigated to a full text article and scanned the full text result. This meant the results were manageable, but it also meant that the scans were guaranteed to miss some things. (e.g. if the pages scanned did not include a data table, the scan would be unable to verify if the data tables on this platform were accessible).

Compliance Sheriff is not able to automatically check all features. For those it cannot check it suggests manual or visual verification. Due to limitations of time and resources, we did not manually check all features. Our results are therefore based on only a selection of the available Section 508 checkpoints.

To assess the accuracy of the VPATs we compared each checkpoint with the error log generated by the scans. To identify common accessibility issues we relied both on the VPATs and the Compliance Sheriff scans, as they each emphasized different problems.

Results

Vendors reported being fully compliant with 64 percent of the checkpoints they deemed applicable, and partially compliant with a further 24 percent of applicable checkpoints. They scored themselves highest on the checkpoints relating to color/contrast, image maps, frames, and page flicker: of these checkpoints, over 80 percent of the vendors who felt they were applicable said they were fully compliant. Overall, most vendors acknowledged lack of compliance with multimedia content: of those who felt this was applicable (13 of 17), only 23 percent said they were fully compliant (though this is questionable; see Appendix 1), and almost half (46 percent) said they were not at all compliant.

The Compliance Sheriff scans found numerous compliance issues not indicated on the VPATs. Nine of 17 vendors stated that they were fully compliant with checkpoint (a) (alt text for images), but Compliance Sheriff found problems in 14 of the 17 platforms scanned. Though a majority (81.8 percent) of vendors stated that all the frames on their sites had titles, Compliance Sheriff found frames with missing titles on 76.5 percent of

platforms. Fully 100 percent of sites had at least minor issues with their forms that could result in usability problems for Assistive Technologies, but 75 percent of vendors stated their forms were fully compliant. Additionally, there were a few instances where a vendor stated that a checkpoint was not applicable, but Compliance Sheriff found it to be both applicable and non-compliant.

We collected 17 VPATs, each with 16 checkpoints, for a total of 272 items. Compliance Sheriff only provided automated feedback on 189 of these (the rest required a manual check, which we did not do). In 37 cases, the information provided on the VPAT was incorrect: the scan found compliance issues where the VPAT stated "n/a" or full compliance. This indicates a VPAT inaccuracy rate of 19.6 percent, but it would likely be higher if we were to check the 83 items omitted by the scans.

For a complete description of each VPAT item, accompanied by the scan results and aggregate VPAT information, please see Appendix.

Discussion

Common accessibility barriers

As self-reported by vendors, their most common area of inaccessibility was multimedia presentations. In personal communications, vendors said that the cost of making multimedia content accessible was prohibitive, and many had no stated plans to improve in this area. Almost half of vendors also acknowledged issues with "alt" tags and labels for images, data tables, and scripts; those with whom we spoke about this all indicated their intent to improve in this area. Vendors frequently stated, however, that they could not be held responsible for content created by another publisher, even if it was hosted on their platform.

Based on Compliance Sheriff's automated scan, the most common accessibility issues were images missing alt tags (84.4 percent of platforms had problems), frames without titles (76.5 percent with problems), and forms with missing or confusing labels (100 percent with problems). As noted above, Compliance Sheriff was not able to scan all features.

PDFs

Even if the interface is seamlessly navigable for all users, it is all for naught is the content is inaccessible. Many if not most vendors use PDFs to deliver full text articles (though a number also offer articles as HTML), and while PDFs have the potential to be accessible, many, especially older ones, are not. Assistive Technologies such as screen readers cannot glean any information from a simple scanned image; PDFs must have both structural tags and searchable text in order to be accessible (W3C, 2012; Turró, 2008). Unfortunately there is not a single VPAT checkpoint that clearly addresses this issue. WebAIM.org states that PDFs fall under (m), the checkpoint addressing applets and plug-ins. Two vendors addressed this issue under (m); three vendors addressed it under (a) (alt text for all non-text elements); and others creatively addressed it under (g) (headers for data tables) and (k) (text-only equivalent for web pages). In total, 12 vendors did not address this issue at all, as it is not specifically included in any of the checkpoints. In a personal conversation, one vendor stated that copyright limitations prohibited them from converting old PDFs into an accessible format, though the US Court of Appeals for the 2nd Circuit recently ruled that such transformations are considered fair use (Authors Guild v. Hathi Trust, 2014, 902 F. Supp.2d 445).

Vendor difficulty in filling out VPATs

Accuracy aside, vendors varied widely in their ability to fill out a VPAT coherently. (perhaps for this reason, California State University has created a helpful guide to completing this form as part of their Accessible Technology Initiative; see California State University Accessible Technology Initiative, n.d.). Some VPATs had clearly been completed by someone with intimate knowledge of the product and understanding of the checkpoints (Elsevier's Science Direct team provided an exceptionally detailed VPAT). But some explanations of compliance simply did not address the issue at hand. For example, one vendor stated that because their "pages can be bookmarked," they were compliant with (o) (providing a method to skip repetitive navigation links). Another stated only that their forms "should" work with Assistive Technology, but gave no indication that they had verified this assumption.

Limitations

There are two main limitations of this study: first, we only scanned three pages of each platform; second, Compliance Sheriff was not able to verify all checkpoints.

We were not able to scan every page of every database or platform, so it is inevitable that our data from Compliance Sheriff is incomplete. For items such as multimedia materials, data tables, and PDFs, it would be worth tracking down instances of each and re-running the scans. Additionally, Compliance Sheriff was not able to automatically scan all checkpoints; manual verification of these checkpoints would provide richer data. Compliance Sheriff also occasionally made mistakes, but we manual checked every error it discovered to determine that it was in fact a compliance issue and not a scan error.

Further considerations

Section 508 is US law, but it is not the most complete or up to date web accessibility standard. And while the Section 508 refresh might look more like the WCAG 2.0 guidelines (or some future iteration thereof), adhering to these guidelines still does not guarantee usability. One study found that "more than two-thirds of the website accessibility problems identified by the disabled users would not have been identified by application of the WCAG 2.0 guidelines alone" (Rømen and Svanæs, 2012). Another criticism is that these guidelines were not developed based on "statistically validated research of users" (Ribera *et al.*, 2009).

Checklists like Section 508 and the WCAG guidelines also run the risk of encouraging "easy compliance rather than real accessibility" (Ribera *et al.*, 2009). A web site could be technically usable, but only given an inordinate amount of time and effort (Rømen and Svanæs, 2012). Relying solely on a checklist rather than on user experience can result in products that literally check all the boxes while still being practically challenging for users with disabilities.

One area in which both Section 508 and WCAG 2.0 fall short is criteria for Rich Internet Applications. Most modern web sites are not static HTML; they include scripts and widgets that make their content dynamic and interactive. The resulting interface is comprised of multiple sections which can change and refresh independently from one another. Assistive Technologies can have difficulty interpreting the different page elements and may not be aware of or able to communicate constant changes and updates (Chen *et al.*, 2013; Linaje *et al.*, 2011). WAI-ARIA seeks to rectify this problem by providing semantic markup for each page element. Once WAI-ARIA becomes more

widely adopted, products like Compliance Sheriff would need to be updated to automatically assess RIA accessibility (Abu Doush *et al.*, 2013). Of course, even WAI-ARIA is not a panacea, and it involves a significant learning curve for some users.

Conclusion

Other studies have shown that many library-licensed resources cause difficulties for users with disabilities. Our study demonstrates that most vendors are not yet fully aware of the accessibility issues in their own products. The next phase of our project will be to provide feedback to all our vendors and solicit further details or compliance roadmaps as needed.

Obtaining a VPAT or similar documentation should be the beginning of a conversation, not the conclusion. In order to improve access and usability for all users (including the non-disabled, as mobile users face similar barriers; Yesilada *et al.*, 2011), publishers, vendors, and libraries need to work together to test, re-test, and create accurate documentation for all products. It is cost prohibitive (and redundant) for all libraries to engage in extensive testing of their licensed products, and given how frequently publishers update their platforms this process needs to be constant. What is needed is an open repository for both vendor-supplied documentation, and the results of any usability testing. This would give libraries and vendors alike the tools and information needed to make meaningful choices and changes. There already exist organizations focussed on accessibility in libraries, including the Association of College and Research Libraries' Universal Accessibility Interest Group (www.ala.org/acrl/aboutacrl/directoryofleadership/interestgroups/acr-igua), the Library Information Technology Association's Accessibility Interest Group (www.ala.org/lita/about/igs/universal/lit-iguacc), and Libraries for Universal Accessibility (http://uniaccessig.org/lua/). Together, we can keep the conversation going on our listservs and at conferences, and make a significant difference in guaranteeing equal access for all users.

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Appendix. Detailed results for each section 508 checkpoint

Italicized text is from Section 508 and appears verbatim on each VPAT.

(a) *A text equivalent for every non-text element shall be provided (e.g. via "alt," "longdesc," or in element content).*

"Alt" tags are read by screen readers and other Assistive Technologies in order to communicate the information conveyed by the image. They are required for all non-decorative images.

Over half of our vendors (nine of 17) reported being fully compliant with this checkpoint. However, Compliance Sheriff found missing "alt" tags in six of these nine "compliant" platforms. The most common images missing alt tags were logos and branding; journal and book covers appearing in search results; and navigation guides such as directional arrows and Open Access icons.

(b) *Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.*

Synchronized captions and audio descriptions allow users with visual or auditory impairment to access the same material as other users.

Vendors tended to be well aware of their compliance issues in this area, and in personal communication indicated that a lack of funding would prevent them from retroactively making their materials accessible even if they were able to do so going forwards. Only two vendors said they fully supported this checkpoint with appropriate captions for their multimedia content (in both cases, tutorial videos). One vendor stated they were compliant, but amended this with the caveat that they could not guarantee that all third party content hosted on their site was compliant; it would therefore have been more accurate to say they were only partially compliant. In our scans, Compliance Sheriff did not encounter any multimedia content and so could not be used to verify this checkpoint.

(c) *Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.*

Users with limited visibility (including the color blind, and anyone looking at a screen on a bright sunny day) may have difficulty perceiving color and benefit from alternate means of communicating information.

In many cases, Compliance Sheriff required visual verification on this checkpoint. Almost all vendors believed they were fully compliant with this checkpoint. One noted that their site highlighted search terms in the results list in yellow and did not communicate this information in any other way. Further investigation revealed that many others employed similar color-based visuals to enhance the user experience, but stated they were still compliant because "color was used for emphasis not functionality." One vendor stated that this checkpoint was not applicable, but this was incorrect.

(d) *Documents shall be organized so they are readable without requiring an associated style sheet.*

Because screen readers don't read CSS, all HTML page elements should be organized in a logical sequential order.

Only one vendor stated they did not support this checkpoint, because as a "web based application" their site "requires style sheets to work correctly." All the others did not seem to have this difficulty, and stated that their site was at least readable without style sheets even if it was not optimized. Compliance Sheriff did not verify this checkpoint.

(e) *Redundant text links shall be provided for each active region of a server-side image map.*

(f) *Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.*

Client-side image maps with appropriate hot spot alt text allow users to navigate image maps without a mouse.

Only one vendor acknowledged using image maps and stated that theirs supported these checkpoints. However, we found image maps with compliance issues on one platform whose

VPAT had claimed these checkpoints were not applicable. Following a request for clarification, the vendor apologized and stated that they would both update their VPAT and address any issues with their image maps.

(g) *Row and column headers shall be identified for data tables.*

(h) *Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.*
Data tables need headers associated with the appropriate data cells to be understandable to screen readers. Tables used for layout only should not use headers to avoid confusion.
A majority of vendors said they were either fully or partially compliance, though again, some claimed they were not responsible for content from other publishers. Compliance Sheriff had difficulty testing this checkpoint because it frequently flagged layout tables as possible data tables.

(i) *Frames shall be titled with text that facilitates frame identification and navigation.*
Like alt text for images, frame titles help the user navigate the web page.
A majority of VPATs (nine of 17) claimed to be fully compliant, and six said this checkpoint was not applicable. However, Compliance Sheriff found frames on every platform, and found missing titles on 13 of the 17 platforms scanned. Frames were used in a variety of ways across platforms, but the most common problems were with social media sharing widgets and internal advertising. There were only a few functional frames missing titles: a log in box, a feedback box, and a widget for saving articles.

(j) *Pages shall be designed to avoid causing the screen to flicker with a frequency > 2 Hz and lower than 55 Hz.*
Flickering screens can trigger epilepsy.
All but one vendor claimed either full compliance or said it was not applicable because their pages did not flicker. The only vendor who said they were partially compliant was being refreshingly honest, as they were simply admitting that they could not guarantee all the content they got from other publishers was compliant.

(k) *A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.*
Text-only pages are necessary only when there is no other way to make the page accessible. In most cases, therefore, this is not required.
Some vendors misunderstood that this checkpoint is only required in certain circumstances, and so indicated they were not compliant when in fact they did not need to meet this requirement.

(l) *When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by Assistive Technology.*
Scripts can pose problems for Assistive Technology because they change the layout and content of a page. Markup exists to make Rich Internet Applications accessible (WAI-ARIA), but its use is not yet mandatory.
Compliance Sheriff is not able to fully verify this checkpoint. Nine VPATs stated they were compliant, and the rest acknowledged that they were either non-compliant or only partially compliant. Many noted that work is ongoing in this area to ensure better compliance.

(m) *When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).*
Links should be provided to download any needed plug-ins, and the content (including PDFs) must also be accessible.

A majority of sites provide a link to Adobe plug-ins needed to view PDFs, however, only two vendors addressed the accessibility of these PDFs. Three vendors who stated that that plug-ins were not required on their site provided HTML versions of full text documents. Compliance Sheriff found only two instances of missing links where a vendor had stated they were fully compliant. As noted above, most vendors failed to address the accessibility of their PDFs.

(n) *When electronic forms are designed to be completed online, the form shall allow people using Assistive Technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.*
All form fields require appropriate labels that enable them to be read and completed through the use of Assistive Technology.
Two VPATs stated they were fully compliant, but Compliance Sheriff found only one web site to be fully compliant. All the others had issues ranging from minor (duplicate field IDs) to major (missing alt, title, or label for search boxes, search filters, and log in fields). Two platforms included ARIA tags to help screen readers navigate their forms.

(o) *A method shall be provided that permits users to skip repetitive navigation links.*
This enables screen readers to skip directly to page content instead of reading all the navigation links on every page.
The majority of VPATs (11 of 17) stated they were compliant. Several noted that they used ARIA landmarks, and several of those who said they were not compliant indicated that they planned to update this soon.

(p) *When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.*
Users of Assistive Technology may take longer to navigate web pages.
Most VPATs (11 of 17) stated that this checkpoint was not applicable; but given that most sites which include a log in option will eventually time out, that is probably not accurate. Two stated that a user session would time out after extended activity without warning; one said a warning would appear before the site timed out.

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