The Accessible Web: It's not just about Media Metrix numbers, it's about users
A Pilot Study of the Accessibility of Online Canadian Newspapers

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Abstract

A pilot study was conducted to assess the accessibility of online Canadian newspaper web pages to visually and hearing challenged individuals using adaptive technologies. A random sample of thirty newspaper home pages were selected from *Online Newspapers* (Online Newspapers, 2002) and the *Canadian Newspaper Association* (Canadian Newspaper Association, 2002) and 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 newspaper web pages are generally inaccessible, with only 13% meeting *Bobby*'s standards for accessibility. The article concludes by suggesting accessible design strategies, based on the most common problems found, as well as a discussion of the business case for accessibility. The results of this study have significant implications for corporations that rely on unique visitors and page counts for determining the success of their sites as well as corporations that are seeking to create fee-based services via their web sites.

Introduction

The events that unfolded on September 11, 2001 will remain etched as a critical moment in history in the minds of people around the world. As word of the attack on the World Trade Center spread, thousands flocked to media web sites in order to stay informed as the events unfolded (The Business Journal, 2001a; 2001b; Jupiter Media Metrix, 2001). It was in this time of crisis that online newspaper sites used Internet technology as it was initially intended – to communicate information in a time of crisis or war. While the communication of real-time information was possible, the informational needs of disabled users were neglected due to the inaccessibility of many web pages. Unfortunately, the pre-existing inaccessible newspaper sites, coupled with an over-reliance on digital imagery, did little to communicate to users -- such as the blind -- the magnitude of the events that took place that day. While the September 11 events crystallized the need for accessible web documents, it appears that many online newspapers failed to provide the information to the disabled population (Mayfield, 2001).

The increasing reliance on the World Wide Web as a means to disseminate and make information and services available electronically is evidenced in the exponential growth of web sites and companies offering services online. Similarly, Canadian online news sites have begun to create web pages for delivering information contained within their newspapers and to offer immediate access to breaking news stories as was the case on September 11, 2001. In addition to simply delivering news online, many online newspaper companies are looking to the web to supplement circulation revenues which have remained steady but not increased in the last 15 to 20 years (Newspaper Association of America, 2000). The success of these sites is based on calculating the number of unique visitors and page views on the sites (via measurement companies such as Jupiter Media Metrix or NetRatings) and then selling advertising space on their sites based

on the expectation that a strategically-placed advertisement will result in a large number of users viewing the advertisement. For sites that depend on a large number of visitors to deliver advertisement views for the advertisers -- subsequently resulting in a transfer of funds to the company running the news site -- the accessibility and popularity of the web site is critical to fiscal success.

Unfortunately, many web site developers ignore the market of disabled users that use the web. This could result in missing the potential for selling to disabled users who have an estimated $175 - $188 billion (US) dollars to spend annually (Lilly, 2001; Salamone, 2002; Watchfire, 2001; Wilkerson, 2001). Further, failure to make sites accessible alienates a possible 500 million (worldwide) unique page visitors (Watchfire, 2001). As a result, it is prudent for online news sites to start delivering accessible services online so that users utilizing adaptive technologies, such as screen readers, will be able to contribute to the growing digital economy. That being said, the purpose of this study is to investigate how accessible Canadian newspaper web pages are to visually and hearing challenged individuals.

Disability-Related Legislation

The goal of any newspaper is to gather, report, and communicate information to the general population (Lasica, 2001). From a legal perspective, newspapers have always strongly supported and advocated for the provisions set out in the Canadian Charter of Rights and Freedoms as well as the rights owed to individuals under the Canadian Human Rights Act (Lowrey, 1999). 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 pieces of relevant 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 online services may fall under the public services section of the ADA, those offering online services would be required to implement a variety of methods to adapt their sites so that individuals with disabilities may use these services. Likewise, the Workforce Investment Act (1998) requires federal agencies to provide access to electronic data and information technology to individuals with disabilities. Similarly, the Canadian Human Rights Act exists to protect the rights of all Canadians including those with disabilities.

The Canadian Human Rights Act

The 1976 Canadian Human Rights Act (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 particular relevance, in its statement 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 private companies are likely to fall under this section of the CHRA. Inevitably, a challenge under the Act is likely to demand any company providing an online fee-based service

to ensure that the content is accessible to individuals with disabilities, including those who navigate the web with the assistance of adaptive technologies such as screen readers or Braille writers.

The Americans with Disabilities Act

In 1990, the United States enacted the Americans with Disabilities Act (ADA). The Act, essentially aimed at providing a "clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities" (ADA, 2(6)(1), 1990), covers discrimination issues falling under four key areas: 1) employment, 2) public services, 3) public accommodations and services operated by private entities, and 4) telecommunications (Gunde, 1992). According to the Act, a disability is "a physical or mental impairment that substantially limits one or more of the major life activities…[or] a record of such an impairment, or being regarded as having such an impairment" (ADA, 3(2), 1990). Since services offered by private entities fall under the jurisdiction of the "public accommodations and services" section of the ADA, many companies are required to implement methods to adapt their facilities so that they may be utilized by individuals with disabilities.

Since the Act's inception in 1990, it had generally been interpreted as requiring companies or organizations providing a public service to create or upgrade facilities so that disabled individuals can access the facilities. However, a court case launched by the National Federation of the Blind (NFB) against America Online (AOL) stated that the "America Online internet service… has particularly designed its AOL service so that it is incompatible with screen access software programs for the blind" (NFB, 1999). According to the NFB, AOL had contravened the Americans with Disabilities Act under the Section 3 public accommodations and services operated by private entities. Based on this claim, AOL would be required by the Act to rectify the situation

by offering a service that is accessible for users who are disabled. The NFB eventually agreed to suspend the suit against AOL provided that AOL *ensure* that their software is accessible to those with disabilities (Maurer, 2001).

The Workforce Investment Act

Similarly, the United States Workforce Investment Act (1998) requires, under Section 508 (Electronic and Information Technology), that all federal departments and agencies must "ensure…that the electronic and information technology allows…individuals with disabilities …to have access to and use of information and data that is comparable to the access to and use of the information and data by [those]…who are not individuals with disabilities" (Workforce Investment Act, 1998). While Section 508 applies *directly* to federal institutions that offer information in an electronic form, it also has implications for private companies involved in providing services to or on behalf of government agencies (Wright State University, 2002). For example, in April 2000 there were four private income tax companies (Intuit, HDVest, H&R Block and CioCia) that were subjected to lawsuits because the Connecticut Attorney General's Office provided links "to four inaccessible online tax filing services on its Internal Revenue Service's official Web site" (Wright State University, 2002).

Aside from the United States accessibility cases, there have also been other legal challenges due to inaccessible web sites. In 2000, Australian Bruce Lindsay Maguire launched a lawsuit against the Sydney Organising Committee for the Olympic Games (SOCOG) on the grounds that he had been discriminated against in a breach of the Disability Discrimination Act (the Australian counterpart to the ADA and CHRA) by failing to make the Olympic web site accessible (Maguire v SOCOG, 2000). The Australian courts sided with Maguire in their decision stating that the SOCOG had "caused [Maguire] considerable feelings of hurt, humiliation, and rejection…[by

being] negative, unhelpful, and [by having a] dismissive attitude on the part of an organisation charged with the presentation of the most notable sporting event in the history of this country" (Maguire v SOCOG, 2000). As a result, the SOCOG was ordered to pay Maguire $20,000 in compensation.

It is clear from the Canadian and United States legislation, as well as lawsuits such as these, that the need for accessible web sites is a significant issue that could have great ramifications for all including Canadian companies who choose to offer services via the World Wide Web.

The Web Accessibility Initiative and the Center for Applied Special Technology

In response to the growing need for universal accessibility web design guidelines, two US organizations were established: the Web Accessibility Initiative (WAI) and the Center for Applied Special Technology (CAST). The goal of the WAI is to promote web accessibility for persons with disabilities. Through this initiative, the Web Accessibility Initiative developed a series of guidelines for web content accessibility (WAI, 2002a). The goal of the guidelines is to provide web professionals with a scheme for rating the accessibility level (i.e., priority rating levels 1 through 3) of their pages.

The priority ratings are classified on the basis of three levels of accessibility. The first is a "priority one" (P1) 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 (WAI, 1999; emphasis added). A "priority two" (P2) rating suggests that a "web content developer *should* satisfy this checkpoint...otherwise, one or more groups will find it difficult to access information in the document" (WAI, 1999; emphasis added). Finally, a "priority three" (P3) rating recommends that a "web content developer *may* address this checkpoint...

otherwise, one or more groups will find it somewhat difficult to access information in the document" (WAI, 1999; emphasis added).

Using the Web Accessibility Initiative's guidelines, the Center for Applied Special Technology (CAST) developed a piece of software named *Bobby* that can be used to evaluate a web site's HTML code for accessibility and compliance with Section 508 of the Workforce Investment Act (CAST, 2002). Once a web page has been analyzed, *Bobby* generates a report that lists the number of priority level rating violations as well as a list of items that should be checked manually to determine if errors are truly mistakes according to WAI's guidelines.

Currently, there have been no challenges under the Canadian Human Rights Act concerning the inaccessibility of web-based content or services. However, it is quite likely that a disabled individual may argue that online information services, particularly those offered at a cost, must be made accessible for use by those using adaptive technologies to view online content (Marquand, 2000).

Research Goals

The first goal of this pilot study was to explore, with a relatively small sample, the feasibility of using *Bobby* to assess newspaper web sites in anticipation of a larger study of all Canadian newspaper web pages. The second goal of the pilot study was to better understand the kinds of accessibility problems visually and hearing challenged users might encounter when visiting online Canadian newspaper sites. It was hypothesized that the majority of Canadian newspaper web sites would not meet the accessibility standards set forth by Web Accessibility Initiative (WAI), thus leaving site operators at risk for legally-based challenges under the Canadian Human Rights Act.

Method

In order to examine the accessibility of online newspapers to disabled users, a complete list of Canadian online newspapers (*N*=233) was compiled from *Online Newspapers* (Online Newspapers, 2002) and the *Canadian Newspaper Association* (Canadian Newspaper Association, 2002). From the 233 newspaper web pages, thirty (12.8%) 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 a version of *Bobby* (Version 3.2, Beta 10) previously downloaded from the Center for Applied Technology's web site was used. From February 2002 to March 2002 *Bobby* was used to analyze the main home page for each of the thirty newspapers in the sample. *Bobby* generated an account of the number of instances for each priority error type for each page. The output was then coded and statistically analyzed. Finally, at each priority level, Bobby identified and manual check identified errors were collapsed into one error category since the errors flagged for manual check were in fact valid priority errors (e.g., Priority one manual ratings were in fact priority one errors; therefore all priority one errors considered valid).

Results

Of the 30 web pages tested, only 13% (*n*=4) met *Bobby*'s accessibility standard -- meaning that 13% received a *Bobby* 'pass' rating. As noted earlier, the *Bobby* report indicates that a number of priority one, two, and three errors exist that must be checked manually. For subsequent analyses, the number of *Bobby* identified errors was added to the number of *Bobby* manual check errors within a particular priority level for an *overall* number of errors within that priority level.

These two types of errors (i.e., manual and automatic) were highly correlated with each other across the levels (r=.91 to .99).

Eighty-seven percent (87%) of the pages contained priority level one errors (both *Bobby*-identified errors and manual user verifications) -- that is, errors that are considered to be fatal flaws. One hundred percent (100%) of the web pages contained priority two errors -- that is errors that are considered as serious but tolerable for *Bobby* approved designation (i.e., only 1 web site contained no priority two errors). One hundred percent (100%) contained priority three errors -- that is errors that may cause problems for accessibility. Table 1 summarizes this data.

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

Number of Errors per Page	**Type of Error**		
	Priority 1	Priority 2	Priority 3
Mean	78.9	173.8	35.8
Median	26.0	65.5	13.0
Standard Deviation	112.7	232.4	61.9
Range	0 - 367	1 - 765	1 - 226
Adjusted Mean	48.9 (n=27)	91.7 (n=26)	16.4 (n=27)
Adjusted Standard Deviation	13.3	97.4	18.7
Adjusted Range	0 - 287	1 - 314	1 - 84
Number of pages with errors	26/30	30/30	30/30

The means described in Table 1 are partially skewed by a few extreme cases. For each type of error there were three or four outliers that may have artificially inflated the average number of priority errors. Therefore, the median, the adjusted mean, and the range may be more representative measures of central tendency and dispersion.

Correlational analysis indicated that web pages that had any one type of error tended to have higher levels of the other types of errors (*average r*(30)=.92, $p<.0001$). Also, the average numbers of errors by priority types were significantly different from one another at all levels ($F(1, 31)=17.2$, $p<.0001$; using the Greenhouse-Geisser adjustment to the degrees of freedom because of lack of sphericity). Priority three errors (12% of all errors) were the smallest group. Priority two errors (60% of all errors) were most prevalent. The number of priority one errors (27% of all errors) fell between the number of priority two and priority three errors.

Discussion and Recommendations

This pilot study suggests that Canadian newspaper web sites are not meeting the Web Accessibility Initiative's standards for web accessibility for visually and hearing challenged online users. Very few web sites received a "*Bobby* Approved" status, with most of the web sites having a moderate number of priority one or fatal accessibility 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 newspaper web sites need to pay more attention to accessibility features when designing their web pages, as doing so will increase usability for all users, including those using adaptive technologies to access the World Wide Web.

There are a number of other factors that should also be taken into account when considering web accessibility issues including: 1) why accessibility is important from a business perspective, 2) how measurement services such as Jupiter Media Metrix measure web sites, and 3) what are the common accessibility problems (and solutions) that newspaper web sites most frequently exhibit.

The Business Case for Accessibility

Aside from avoiding potential lawsuits over inaccessible web sites, web content and online service providers may also want to consider the number of reasons why it makes good *business*

sense to have an accessible web site. The first and probably most significant business reason to create accessible web sites is the opportunity to ***attract new users*** and ***gain a larger segment of the market share***. Not only will an accessible web site service enable more disabled visitors to visit the site, but it will also enable non-disabled but low-technology users (e.g., those using text-only browsers, Personal Digital Assistants or other technologies, low bandwidth connections, etc.) to utilize the site to the fullest extent possible (SSB Technologies, 2002; WAI, 2002b).

Another motivation for building an accessible web site is to ***improve overall efficiency***. With a well-designed and accessible web site, a business can reduce site maintenance (e.g., by using style sheets, text alternatives) and avoid costly retrofits as well as avoid having to maintain multiple versions of web pages. Similarly, by implementing an accessible and navigable site, the server-load and server-bandwidth issues are reduced as users will be able to find quickly desired information, thereby placing less demand on the server (WAI, 2002b).

Finally, developing an accessible web site demonstrates ***social responsibility*** and can ***improve the community's opinion of the organization.*** By choosing to *lead* the way in promoting and advocating equal web access for all, stakeholders and other organizations are given a clear message that the organization is committed to raising awareness and solving web accessibility problems (SSB Technologies, 2002; WAI, 2002b).

Jupiter Media Metrix

Measuring web sites is a common approach used by many media organizations to determine the success of their site and often used to further business goals (i.e., sell advertisements to generate revenue). Jupiter Media Metrix is an international company that is focused on measuring Internet sites by collecting information on marketing, online advertising, content and programming, payments and transactions, and online behavior and demographics (Jupiter Media

Metrix, 2002b). In addition to this information, Jupiter also offers both advisory and analysis services (based on the collected measurement information of a specific company) which can then be used to assist in developing business strategies (Jupiter Media Metrix, 2002a). These measurements can be used to provide extensive additional information to clients including:

- Showing clients how to use online content to achieve audience objectives (e.g., acquisition, retention, sales, ad revenues, steering audiences to other assets or partners)
- Addressing digital content asset valuation and cost-effective content acquisition and creation
- Examines how the blending of content, navigation, communications, and community applications and utility features ensures particular user behaviors

(Jupiter Media Metrix, 2002b)

Many online media companies in Canada (e.g., CBC.ca, Radio-Canada.ca, and Globeandmail.com) utilize this service to determine the successful of the online services that they are offering (Jupiter Media Metrix, 2001). However, it is important to note that while using services such as those provided by Jupiter Media Metrix can provide a substantial amount of information to a company concerning the number of page visitors as well as unique visitors to their sites, it does not necessarily address the difficulties users may have as a result of inaccessible web pages. In contrast, *Bobby*-based assessments of web sites do address accessibility issues and can assist businesses in achieving business goals.

5 Common Errors and Solutions for Online Newspaper Sites

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 online newspaper content producers should pay particular attention to the following strategies when constructing web pages:

1. **"Use relative sizing and positioning (% values) rather than absolute pixels"** (*Bobby*).

Of all newspaper home pages, 18% 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. See Figure 1.

```
</head>
<body background="images/sidebar.gif" leftmargin="0" topm
<table BORDER=0 CELLSPACING=0 CELLPADDING=0 WIDTH="600">
<tr>
        <td VALIGN=top width="150">


<table BORDER=0 CELLSPACING=0 cellpadding=0>
<tr><td width="126"> </td></tr>
```

Figure 1: In this example, the table size is defined by an absolute number that represents pixels. It should be defined as a percentage of the screen (e.g., width="600" versus width="80%").

2. **"Use foreground and background colo[u]r combinations that provide sufficient contrast"** (*Bobby*)

Of the web pages evaluated, 13% 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 greyscale) the difference between light and dark colours would be clear. This is particularly relevant for individuals who are colour blind. See Figure 2.

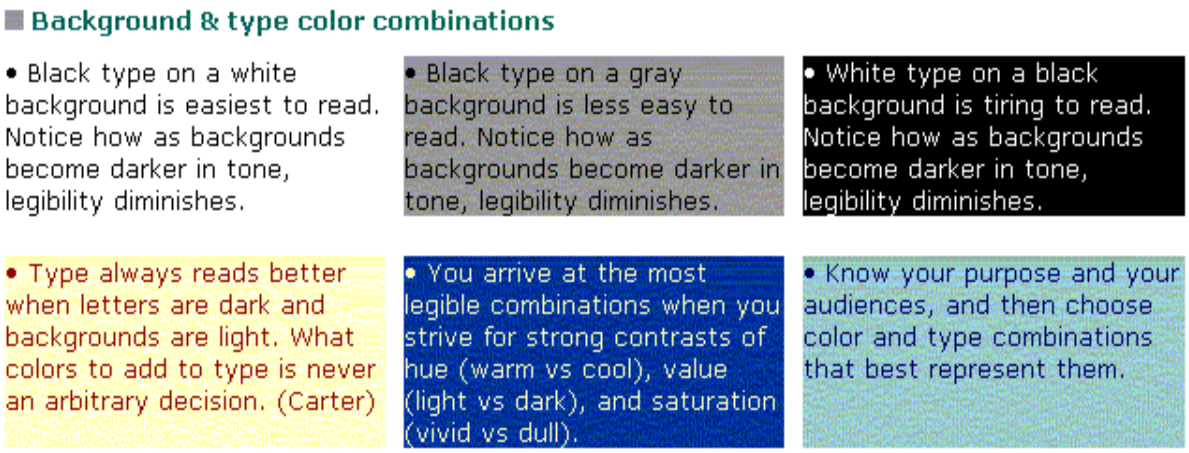

Figure 2: This example demonstrates how different colour combinations can be used to assist individuals who are colour blind. (Source: http://www.fc.peachnet.edu/irc/webdesign/color.html)

3. **"If you use colo[u]r to convey information, make sure the information is also represented another way"** (*Bobby*).

   Thirteen percent (13%) of the newspaper sites demonstrated this type of priority one error. A typical way this type of error manifests itself is when a content provider chooses to indicate links in a page by using a red colour while the regular text is in black. If the designer has not underlined the links a site user that is colour blind may not recognize the difference between the red link and the black text. For a more comprehensive discussion of safe web colours for colour deficient vision see http://innovate.bt.com/people/rigdence/colours/index.html.

4. **"Avoid use of deprecated language features"** (*Bobby*).

   Overall, 9% of the newspaper 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. Another method for addressing this is to utilize an HTML validator (such as CSE HTML Validator) or web authoring programs that automatically flag deprecated HTML tags (e.g., Allaire's HomeSite).

5. **"If an image conveys important information beyond what is in its alternate text, provide an extended description"** (*Bobby*).

   Six percent (6%) 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. See Figure 3.

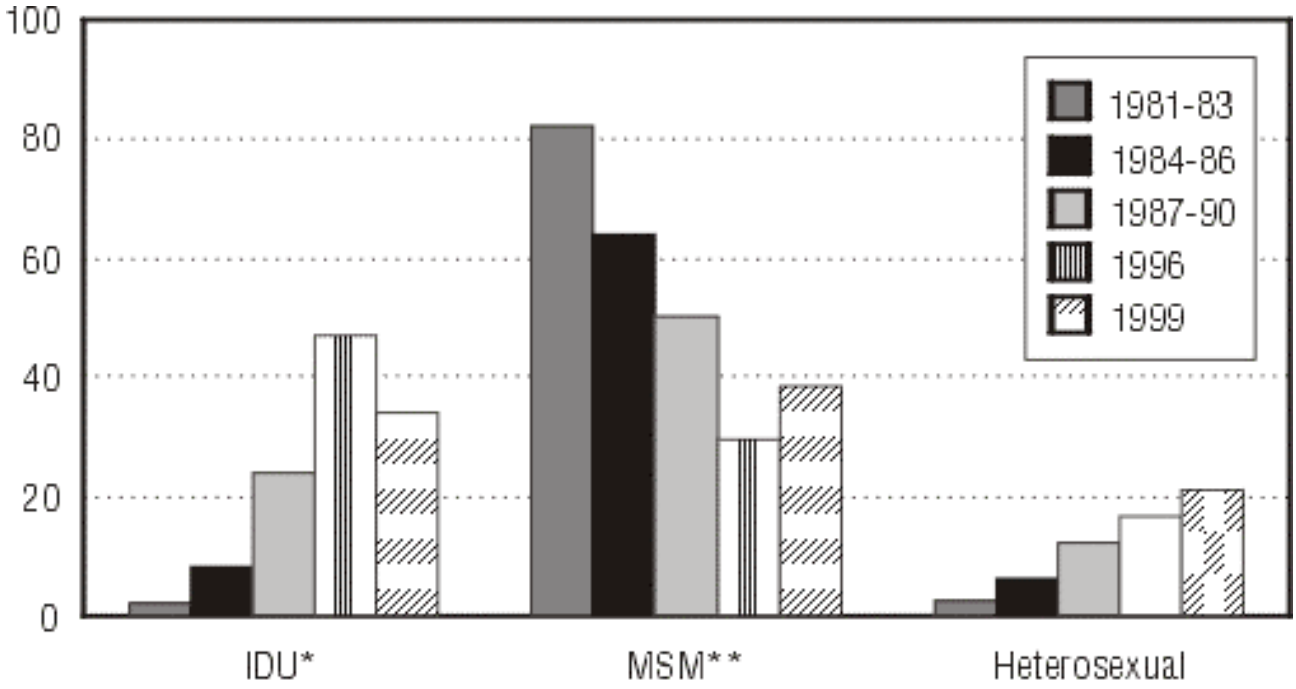

Figure 3: This example demonstrates how little information about the graph is communicated to the blind user. The ALT tag associated with this image <ALT="Estimated exposure category distribution among new HIV infections in Canada, by time period"> does not communicate the information in the graph.

Clearly, the problems listed above may be rectified easily in order to make newspaper web sites accessible to disabled web users.

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 newspaper home pages is feasible and desirable. More importantly, the results indicate that Canadian newspapers web sites need to ensure that existing and future variations of their web sites are designed carefully so that they are accessible to all users, including those who are visually or hearing challenged. Given the emerging trend of digital convergence among online news industries (e.g., Dibean & Garrison, 2001; Noack, 2001), it is crucial that media sites take a proactive approach to addressing the issue of accessibility on their web sites. Since traditional banner advertising approaches to funding sites are failing to bring in necessary revenues (Arant & Anderson, 2001), media industries are

investigating implementing fee-based information services for users (Dibean & Garrison, 2001). As these fee-based services would be considered services available to the public under Section 5 of the Canadian Human Rights Act, it is *imperative* that media sites attend to issues such as the potential for legal challenges, the fact that there are 4 million Canadians with disabilities, as well as the estimated increase of users with disabilities as the population ages (Paciello, 2000). Finally, it is both necessary and prudent to ensure that all staff responsible for updating and creating web content are properly trained on issues of web accessibility thus ensuring that all information seekers are being served equally.

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Further Resources and Reading

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Software:

A-Prompt (Accessibility Prompt)
http://aprompt.snow.utoronto.ca/
[Web Accessibility Verifier]

Bobby
http://www.cast.org/bobby/
[Accessibility Validator]

HTML Tidy
http://tidy.sourceforge.net/
[HTML/Accessibility Validator]

IBM Home Page Reader
http://www-3.ibm.com/able/hpr.html
[Screen reader]

Jaws (Freedom Scientific)
http://www.freedomscientific.com/
[Screen reader]

LIFT for Macromedia Dreamweaver
http://www.usablenet.com/lift_dw/lift_dw.html
[HTML/Accessibility Validator and Creation Tool]

Macromedia Flash MX
http://www.macromedia.com/macromedia/accessibility/features/flash/overview/
[Software which includes Accessibility Validator and Creation Tools]

Window-Eyes (GW Micro, Inc.)
http://www.gwmicro.com/windoweyes/
[Screen reader]

Web Sites of Interest

Adaptive Computer Technology Center
http://www.utoronto.ca/atrc/

Center for Applied Special Technology
http://www.cast.org/

Government of Canada's Government On-line Internet Guide.
http://www.cio-dpi.gc.ca/ig-gi/index_e.asp

Trace Research & Development Center
http://trace.wisc.edu/

Treasury Board Common Look and Feel (CLF) Standards
http://www.cio-dpi.gc.ca/clf-upe/index_e.asp

WebABLE
http://www.webable.com/

Web Accessibility Initiative (WAI)
http://www.w3.org/WAI/

UsableNet
http://www.usablenet.com