Accessibility in Government Websites

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ABSTRACT

The promise over the past eight years to the American public was to develop quality government services while striving to become more transparent, therefore leading to more efficient and effective information to all end users. As government strives to attain these goals and focuses on the needs of every citizen; have they been mindful of those users who have accessibility barriers to the same information? It is essential that all citizens have the same equal access to all government resources. In addition, agencies should continue to evaluate their informational service needs while planning and implementing their digital strategies. This research paper will briefly look into the history, requirements, technologies, non-accessible material, and best practices today while also looking at the progression of this movement over the past ten years.

KEYWORDS

Assistive technologies for persons with disabilities, government, handicapped persons/special needs, web-based services

INTRODUCTION

In the United States, 54 million people have some type of disability, and that number worldwide is closing in on more than 550 million [13,5]. The number of users with disabilities will continue to grow as our ever-aging baby boomer generation creeps further into their retirement years. As the general public continues to engage in online experience through web, social, or multimedia; we can only assume that the information these services provide should also be accessible by those with disabilities.

Throughout history, persons with disabilities have been treated differently than those of any other protected class in the United States. It becomes apparent that through differentiating circumstances, the laws that were put into place to protect these individuals, suddenly find inaccessibility through online environments a challenge and the enforcement of equality is like no other within a minority group's experience. Disability rights laws have been built upon the premise that "rights are only available if one is a member of the class. Thus people with disabilities are the only group that has active responsibility under the law to enforce their own rights and petition for equality when it is not already available [19]."

Government involvement and online services have made generating and information gathering for the public much simpler through the rise of the Internet and its collective technologies. Through current emerging technologies, governmental agencies are able to deliver services and information to citizens through the Internet. This means that paper records that were once locked away in vaults and obscure document warehouses are now digitized and distributed through government resources. These services, which are now delivered using a web interface, have become such commonplace in recent years; one might ask whether accessible websites are designed to meet the user's needs, preferences, skills, and situations. If so, does this flexibility benefit people in certain situations, "such as people using a slow Internet connection, people with temporary disabilities such as a broken arm, and people with changing abilities due to aging [17]."

Jaeger describes in his findings, "government agencies do not as a rule engage citizens in the development of their e-government services and resources. Rather, many application are internally driven to meet cost savings and other government mandates regarding efficiency [3]." Since government agencies are not engaging their users for feedback on the desired services and resources, then how are they testing and making all resources accessible by all users in their community?

REQUIREMENTS

Two federal civil-rights statutes were initiated to guide federal, state and local agencies into making information technology available to Americans with disabilities. The Americans with Disability Act (ADA) of 1990 and Section 508 of the Rehabilitation Act of 1973, as amended in 1998, prohibited places of public accommodation to discriminate against people with disabilities [6,7,11].

In 1998, President Clinton signed Section 508 of the Rehabilitation Act, which specifically outlined that all electronic and information technologies that are purchased, developed, maintained, or used be fully accessible by people with disabilities. It describes that in order for websites to be fully accessible, they must be flexible enough to allow for various input and output devices. The anticipated solution was to add no additional code to a website, but rather if the initial markup and code have been implemented in such away to allow for these various

impairments, than those with disabilities would not feel the restrictions on the information for which they desire.

Jaeger describes web accessibility has having three connecting foundations: "(i) the content accessibility of websites for persons with disabilities to perceive, understand, and use; (ii) making Web browsers and media players usable for persons with disabilities by making them operable through assistive technologies and (iii) Web authoring tools and technologies to support production of accessible Web content and sites, so that persons with disabilities can use them effectively [2]."

He supports these foundations by describing a properly accessible website to that of an accessible building. He says that just as an "accessible building offers curb cuts, ramps, and elevators to allow a person with disabilities to enter and navigate through the building with ease [2]," so shall a website's navigation and content provide the same fluid movement throughout. If a website is considered inaccessible, than all the content and information available to the general public would already be considered less information to those with impairments or disabilities.

CURRENT TECHNOLOGIES
There are numerous accessibility tools that are available in both commercial and open source varieties. Searching the web, one will find tools like AChecker, aXe, HTML Code Sniffer (AATT), WebAIM (Color Contrast Checker), and WebAIM (Wave) for websites. As for PDFs (portable document format), Adobe Acrobat XI and greater has a tool built in to test for accessibility. Many others are listed on the World Wide Web Consortium (W3C) list of accessibility tools [17] and the General Services Administration (GSA) Section 508 site for creating accessible electronic documents [11].

These accessibility tools can be very useful to designers and programmers whether or not their sites follow the Web Content Accessibility Guidelines (WCAG). Jaeger encourages the use of these tools "during the design, implementation, and maintenance phases of Web development. If these tools are used carefully, it can help the targeted users in preventing accessibility barriers, repairing encountered barriers, and improving the overall quality of Web sites [2]."

NON-ACCESSIBLE MATERIAL
For many users the ability to access the information on government websites is typically due to some of the following items found in Jaegers research. Users describe their experience on e-government solutions as having a lack of total integration across all services, requiring them to access multiple solutions to perform tasks that sometimes requires multiple logins. They expressed problems with design, which related to images, colors, and sometimes grouping of data. Specific technology requirements also

plagued visitors by requiring them to use specific browsers, plugins, or configurations to access resources. Common languages or translational barriers created an inability to properly comprehend or understand the information being presented. Finally, the process of locating a website administrator's email address to address any accessibility issues regarding the resources, documents and forms [3].

DATA COLLECTION METHODS
The collection of all incorporated municipalities in the State of Illinois was retrieved from a public dataset to create a reporting population. Additional information was retrieved to produce website address, county, and census population.

Following the procedures of similar tests [1,6,8], all the municipality data has been given a control number. A column was added to create a randomizer for each municipality. The dataset was then sorted using the randomizer output to put the entire list of municipalities in random order.

Each website was evaluated by using the WAVE (WebAIM) accessibility tool to look for errors, alerts, and contrast errors. Since Lazar's findings mentioned "human evaluations are much more effective than automated evaluations [8]," each website's code was inspected to determine the underlying content management system (CMS) used. This inspection of code allows the researcher to define whether the municipality purchased software, or developed it in house with either open source CMS or custom programming.

RESULTS
A sample was selected from the top thirty randomized municipalities within the population. The mean size census population was 13,600 residents, as shown in Figure 1, with a majority of the municipalities' locations being in northern Illinois Counties.
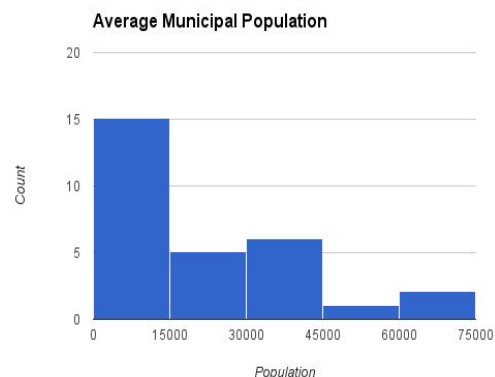

Figure 1. – Population Distribution

Half of the municipal websites inspected were developed in house, while others were purchased through a vendor based

CMS. Using the WAVE (WebAIM) online accessibility tool, each website was evaluated for accessibility in three areas: errors, alerts, and contrast errors.

Errors, where typically found to have missing elements related to alternative text information for images or empty links. Figure 2 shows that the median amount of errors is around eight, with a range from as little as two and as great as twenty-four.
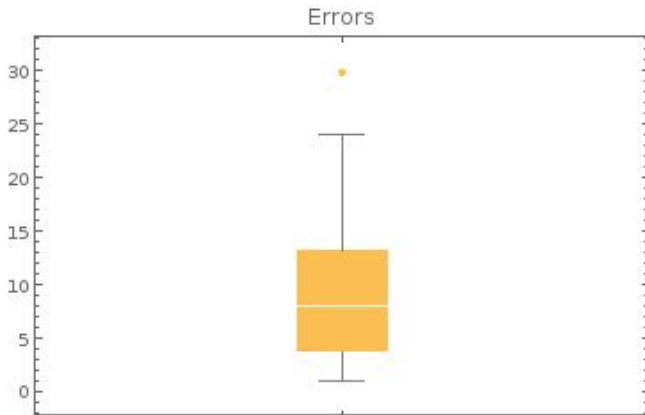

Figure 2. – Accessibility Errors

Alerts [Figure 3] are elements that typically are unlabeled, missing proper headers, suspicious link text that makes no sense, and adjacent redundant links. The amount of alerts shown from the results, depict elements not being properly formatted when editing site content. The findings indicate that an average website has twenty-eight alerts that need to be fixed to create better accessibility.
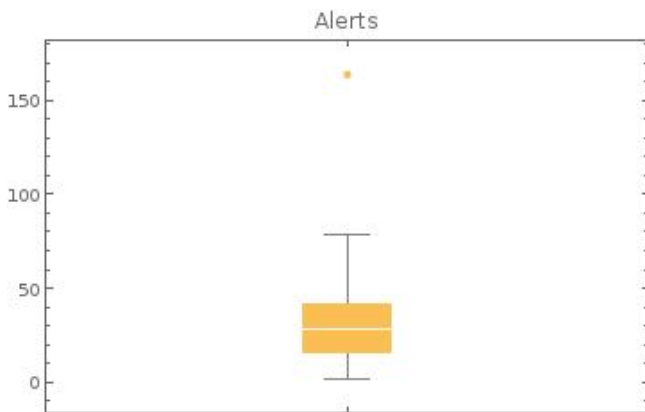

Figure 3. – Accessibility Alerts

Contrast Errors [Figure 4] depict the amount of contrast between an elements foreground and background colors. These errors create inadequate contrast for all users, but especially those with low vision. The findings show that an average website can have nineteen elements that might cause accessibility barriers for those with visual impairments. By enabling better contrast ratios, developers help users with disabilities distinguish more easily between foregrounds and backgrounds.
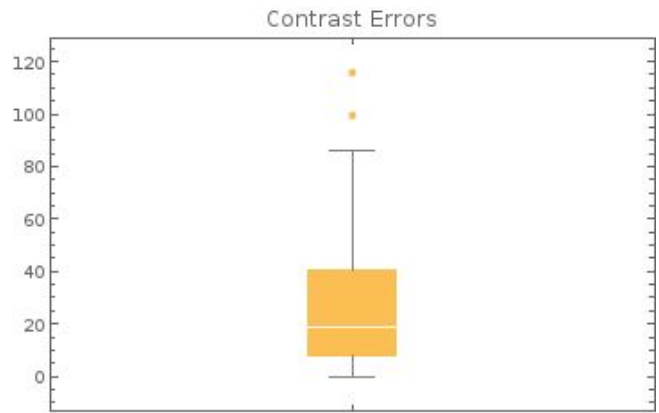

Figure 4. – Accessibility Contrast Errors

BEST PRACTICES

In order for users to engage in government services and resources without barriers, agencies must take an in depth look into the strategies needed for integrating and designing the information and service needed by their end users.

Many of the laws that have been enacted, empower a retrofitting culture of mandates that are designed or implemented after the delivery of information rather than building it into the early planning stages or long range planning. If the Internet of today is to fulfill a promise of providing levels of inclusion for individuals with disabilities, then equal access without barriers needs to be addressed and eradicated. Mechanisms built into the development, iteration, and deployment of these services would be better for all users had they been integrated from the onset of creation [5,3].

Comprehensive Plan

Governments have been creating strategic and comprehensive plans for decades, but do these plans integrate the user experience and overall accessibility that all visitors come to expect? Agencies should include in their comprehensive plan, details of the user-centered services which will help support the overall agencies strategy for delivering online resources; they should include their definition of a target audience(s); deliver correct resources and information that the service addresses to the defined targeted users; plan, develop, and deploy for the overall development of the service; and produce key milestones which help deliver and support accessibility by all users [3].

Conduct User Needs Assessments
A government agency should include assessments to better understand their end users' needs. 1) Identifying technology needs can determine barriers towards the use and delivery of content and resources to the end user, therefore addressing and limiting accessibility issues; 2) determine and evaluate content needed to support end users in their quest for information; and 3) understand your end user's knowledge about the domain and whether the services and/or resources fulfill their goals.

Before designing the ideal government service, agencies need a better understanding on how their visitors seek, acquire, solicit and use the information accessible on their website. Discovering these benchmarks enables governments to know how their visitors find and use information, as well as the sources they use. [3]

Engage Users
Governments need to continually evaluate their online practices, while enhancing their existing services. Including the end user into online services can help diminish barriers and create beneficial feedback. Conventional methods of focus groups and interviews can be an avid starting point, which later spring boards into functionality, usability, and accessibility testing.

Functionality testing tells how well the agency implemented and fulfilled the functions of their site. Measuring functionality can happen through the use of basic search functions, monitoring how users complete online forms, examine satisfaction levels of document delivery, use of multilingual features, and advanced features used while engaging with the site.

Usability testing determines whether the site works in the manner that it was intended and provides adequate results. Users should be able to intuitively access various elements, discover how to operate and interact based on meaningful instructions, and define efficiencies and memorable areas and levels of completeness.

Accessibility testing employs how inclusive the site is for all users, including those with disabilities. Depending on the severity or type of disability, the site should engage the user by working with various assistive technologies and not exclude them [3,5].

Ongoing Content Compliance
While interface guidelines are available through searching the Internet, like WCAG and Section 508, what is not available is the ability to instruct webmasters and content producers on how to continually maintain levels of accessibility.

With these types of accessibility needs, flaws that may not have been present in the initial design, but are added over time, begin to inject levels of inaccessibility. Since current websites are not static and are continually updated through emerging technologies, studies have shown that over time, more complex and newer content gets added, the number of accessibility violations begin to rise. Therefore it is important to document in the form of an accessibility policy, what features exist on the website and how often they are evaluated for accessibility [8].

RECENT REQUIREMENT CHANGES
In March 2010, the U.S. Access Board released a new version of a draft that would add new guidelines to Section 508 and made them available for public comment. This task was to promote, update, harmonize, and refocus the requirements of technology at its related functionality.

In the fall of 2010, President Obama signed into law the 21st Century Communications and Video Accessibility Act of 2010. This law added further requirements for emergency information provided to individuals who were blind and with low vision; strengthened closed captioning technology by means of manufacturers and broadcasters through the Internet; added advanced communications for text and email services; Internet access and services through mobile devices, and mandating all sized devices the ability to perform the above functionality.

During this same timeframe the Department of Justice (DOJ) stated that they would start to promote Internet access for individuals with disabilities, including accessibility to government websites. During the summer of 2010, the DOJ began querying government agencies as to the level of accessibility of their sites as stated by Section 508. This was the first time in many years that the DOJ began efforts to actually follow through on the compliance since and surveying required by the law.

In February 2011, the Attorney General issued a statement that all federal departments and agencies would be part of a survey conducted by the DOJ in order to complete the original Section 508 report. In September 2012, the Attorney General issued the report detailing the findings from Section 508 requirements.

The survey requested data in four major areas: the general "processing for implementing Section 508, procurement, administrative complaints based on civil actions, and website compliance [12]." The findings regarding website compliance found only fifty-eight percent of agencies performing routine automated or manual processing on their websites.

These findings prompted the DOJ to make the following recommendations: 1) agencies must establish accessibility policies and procedures to ensure all developers follow the requirements set forth by Section 508 and the Accessibility Standards; 2) agencies must ensure their above policies and procedures include guidance regarding commonly used elements like PDFs, video, audio, scripting, text files, data

tables, links, and electronic forms; 3) agencies should describe in their policies and procedures their process for testing accessibility of the agencies webpages; 4) agencies should develop and publish an accessibility statement detailing how the agency performs the process of maintaining web accessibility; and 5) agencies should publish email address to allow for individuals with disabilities to communicate any accessibility problems they encounter on the website.

Since the DOJ's issuing of these recommendations, many accessibility tools, the Internet, and assistive technologies have implemented more advanced features. In April 2016, the DOJ withdrew their 2010 Notice of Proposed Rulemaking (NPRM) and are presently reaching out for public comments on various issues to help shape and direct future rulemaking.

The DOJ hopes by engaging in public comment to seek information on potential applications of technology, setting alternatives for smaller public agencies, and to determine a cost and benefits on web accessibility that will help aid regulatory impact.

In addition, the DOJ anticipates gathering measureable information from users on the benefits to persons with particular disabilities, how to measure these benefits, collect user experiences with individuals with disabilities, and finally find a way to measure the cost of web accessibility [14,19].

CONCLUSION
From the data collected and the findings amongst various previous studies, it is clear the current status of government website accessibility continues to be an unresolved issue.

Most problems found in the data collected and previous studies found unlabeled images, mislabeled forms and tables, missing skip navigation functionality, and no keyboard actions [8].

The openness to comply with regulatory laws has taken a rather slow start. As Jaeger states, "Governments need to incorporate ongoing evaluation practices regarding their E-Government services to continually improve and enhance their services [3]." Therefore, by creating government websites from the outset to be accessible to all users by following Section 508 standards, it would take little to no effort to maintain and improve one's existing services.

REFERENCES

1. Abu-Doush, I., Bany-Mohammed, A., Ali, E., & Al-Betar, M. A. (2013). Towards a more accessible e-government in Jordan: an evaluation study of visually impaired users and Web developers. *Behaviour & Information Technology, 32* (3), 273-293.

2. AKGÜL, Y. and Vatansever, K. Web Accessibility evaluation of Government websites for people with disabilities in Turkey. *Journal of Advanced Management Science, 4* (3). 201-210.

3. Bertot, J. C., Jaeger, P. T., & McClure, C. R. (2008, May). Citizen-centered e-government services: benefits, costs, and research needs. *In Proceedings of the 2008 international conference on Digital government research* (pp. 137-142). Digital Government Society of North America.

4. E-Government Act of 2002, 2016. PUBLIC LAW 107–347. 2002. Retrieved April 27, 2016, from *The Department of Justice:* https://www.justice.gov/opcl/e-government-act-2002

5. Jaeger, P. User-Centered Policy Evaluations of Section 508 of the Rehabilitation Act. *Journal of Disability Policy Studies, 19*. 24-33.

6. Loiacono, E.T. and McCoy, S. Website accessibility: a cross-sector comparison. *Universal access in the information society, 4* (4). 393-399.

7. Matthews, W. "Road to compliance", *Federal Computer Week, 15* (9). 22-28.

8. Olalere, A. and Lazar, J. Accessibility of US federal government home pages: Section 508 compliance and site accessibility statements. *Government Information Quarterly, 28* (3). 303-309.

9. Prencipe, L. W., Achieving section 508 compliance. *InfoWorld, 23* (3). 61.

10. Rutter, R., Lauke, P.H., Waddell, C., Thatcher, J., Henry, S.L., Lawson, B., Kirkpatrick, A., Heilmann, C., Burks, M.R., Regan, B. and Urban, M., Web accessibility: Web standards and regulatory compliance. Apress, New York, 2006. http://library.books24x7.com.ezproxy.depaul.edu/toc.aspx?site=XOBDU&bookid=14675

11. Section 508 of the Rehabilitation Act. 29 U.S.C. § 794d. 2000. Retrieved May 16, 2016, from the *General Services Administration on Section 508 Standards:* http://www.section508.gov

12. Section 508 Report to the President and Congress: Accessibility of Federal Electronic and Information Technology. 2012. Retrieved May 16, 2016, from the *United States Department of Justice Civil Rights Division:* http://www.ada.gov/508/508_Report.htm#_Toc32

7291796

13. U.S. Census Bureau, 2010. "Americans with Disabilities 2010: Household Economic Studies". Retrieved April 27, 2016, from *U.S. Census Bureau*: http://www.census.gov/prod/2012pubs/p70-131.pdf.

14. Statement Regarding Rulemaking on Accessibility of Web Information and Services of State and Local Government Entities, 2016. Retrieved May 16, 2016, from the *U.S. Department of Justice, Civil Rights Division:* http://www.ada.gov/regs2016/sanprm_statement.html

15. W3C / WCAG Overview, 2012. Retrieved April 26, 2016, from *World Wide Web Consortium:* http://www.w3.org/WAI/intro/wcag

16. W3C Web Accessibility Evaluation Tools, 2006. Retrieved April 27, 2016, from *World Wide Web Consortium:* https://www.w3.org/WAI/ER/tools

17. W3C Web Content Accessibility Guidelines (WCAG) 1.0, 1999. Retrieved April 27, 2016, from *World Wide Web Consortium:* https://www.w3.org/TR/WCAG10

18. W3C Web Content Accessibility Guidelines (WCAG) 2.0, 2008. Retrieved April 27, 2016, from *World Wide Web Consortium:* https://www.w3.org/TR/WCAG20

19. Wentz, B., Jaeger, P.T. and Lazar, J. Retrofitting accessibility: The legal inequality of after-the-fact online access for persons with disabilities in the United States. *First Monday, 16* (11).