Compliance of Section 508 in public library systems with the largest percentage of underserved populations

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ABSTRACT

The issues of mobility, sight, and hearing impairments with respect to virtual accessibility are as important as physical accessibility when it comes to using public library services. However, a few studies have explored the accessibility of public library websites from the perspective of underrepresented user groups. The purpose of this study is to evaluate the accessibility of public libraries' websites by testing the compliance on Section 508, and further investigate the correlation between Web accessibility and public libraries' IT budgets. The study selected twenty public library systems that have the highest percentages of people with disabilities and older adults. Key findings indicate that most public library websites do not comply with Section 508, and thus, suggest that public library websites are not suited to deliver effective information services for underrepresented user populations who need special assistance. In addition, there is no significant association between the public library websites' accessibility and their IT budgets, which suggests that public libraries' lack of awareness of Web accessibility be the major challenge for compliance with Section 508.

1. Introduction

Persons with disabilities and older adults are underserved populations for information services in digital environments (Kars, Baker, & Wilson, 2008). The populations of persons with disabilities and older adults in the U.S. are approximately 56 million and 38 million, respectively (U.S. Census Bureau, 2010a, 2010b). Among those, approximately, 24.5 million have difficulty in using library websites (Fulton, 2011). Due to the issues of mobility, sight, and hearing impairments, virtual accessibility is as important as physical accessibility for both persons with disabilities and older adults in using public library resources or services.

Web accessibility pays special attention to people with disabilities and older adults (W3C, 1994–2012). Previous studies have discussed the accessibility issue on websites in general (including libraries) (Brobst, 2009; Byerley & Chambers, 2002; Curl & Bowers, 2009; Farrelly, 2011; Green & Huprich, 2009; Lazar et al., 2012; Lilly & Fleet, 2000; Mates, 2004; Providenti & Zai, 2007b; Schmetzke & Comeaux, 2009; Wentz, Cirba, Kharal, Moran, & Slate, 2012; Yu & Lau, 2006), or on government websites (Abu-Doush, Bany-Mohammed, Ali, & Al-Betar, 2013; Brobst, 2012; Jaeger, 2004, 2006, 2008; Jaeger & Matteson, 2009; Jaeger et al., 2013; Lazar et al., 2013). According to previous studies done about a decade ago, there are several critical barriers to compliance with Web accessibility: budget constraints, lacks of

perception, skills, and knowledge, and absence of authoritative guidelines (Brophy & Craven, 2007, as cited in Disability Rights Commission (United Kingdom), 2004). Now, fortunately, owing to the advance of information technologies, some of the obstacles such as the lack of technical skills and knowledge, and standards or guidelines have been overcome (Parmanto, 2010; Sahib, Tombros, & Stockman, 2012). To achieve Web accessibility, W3C, (1994–2012) and U.S. government have developed clear technical standards such as Web content accessibility guidelines (WCAG) 1.0, 2.0, and Section 508. In particular, Section 508 has served as a momentum for public libraries to facilitate the use of their websites and electronic resources. Two issues, however, still matter: one is lack of perception, and the other is budget limitations.

One of the main roles of public libraries is to mitigate information disparity or narrow the gap between haves and have-nots (American Library Association, 2012). For "the digitally excluded" people, public libraries serve as unique intermediaries to support their interaction with government, communities, and other agencies (Jaeger et al., 2013, p.74). Public library websites are often the first entrance to using information resources or services online. In order to deliver effective information services, public libraries rely on information and communication technologies (Bertot, 2013; Bertot, Jaeger, Langa, & McClure, 2006; Gould & Gomez, 2010). Along with utilizing such technologies, a public library should understand the community it serves, the characteristics and lifestyles of the community members, its environments, etc. (Riley-Huff, 2012). Although community analysis is vital to identify the particular information needs of a community, little attention has been paid to the accessibility of public library websites

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that serve the communities composed of high rates of underserved population. In order to bridge the research gap, the present study aims to evaluate the accessibility of public library websites that have high rates of the underrepresented groups as their users or potential users. Developing websites that include technologies (e.g., screen readers, braille translator, text-to-speech and speech-to-text, and transcoder) to support virtual accessibility takes considerable cost, which are closely related to funding issues allocated by the government (Fulton, 2011; Gould & Gomez, 2010). According to the reports from Web practitioners, limited budgets are one of the major obstacles to provide accessible Web content (Farrelly, 2011). Indeed, due to recent on-going economic depression, financial constraints can be one of the biggest challenges to establish accessible public library websites (Fulton, 2011). In addition to assessing Web accessibility of public libraries, thus, the present study investigates the relationship between Web accessibility compliance and the library budgets. Accordingly, this study addresses the following research questions:

- Do public library websites support people with disabilities and older adults, allowing them to overcome physical difficulty in accessing the services of the public libraries? In other words, do the websites comply with Section 508?
- Is there any association between public library websites' accessibility and budgets?

2. Previous studies of Web accessibility and Section 508

The World Wide Web Consortium (W3C), (1994–2012) defines Web accessibility as:

Web accessibility means that people with disabilities can use the Web. More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. Web accessibility also benefits others, including older people with changing abilities due to aging (para. 1).

The statement clearly presents that Web accessibility aims at making Web content accessible to everyone, particularly focusing on people with disabilities and older adults. According to the WCAG 2.0 (W3C, 1994–2012), Web content is defined as the information in a website, including "natural information such as text, images, and sounds" and "code or markup that defines structure, presentation, etc." (para. 2).

In order to provide accessible websites, assistive technologies are required. Lacks of these technologies have been one of the most critical obstacles in assuring the accessibility compliance (Brobst, 2009; Brophy & Craven, 2007). One of the salient technologies is the screen reader, which enables websites more accessible by converting texts into sound or voice; a screen reader reads out and in text on the websites (Edwards, 2008). Similarly, specialized web browsers read text loud even by navigating websites section-by-section, rather than line-by-line which is provided by a screen reader (Raman, 2008). For people with disability, intermediary technologies such as a Web transcoder are very helpful for overcoming the difficulty of accessing Web content. The transcoding technology facilitates users to use information on the Web by providing the users the information more accessible formats or visual layouts. For example, the text transcoder assists people with hearing problems by providing a text-based view of Web information, which includes voices or sounds (Edwards, 2008). Such advancement of information technology has supported Web accessibility by facilitating the use of the websites (Harper & Yesilada, 2008).

Brophy and Craven (2007) addressed accessibility issues evolved from Web intensive library resources and services. They discussed design of Web interfaces based on WCAG, accessibility evaluation, and perception of accessibility. The study more specifically identified the

particular user groups who would benefit from achieving Web accessibility:

- People with visual disabilities (totally blind or visual impairment) to use screen reading or enlargement technologies
- People with learning disabilities (e.g., dyslexia) to use screen reading/adjustment technologies
- People with hearing disabilities to use sound captioned or audio aids
- People with physical disabilities (e.g., can't handle mouse) to use mobility assistive technologies such speech input or joysticks (Brophy & Craven, 2007).

In order to provide insights into accessibility design, Friedman and Bryen (2007) analyzed twenty guidelines and identified four key design recommendations: "1) Use pictures, graphics, icons, and symbols along with text…2) Use clear and simple text…3) Use consistent navigation and design on every page…and 4) Use headings, titles, and prompts…" (p. 205). Similarly, Riley-Huff (2012) suggests developing universal design for Web accessibility to provide consistent and usable library services in compliance with accessibility standards. Sahib et al. (2012) investigated the differences of information-seeking behavior between people with sight impairment and sighted searcher. They examined how people with sight impairment interact with speech-based screen readers while seeking information, and found that a lack of visual cues influenced on query reformulation of those people. Based on the findings, the study suggested the guidelines for designing accessible interfaces with screen readers.

Recently, Hill (2013) reviewed the previous studies regarding accessibility and disability conducted in the field of Library and Information Science from 2000 to 2010. The main themes that the study identified were accessibility issues about Web, database, software, services to people with disabilities, programs, projects or products for accessibility, legislation, etc. With regard to the accessibility to library websites, many studies have discussed the perception for digital library services, or suggestive insights into promoting such services (Bonnici, Matta, & Wells, 2009; Green & Huprich, 2009; Mates, 2004; Schmetzke & Comeaux, 2009). Gould and Gomez (2010) suggested financial support to improve the accessibility of public library websites. Some studies examined accessibility compliance, which Section 508 of the Rehabilitation Act of 1973 required for institutions that were funded by the federal government (Brobst, 2009, 2011, 2012; Jaeger, 2004, 2006, 2008). Jaeger investigated compliance of Section 508 in federal e-Government websites and identified the major barriers to their Web accessibility which were: compatibility errors with screen enlargement, screen readers, and alternate color schemes; issues of flash or moving images; graphics without alternative text tags; audio content without equivalent text; problems with mouse control menus; and issues of clear and consistent navigation and orientation (Jaeger & Matteson, 2009).

Brobst (2009) tested accessibility for the websites of 78 public libraries in Florida, and found out that only 21 libraries (27%) attained the compliance standard. In addition, Brobst (2012) investigated the accessibility of federal health care websites; to evaluate their accessibility, he employed multimethod including auto testing, manual testing by experts, and content review. The results of the study indicated that their poor compliance with the accessibility guidelines that the Americans with Disabilities Act of 1990 and Section 508 of the Rehabilitation Act of 1973 regulate. In conclusion, the study suggests more consistent and clear guidance between the two polices and additional training for website managers.

There have been continuous endeavor to evaluate accessibility of Web content with scientific approach. Parmanto & Zeng (2005) addressed the weaknesses of accessibility measurements and proposed a novel metric based on WCAG guidelines to automatically measure Web accessibility. A large portion of previous studies tested Web