Accessibility of University Course Syllabi

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Abstract

Over the last twenty years, governments and a range of disability rights organizations have advocated for increased accessibility to educational materials and school documents for people with disabilities. Recently, several studies have shown that accessibility is still lagging among educational institutions and other government agencies. The purpose of this study was to analyze extant higher education syllabi to determine the level of compliance with the current Web Content Accessibility Guidelines (WCAG 2.0). The study reviewed the current accessibility requirements for schools under WCAG 2.0 and Section 508 of the Rehabilitation Act as amended in 2018. It then provides a review of 62 higher education course syllabi to determine the accessibility of each for individuals with disabilities. The study found that only 6% of syllabi fully meet accessibility criteria. Recommendations for improving accessibility are included.

Keywords:

Accessibility, ADA, Disabilities, Section 508, WAI, WCAG, Course materials

ACCESSIBILITY OF UNIVERSITY COURSE SYLLABI

The University of California, Berkeley, and other high-profile universities have removed online course content over the last few years rather than risk litigation for not modifying the materials, so they are fully accessible for those with disabilities (Olson, 2017). According to the US Department of Education (2021) about 14 percent of students have a disability. Students with disabilities are still underrepresented in higher education although the percentage of students with disabilities appears to be rising in Australia, the United Kingdom, and the United States (Kent et al., 2018). Aquino & BuShell (2020) articulated that an increasing number of students need accommodations particularly within an online environment. They also identified a need for institutional awareness and support for the success of post-secondary stakeholders.

According to the Cato Institute there is a continued need to address the issue of online accessibility for disabled users. Users who have vision impairments, hearing issues, or lack fine motor skills are those most likely to struggle with website and online content that is not fully accessible (McElaney, 2022). Some institutions identify that some instructors are hesitant to volunteer for online courses due to the concerns of ensuring their materials are fully accessible (Cifuentes et al., 2016). The purpose of this study was to analyze extant higher education syllabi to determine the level of compliance with the current Web Content Accessibility Guidelines (WCAG 2.0). Additionally, the study hoped to bring an increased level of awareness to faculty and instructional designers as to the need to comply with the WCAG 2.0 guidelines.

Background

In most countries, there are laws that clearly protect the rights of students with disabilities including the right to have access to course materials. In the United States, the Americans with Disabilities Act (ADA) and sections 504 & 508 of the Rehabilitation Act of 1973 tend to be the primary engines for enforcing accessibility compliance. Section 508 was updated in 1998 to mandate website accessibility. Prior to 2014, it was less likely for accessibility issues to be asserted as there was a lack of clear guidance for website and online materials accessibility. The website issues were addressed in a US Department of Justice consent decree with H&R Block that clearly identified the Web Content Accessibility Guidelines (WCAG) 2.0 as the criteria to be used (Pendergast, 2017). Those WCAG guidelines were embodied within Section 508 in January 2018. WCAG guidelines were built on four accessible design principles; perceivable, operable, understandable, and robust. Perceivably includes text alternatives for non-text content, captioning of videos, adaptability of text, and contrast. Operability includes keyboard accessibility, timing, issues that may cause seizures, methods of navigation, and methods

of input. Understandability addresses everything from the overuse of jargon and technical language to input assistance and instructions. Robustness is defined by W3C as "content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies." (W3C, 2019).

A search of the US Department of Education's Office of Civil Rights' (OCR) Recent Resolution Search identified 892 resolutions with educational institutions dealing with web accessibility since that ruling (OCR, 2022). The OCR is one of the primary organizations to address web accessibility in educational institutions. A review of K-12 special education cooperative websites found that only 25% of those sites met minimum accessibility standards. Since those institutions are focused on the needs of disabled students, it seems probable that other institutions are even less likely to meet minimum accessibility requirements (Baule, 2019). In 2018, only 5% of K-12 school districts felt their websites were fully accessible. Meanwhile, 61% of the districts knew their sites were not fully accessible and the remaining 34% were unsure of the status of their website (Cooper, 2018). A study of academic research libraries revealed that only about 37% of libraries were prepared to support individuals with disabilities and that 70% of academic librarians wished for more training on serving those with disabilities (Brunskill et al., 2021).

The assumption of some administrators and faculty may be that the newer learning management systems, web sites, etc. are already fully accessible for students with disabilities. Hackett & Parmanto's (2005) study of higher education websites found those sites actually became less accessible over time as they became more complex during the decade of the study. Pendergast (2017) study found that of 24 large universities, only one did not have accessibility issues and that the average university website had 10 known, 14 likely, and 47 potential problems. Pendergast followed up with a vertical review of one demonstration course. That review showed accessibility issues with every portion of the course including the LMS help pages. Similar results were identified in a review of an associated group of 44 Indian colleges associated with the University of Kashmir and the Cluster University Srinagar where the average website had more than 50 identified accessibility issues (Ismail & Kuppusamy, 2019). The author's survey of IT leaders and help desk supervisors found that only 23% of those leaders with web-based help libraries have reviewed them to ensure accessibility for users with disabilities.

Another issue may be that faculty are not always aware of the fact some of their students have disabilities. It is not uncommon for students and even faculty to not disclose issues to all of their instructors. An Australian study found that less than a quarter of students with a disability always disclose them to their instructors. More than 27% of those students responded that they "rarely" or "never" disclose their disabilities within an instructional setting (Kent et al., 2018). It is not clear if a lack of disclosure is due to a less than positive response to instructor responses to their disclosures (Aquino &

BuShell, 2020). Kent et al. (2018) also confirmed that students with disabilities are more likely to enroll in online courses. Cifuentes et al., (2016) outlined that although making course materials accessible is the right thing to do, many faculty expressed concern over the amount of time necessary to modify materials for an occasional student. Cifuentes et al., further clarified that students without disabilities often benefit from materials that meet accessibility standards. That is a point that is occasionally lost in that ensuring course materials are accessible tends to assist all learners in more fully utilizing course materials.

Methods of Compliance Checking

There are simple methods of checking for compliance of accessibility guidelines. For web-based documents, using one of the WCAG compliance checkers is simple. Adobe Acrobat Pro can be used to determine the accessibility of pdf formatted documents (Adobe, 2022). Microsoft includes an accessibility checker within the Office Suite since 2010. It provides feedback for the author in identifying errors and warnings. It also provides potential tips to the user in how to make a document more accessible (Microsoft, 2018). Most learning management systems (LMS) include a website accessibility solution of some type. Blackboard launched Blackboard Ally (PR Newswire, 2018) to provide assistance in ensuring online content is accessible. Canvas utilizes the Blackboard Ally tool for integrating into its core rich text editor as well. There is also a portable document format (PDF)/universal accessibility (UA) standard (also known as ISO standard 14289-1) that identifies a pdf document for universal access. This means it is designed to meet accessibility requirements and work more effectively with screen readers and other compliant assistive technology (PDF Association, 2021).

If the original developers didn't review accessibility compliance, faculty do not need to worry as several after the fact compliance options exist. AChecker is a Canadian-based free accessibility checker that allows users to check individual web pages for compliance, by uniform resource locator (URL), hypertext markup language (HTML), or document upload. This tool can assess accessibility against Level A, Level AA or Level AAA standards from WCAG 2.0; Section 508, or other criteria. The accessibility issues are stratified into three categories. The first are known problems which the software can definitely determine are accessibility issues. Likely problems are probably issues but they need a human decision in order to confirm the issue. The last group are potential problems and AChecker cannot inherently identify and requires a human decision. If no problems are identified, AChecker provides a result including a compliance icon which can be inserted onto the institution's website to show compliance (AChecker, 2021).

The question arises if institutions, which are generally aware of the accessibility requirements and often have staff or contractors to build out their websites are often out of compliance, how well do individual instructors comply with accessibility requirements. This study conducted a review of representative sample syllabi from

several midwestern four-year universities against the PDF/UA accessibility standards which align with the WCAG 2.0 standards. General office documents use the assistant secretary for public affairs' (ASPA) ASPA/DCD General Office Document File 508 Checklist also based on the WCAG 2.0 requirements. Those are also available on the US Dept. of Health and Human Services website (US Dept. of Health and Human Services, May 2019).

Syllabi

Researchers have looked at the course syllabus as a contract, communication device, or curriculum map. It is one of the most used documents in higher education (Richmond, 2021). The importance of a quality syllabus is beyond the catalog of information it provides relating to assignment due dates, topics, assigned readings, and often student policies. However, syllabi set a tone and make an impression on students beyond providing information (Mansbach, 2016). They can provide students insights into what to expect in the course and from the instructor. Hess and Whittington (2013) articulate that syllabi are public documents that provide explicit descriptions of the course, and they are used for equivalency decisions and grievances beyond their instructional uses. There has been some desire to move from the syllabus as a more contractual document to either a curriculum map (Weimer, 2018) or as an accommodation process for students with a focus on accommodating all students instead of simply making minor modifications as the focus on ADA required "reasonable accommodations" (Womack, 2017). Kim and Ekachal (2020) found that a less detailed syllabus tended to have a more positive impact on student impressions particularly when it included graphics. Denton and Veloso (2017) found that including positive language instead of addressing prohibitions in the syllabus can develop positive impressions among students as well. This could lead to students being more willing to contact the instructor outside of the class as well. Since it is a common document in higher education, it seems appropriate to use it as a measure of accessibility of course materials.

Methodology

This methodology of this study was designed to extend several earlier studies of higher education accessibility primarily Pendergast's (2017) evaluation of higher education websites. This study turned to look at course materials themselves. A sample of 62 undergraduate and graduate syllabi were reviewed for the study gathered from several upper midwestern states through both requesting syllabi from university faculty and gathering educational syllabi available on the web. Most of the syllabi were from education disciplines. The vast majority were developed for online courses due to the impact of the Pandemic. All were text-based. None of the syllabi were image rich. Most of the syllabi were obtained in Adobe's portable document format (pdf). A few were obtained as MS Word documents. Those obtained as Word documents were converted to

pdfs so that the Adobe Acrobat Pro accessibility checker could be used to review all of the syllabi in a uniform manner.

Adobe's accessibility checker identifies 33 potential accessibility issues with a pdf document divided into seven areas from the document properties themselves, through the page content, forms, alternative text for visual content, tables, lists, and headings. The Adobe checker is slightly different from the US Dept. of Health and Human Services' (HHS) list which includes nine facets including 66 sub-facets. However, it addresses issues beyond the creation of the initial document. For instance, the HHS list addresses issues with a scanned version of a document. Whereas the Adobe checker is focused on documents created and shared electronically. There are other minor differences such as documents of more than 10 pages are to have bookmarks to assist users in moving through the document using the HHS standards, but Adobe doesn't require bookmarks until the document is 21 pages in length. A common problem for both lists is that the primary language of the pdf is not identified. An uncommon issue would address documents utilizing forms that include JavaScript. They must not be set to time out where a user might be slow to move a mouse or click a response (US Dept. of Health and Human Services, June 2019).

Findings

The syllabi ranged in length from four to 40 pages with a mean of 10.5 pages and a median of eight pages. The modal length was six pages. Nine of the syllabi were from upper-level undergraduate courses. Fifty-three were from graduate level courses. Adobe's Accessibility Checker evaluates 31 of the 33 criteria. It leaves logical reading order and color contrast to the user to evaluate. As all the syllabi were black on white, they all met the basic criteria of a contrast of at least 4.5:1 for normal text and 3:1 for text 14 point or larger. For comparison black on white has a contrast ratio of 21:1. (WebAim, 2022). The lowest level of contrast was a table with grey background that had a contrast ration of 9.13:1 in an undergraduate syllabus. No review of the logical reading order was completed. It was assumed that instructors all organized their syllabi in a logical order for their students.

The range of automatically accessed accessibility issues ranged from none for four of the syllabi to three syllabi that were identified as having 19 accessibility issues. Table 1 lists the number of syllabi identified with the number of accessibility issues.

Table 1

Number of Accessibility Issues Identified per Syllabus

Number of Issues Identified	Number of Syllabi	Percentage of Syllabi
19	3	4.84%

Number of Issues Identified	Number of Syllabi	Percentage of Syllabi
18	4	6.45%
17	5	8.06%
16	5	8.06%
5	1	1.61%
4	3	4.84%
3	5	8.06%
2	7	11.29%
1	25	40.32%
0	4	6.45%

Table 2 lists the accessibility facets that addressed issues which were not present on any of the syllabi. None of the syllabi used forms that students would fill in or that could be auto filled. There were no multimedia components, embedded videos, or JavaScript, etc. in the sample documents. Therefore, the documents all passed the accessibility criteria but to some extent they could be considered as false positives as those features were not included in any of the syllabi.

Table 2

Compliance Facets Addressing Features Not Present in Syllabi

Accessibility Facets Addressing Features Not Present in any Syllabus
Image-only PDF (no OCR)
Tagged multimedia
Screen flicker
Scripts are not accessible
Timed responses are not present
Tagged form fields
Field descriptions for forms

Table 3 lists each of the accessibility facets and the number of syllabi who did not meet the accessibility criteria for that facet. The most common issue identified was a lack of headers for tables. Fifty of the syllabi were identified as having this issue. Tables are commonly used in syllabi to frame calendars, list readings and assignments, and so forth. A table heading is easily missed when the document has a label for the table or uses the header row as a table for a reader not using a screen reader or other assistive device.

Table 3

Compliance by Facet of Items Present in Syllabi

Accessibility Facet	Number of Syllabi with issue	Percent of Syllabi with issue
Headers for tables	50	80.65%
Document title	38	61.29%
Figures alternate text	23	37.10%
Appropriate nesting	21	33.87%
Other elements alternate text	19	30.65%
Regularity of tables	19	30.65%
Primary language not identified	18	29.03%
Nested alternate text	18	29.03%
Tagged reading order	17	27.42%
All content is tagged or marked as an artifact	17	27.42%
Associated with content	17	27.42%
Annotation hidden by alternative text	17	27.42%
Rows (TRs) are children of table elements	17	27.42%
TH and TD are children of TRs (TH = Table Headings; TD = Table Cells)	17	27.42%
List items	17	27.42%
Lbl and LBody (Lbl=list body label; LBody=List Body Item)	17	27.42%
Tab order	12	19.35%
Tagged annotations	5	8.06%
Character encoding	4	6.45%
Bookmarks	2	3.23%
Accessibility permission flag	0	0.00%
Navigation links are not repetitive	0	0.00%

The second most common accessibility problem was the document title itself. An informative document title is important to assist all users identify the proper document. A document's title is the first thing an assistive technology program will recognize and read after opening a document. Some syllabi were only labelled with a course number, the

instructor's name, or otherwise did not provide a meaningful title. A fully descriptive title is recommended. The third most common issue was that images or figures were missing alternative text. Thirty-seven percent of the syllabi exhibited this issue. In many cases, decorative images such as logos were simply not identified as decorative. In some cases, images were not provided with descriptive text for those users limited to screen readers. This was also a common issue identified with websites in previous studies (Pendergast, 2017; Ismail & Kuppusamy, 2019).

Table regularity is defined in that for tables to be accessible, tables must contain the same number of columns in each row, and rows in each column (Adobe, 2022). Over 30% of the syllabi had tables that did not conform to the regularity criteria. The primary language was English for all the sample syllabi but 18 of the documents did not properly identify this. This is important not only for screen readers but also is potentially for some translation software commonly utilized by international students. Other issues with tables and lists were common in a little over a quarter of the sample.

The issue of nesting deals with properly identifying the order of headings. This is a function of the Styles function in MS Office and the header tags in HTML. This allows the user to follow the organization of the document more easily particularly when using a screen reader. According to Adobe (2022) this is an advisory technique and not required by WCAG 2.0. The tab order was an issue in less than 20% of the documents. The other issues including the bookmark issue and character encoding were problems in less than ten percent of the sample.

Discussion

The analysis of the syllabi in the sample found only six percent ($n = 4$) of the sample to be fully accessible as measured by the Adobe Accessibility Checker. Another 58% ($n = 36$) of the sample identified between one and five areas of non-compliance. Seventeen of the syllabi (27.4%) had between sixteen and nineteen accessibility issues identified. Therefore, the accessibility of the syllabi sample is less accessible than the university websites which have been previously studied (Pendergast, 2017; Ismail & Kuppusamy, 2019).

There seems to be a clear need for further training and professional development in accessibility. Institutional leadership and educational technology leaders must put more energy into awareness and professional development regarding the need for accessible course materials. Instructional staff should be aware of the ways to ensure the accessibility of their course materials. Besides the training, instructors need to be given additional time and resources to confirm materials are fully accessible. Release time or summer projects devoted to updating and improving materials is one way to improve accessibility. As organizations move away from commercial textbook products and

embrace Open Educational Resources (OER), there will be an even greater need for ensuring accessibility. OER materials are not always put through the same vetting process that commercially development materials have been subjected to prior to publication. Therefore, instructors will need to ensure that such materials are accessible.

One limitation is that the sample was gathered as a convenience sample. It was not a systematic review of a single university or university system that had worked to provide professional development on accessibility issue to their faculty. Additionally, the syllabi were not identified as being developed by full time faculty or adjunct faculty who may have less access to professional development and support services. Such a stratification could help identify the effectiveness of professional development on accessibility.

Conclusions and Recommendations

Course materials, as represented by the syllabi, are still in need of improvement to be fully accessible. Even though most LMSs and common productivity software tools offer embedded accessibility checkers, they are either not being utilized or instructors don't understand how to improve their documents. The most common accessibility issue identified was a lack of headers for tables. There were several other table related issues including the lack of regularity of tables. Specific templates for instructors including properly formatted and labelled tables that meet accessibility guidelines should be provided by instructional technology staffs in all universities. Sample document templates could significantly assist instructors in meeting accessibility requirements. Sample document title rules to create descriptive document titles would be helpful for instructors as well. Another topic to address would include how to include alternative text for images in documents, presentations, and websites. Instructors need to understand the potential value of alternative text for images. Brief instructional videos or help guides addressing the above issues as well as how to utilize heading styles to better organize documents as well. Addressing those issues could address more than 80% of the issues identified by this study.

Access or instructional technology staff could offer to review course materials for accessibility for instructors. This could potentially combine with a review for inclusive and non-biased language issues as well. This could provide instructors with a good road map to make more inclusive and accessible materials for their students.

Recommendations

Individual instructors need to take responsibility to ensure accessibility of course materials. This will improve the experience of students with accessibility issues and potentially improve the experience of other learners. Educational leaders must ensure all levels of the academic process are aware of accessibility criteria and the tools to ensure the same. Training should be provided on how to improve instructor created materials

and to select resources that provide full educational access for all. At a minimum, trainers should provide information on providing alternative text for images, using proper headings to enhance navigation, the constraints of using properly contrasting colors, and how to make tables accessible. New instructors should be provided a basic overview of how to utilize the accessibility checkers in Acrobat, the institution's productivity suite, and any other core productivity software. All instructors should be regularly reminded of the existence of the compliance evaluation tools available within existing university software suites and learning management systems (LMSs). Contact information on where to go for additional help with accessibility should be provided as well.

Declarations

This article does not contain any studies with human participants or animals performed by any of the authors

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