

Online On Ramps: A Pilot Study Evaluation of the Accessibility of Canadian Public Library Web Sites to Visually and Hearing Challenged Users

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ABSTRACT

A pilot study was conducted to assess the accessibility of Canadian public library web pages to visually and hearing challenged individuals using adaptive technologies. A random sample of thirty library home pages were evaluated using *Bobby*, a software program created by the Centre for Applied Special Technology using the World Wide Web Consortium's *Web Accessibility Guidelines*. Results suggest that Canadian public library web pages are generally inaccessible, with only 10% meeting *Bobby*'s standards. The article concludes by suggesting design strategies, arising from the most common problems found, to support increased accessibility for disabled users.

RÉSUMÉ

Une étude pilote a été dirigée pour évaluer l'accessibilité des sites Web des bibliothèques publiques canadiennes pour les individus malvoyants et malentendants utilisant les technologies d'adaptation. Les résultats suggèrent que les sites Web des bibliothèques publiques canadiennes sont généralement inaccessibles. Cet article conclut en suggérant des stratégies de conception qui proviennent des problèmes les plus communs trouvés pour soutenir de l'accessibilité augmentée pour des utilisateurs handicapé-e-s.

INTRODUCTION

Canadian public libraries have a long tradition of making their services fully available to individuals with disabilities through the provision of physically accessible facilities, specially formatted materials in a variety of media, special equipment to make traditional materials accessible, and other special programs and services. Indeed, the *Canadian Human Rights Act*, Section 5 "Denial of good, service, facility or accommodation" (1999) requires libraries and other publicly funded organizations to do this. The increasing reliance on the World Wide Web as a means to disseminate and make information available electronically is evidenced in the exponential growth of web pages. Canadian public libraries have begun to create their own web pages and use these as an alternative, and in some cases sole, means of delivery of many important basic services and documents such as reference, program listings, and access to the library's catalogue and other

databases. New adaptive technologies such as screen readers allow disabled individuals to access web pages as long as the pages have been designed with features, such as alternate text descriptions for graphic images, that facilitate the use of these adaptive technologies. The purpose of this study was to investigate how accessible Canadian public library web pages are to visually and hearing challenged individuals.

LEGISLATION AND PROFESSIONAL STATEMENTS

Both Canada and the United States have measures in place to protect the rights of those with a disability. In the United States there are two relevant pieces of legislation: the *Americans with Disabilities Act* (1990) (*ADA*) and the *Workforce Investment Act* (1998). The *ADA* is aimed at providing a "clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities" (*ADA*, 2(6)(1), 1990). Since American public libraries fall under the public services section of the *ADA*, they are required to implement a variety of methods to adapt their facilities so that individuals with disabilities may use these services. The *Workforce Investment Act* (1998) requires federal agencies to provide access to electronic data and information technology to individuals with disabilities.

The *Canadian Human Rights Act* (1976) (*CHRA*) endeavours to protect the rights of all individuals including those with disabilities. The *CHRA* shares some characteristics with the *ADA* in that it strives to ensure that "all individuals should have an opportunity equal with other individuals to make for themselves the lives that they are able and wish to have and to have their needs accommodated...without being hindered in or prevented from doing so by discriminatory practices based on race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, family status, disability or conviction for an offense for which a pardon has been granted" (*CHRA*, 1976). Section 5 of the *CHRA* is of specific interest, as it states that it is "a discriminatory practice in the provision of goods, services, facilities or accommodation customarily available to the general public...to deny, or to deny access to, any such good, service, facility or accommodation to any individual, or...to differentiate adversely in relation to any individual" (*CHRA*, 1976). As of yet the *CHRA* has not been applied to the online realm but web site services offered by public libraries are likely to fall under this section of the *CHRA*. Inevitably, a challenge under the *Act* is likely to require all public libraries providing online materials to ensure that the content is accessible to individuals with disabilities who navigate the web with the assistance of adaptive technologies such as screen readers or Braille writers.

The Canadian Library Association (CLA) has two explicit statements relevant to the issue of web accessibility. The first concerns information and telecommunications access while the second entails principles that address library and information

services for people with disabilities. The *Information and Telecommunications Access Principles Position Statement* (1994) does not specifically address web accessibility issues for people with disabilities but does refer to “abilities” in the context of discussing information and telecommunication network service access. The *Canadian Guidelines on Library and Information Services for People with Disabilities* (1997) position paper sets forth guidelines including the need to ensure staff familiarity with relevant human rights legislation, ongoing evaluation of service delivery, and training policies and procedures that sensitize staff to disability issues. Finally, the statement asserts that “[t]echnology that makes library resources accessible to those unable to come to the library in person include[s] remote-access catalogues; reference and information requested and answered via e-mail, TTY and regular telephones, and facsimile” (CLA 1997). As such it is imperative that public libraries be vigilant in ensuring that the products of new technologies (e.g., web pages) are also accessible for library patrons with disabilities.

THE WEB ACCESSIBILITY INITIATIVE AND THE CENTER FOR APPLIED TECHNOLOGY

In response to the growing need for universal accessibility web design guidelines, two key organizations were established: the World Wide Web Consortium (W3C) and its sub-group the Web Accessibility Initiative (WAI) and the Center for Applied Special Technology (CAST). The goal of WAI is to promote web accessibility for persons with disabilities. Through this initiative W3C developed a series of guidelines for web content accessibility (W3C 2000b). The guidelines provide web professionals with a scheme for rating the accessibility level of their pages.

These priority ratings are classified on the basis of three levels of accessibility. The first is a “priority one” rating which requires that a “web content developer *must* satisfy this checkpoint...otherwise, one or more groups will find it impossible to access information in the document (W3C 2000a; emphasis added). A “priority two” rating suggests that a “[w]eb content developer *should* satisfy this checkpoint...otherwise, one or more groups will find it difficult to access information in the document” (W3C 2000a; emphasis added). Finally, a “priority three” rating recommends that a “[w]eb content developer *may* address this checkpoint...otherwise, one or more groups will find it somewhat difficult to access information in the document” (W3C, 2000a; emphasis added).

Using the WAI guidelines, CAST developed a piece of free, public software named *Bobby* that may be used to evaluate a web site’s HTML code for accessibility (CAST, 2001a). Once a web page has been analyzed, *Bobby* creates a report that gives the number of priority level rating violations as well as a list of items which

should be checked manually to determine if errors are real mistakes according to WAI's guidelines.

Although no challenges concerning the inaccessibility of online content have yet arisen under the *Canadian Human Rights Act*, a disabled individual may argue that online services, such as those offered by Canadian public libraries, must be accessible using adaptive technologies.

RESEARCH GOALS

The first goal of this pilot study was to explore, with a relatively small sample, the feasibility of using *Bobby* to assess public library web sites in anticipation of a larger study of all Canadian public library web pages. The second goal of the pilot study was to get an initial sense of the accessibility of Canadian public library pages and the kinds of problems visually and hearing challenged users might encounter. Since public library staff may lack the appropriate training for web site design, it was hypothesized that the majority of Canadian public library web sites would not meet the disability accessibility standard as set forth by WAI, thus leaving themselves at risk for legally-based challenges under the *Canadian Human Rights Act*.

METHOD

A list of Canadian public libraries was compiled from a roster available from the National Library of Canada's web site identifying all public libraries within Canada having web sites and/or online catalogues (National Library of Canada, 2000). From a total of 583 libraries listed, 125 were immediately excluded because of duplicate entries (e.g., one entry for the web site and another for the online catalogue). Of the remaining 458 public libraries with home pages, 145 additional listings were also excluded as they represented telnet-based access to the library catalogue, branch library duplicates or invalid links. The final population was comprised of 313 Canadian public library web pages. From the 313 library web pages, thirty (9.6%) were randomly selected for analysis.

For the purpose of this research, the term disability was applied only to hearing and visual impairment as this is how the term is operationalized by *Bobby*. In other words, *Bobby* searches for problems in a web page specifically involving visual and hearing impairment but not other disabilities. In order to evaluate the web pages the most recent version of *Bobby* was downloaded from the Center for Applied Technology's web site. From December 2000 to January 2001 *Bobby* was used to analyze the main home page for each of the thirty public libraries in the sample. *Bobby* generated an account of the number of errors for each page. The output was then coded and statistically analyzed.

RESULTS

Of the thirty web pages tested, only 10% (n=3) met *Bobby's* accessibility standard. Ninety-three percent of the pages contained priority level one errors, that is errors that are considered to be fatal flaws. One hundred percent of the web pages contained priority two errors, that is errors that are considered as serious but tolerable for *Bobby* approved designation. Ninety percent contained priority three errors, that is errors that may cause problems for accessibility. Table 1 summarizes this data.

The means described in Table 1 are partially skewed by a few extreme cases. For each type of error there is at least one outlier that artificially inflates the average number of priority errors. Therefore, the adjusted mean and the median may be more representative measures of central tendency.

Correlational analysis indicated that web pages that had any one type of error tended to have higher levels of the other types of errors ($r=.49, p<.01$). Also, the average numbers of errors by priority types were significantly different from one another at all levels (*adjusted* $F(1.3, 38.6)=13.3, p<.0001$). Priority three areas (11% of all errors) were the smallest group. Priority two errors (59% of all errors) were most prevalent. The number of priority one errors (30% of all errors) fell between the number of priority two and priority three errors.

Number of Errors per Page	Type of Error		
	Priority 1	Priority 2	Priority 3
Mean	22.0	43.1	7.8
Median	15.0	28.0	7.0
Standard Deviation	23.4	48.0	7.5
Range	0 - 88	1 - 191	0 - 34
Adjusted Mean	15.5 (n=27)	32.8 (n=28)	6.9 (n=29)
Number of pages with errors	28/30	30/30	27/30

Table 1. Number of Errors Identified by *Bobby* by Type of Errors

DISCUSSION AND RECOMMENDATIONS

This pilot study suggests that Canadian public libraries are not meeting the WAI standards for web accessibility for visually and hearing challenged online patrons. Very few web sites received a “*Bobby* Approved” status with most of the web sites having a moderate number of priority one or fatal inaccessibility errors. Most web sites also had a relatively large number of priority two or serious errors and a few priority three or tolerable errors. Overall the findings suggest that Canadian public libraries need to pay more attention to accessibility features when designing their home pages so as to increase usability for all patrons, including those using adaptive technologies to access the World Wide Web.

There are a number of key accessibility problems that were common among the thirty web pages analyzed. The five most frequently occurring errors suggest that public libraries should pay particular attention to the following strategies when designing web pages:

1. “Use relative sizing and positioning (% values) rather than absolute” pixels (*Bobby*). Of all library home pages, 15% exhibited this type of priority two error. In order to address this problem, a web designer must define, for example, the size of a table used for layout by using a percentage of the overall page size rather than an absolute pixel size. If this issue is not addressed the page user may have difficulty with navigating the page, or may have difficulty with conceptualizing the page layout.
2. “Use foreground and background colo[u]r combinations that provide sufficient contrast” (*Bobby*). Of the web pages evaluated, 14% displayed this type of priority two error. This problem may be addressed by ensuring that the colour contrast is strong enough so that if the pages were to be printed in black and white (or grayscale) the difference between light and dark colours would be clear. This is particularly relevant for individuals who are colour blind.
3. “If you use colo[u]r to convey information, make sure the information is also represented another way” (*Bobby*). Thirteen percent of the library web sites demonstrated this type of priority one error. A typical way this type of error happens is when a content provider decides to indicate links in a page by using a red colour with the regular text in black. If the designer has not also underlined the links, a site user that is colour blind may not recognize the difference between the red link and the black text.
4. “Avoid use of deprecated language features” (*Bobby*). Overall, 10% of the library web pages suffered from this type of priority two error. Deprecated features are HTML tags that are from an older version of HTML. For example, in order to define Java components embedded in a web page (such as applets), an earlier

method of embedding using HTML required the designer to use the <APPLET> tag. However, new versions of HTML (e.g., HTML 4.0) use the <OBJECT> tag to indicate Java elements in a web page.

5. "If an image conveys important information beyond what is in its alternate text, provide an extended description" (*Bobby*). Seven percent of all pages contained this type of priority one error. In order to address this type of error, designers should communicate additional image information (beyond what is included in the short description of an image, e.g., the ALT tags) by enabling users to go to a separate, text-only page to read a detailed description if necessary or desired.

Clearly the problems listed above may be easily rectified in order to make library home pages accessible to disabled online library patrons.

The results of this pilot study suggest that *Bobby* is a useful tool for assessing the accessibility of web pages and indicate that the larger study of all Canadian public library home pages is feasible. More importantly the results indicate that Canadian public libraries need to ensure that existing and future library web sites are carefully designed so that they are accessible to only patrons who are visually or hearing challenged. Given the potential legal implications and the number of individuals with disabilities in Canada, it is crucial that public libraries take a proactive approach to addressing the issue of accessibility to their web sites. Finally, it is both necessary and prudent to make sure that library staff responsible for updating and creating web content are well trained on issues of web accessibility thus ensuring that all library patrons are being served equally well both offline and online.

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