

2011

Canadian academic libraries and the mobile web

Canuel, Robin

Emerald

Robin Canuel, Chad Crichton, (2011) "Canadian academic libraries and the mobile web", *New Library World*, Vol. 112 Issue: 3/4, pp.107-120, <https://doi.org/10.1108/03074801111117014>

<https://knowledgecommons.lakeheadu.ca/handle/2453/4850>

Downloaded from Lakehead University, Knowledge Commons

Title: Canadian academic libraries and the mobile web

Robin Canuel

Humanities and Social Sciences Library, McGill University

robin.canuel@mcgill.ca

3459 McTavish Street

Montreal, Quebec H3A 1Y1

Phone: (514) 398-4698

and

Chad Crichton

University of Toronto Scarborough Library, University of Toronto

ccrichton@utsc.utoronto.ca

1265 Military Trail

Toronto, Ontario M1C 1A4

Phone: (416) 287-7492

Robin Canuel is the Liaison Librarian for Psychology, French Literature, and the Translation Studies and French Language Continuing Education Programs in the Humanities and Social Sciences Library at McGill University. Robin received a Bachelor of Arts degree from McGill University in 2000, and a Master's in Library and Information Studies in 2002 also from McGill.

Chad Crichton is the Coordinator of Reference, Research and Instruction at the University of Toronto Scarborough Library at the University of Toronto. Chad received a Bachelor of Arts degree from Queen's University in 1999, a Master's degree in English Language and Literature from Wilfrid Laurier University in 2000, and a Master's degree in Library and Information Studies in 2002 from McGill University.

Title: Canadian academic libraries and the mobile web

Abstract

Purpose: The purpose of this paper is to assess how Canadian academic libraries have responded to the rapidly evolving mobile environment and to identify gaps in the services provided, while suggesting areas for future development.

Methodology: We conducted an examination of the mobile content and services provided by the libraries of the member institutions of the Association of University and Colleges of Canada (AUCC). Based on this examination, we describe the current state of mobile librarianship in Canadian academic libraries. A review of the literature places the investigation in its broader context.

Findings: Only 14% of AUCC libraries currently advertise some type of mobile web presence, with mobile websites being prevalent over downloadable apps. Examples of content and services are highlighted to illustrate current trends and to provide insight into future directions for developing mobile services.

Practical implications: This study raises awareness of the importance of mobile technology for academic libraries and the need to address the lack of mobile content and services provided by most Canadian postsecondary institutions. We also identify best practices exhibited by the surveyed libraries.

Originality/value: This is the first exploration of this type into how academic libraries in Canada have responded to the mobile environment. The value of this research is in helping libraries identify and address shortcomings in the mobile content and services they provide, and in highlighting efforts by libraries to address their users' needs in this area.

Keywords: mobile web, mobile websites, academic libraries, smartphones, apps, Canada

Paper type: Research paper

Introduction

The recent explosion in the global smartphone and mobile technology market, and the near ubiquity of mobile data connections in the developed world in 2010, have made mobile computing an “indispensable part of day-to-day life in the workforce” (Johnson *et al.*, 2010). This continues to be driven by increasingly rapid and capable devices which provide a user-friendly means of accessing the internet on the go. According to the PEW Internet and American Life Project, 32% of Americans report having gone online with a mobile device (Horrigan, 2009). Fifty-three percent of those between the ages of 18 and 29 have used the internet on a handheld device (a demographic of particular interest to librarians in postsecondary institutions), and on a typical day, 19% of adults access the internet with a cell or smartphone (Horrigan, 2009). Mobile internet access numbers for Canada are similar, if slightly more modest than in the U.S., with 21% of mobile consumers using their phones to browse the Web and access their e-mail accounts (The Nielsen Company, 2009).

The Association of Research Libraries predicted in 2009 that the “ubiquitous presence of WiFi, handheld communication devices, smartphones, etc., will spur libraries to re-tool content for mobile users and mobile devices” (Association of Research Libraries, 2009, p. 16). However, a year later R. Bruce Jensen pointed out in an article in *Library High Tech News* that while the commercial success of mobile technology for business applications, entertainment and gaming has a huge appeal, the obvious attractiveness of these devices in the fields of instruction and information delivery “remains nearly untouched by most libraries” (Jensen, 2010, p.6). This paper assesses how Canadian academic libraries have responded to the rapidly evolving mobile environment. The assessment is based on an examination of the mobile content and services provided through websites and mobile web applications (apps) produced by libraries at postsecondary institutions throughout Canada.

Literature Review

The mobile environment's rapid expansion, and the ever-swift advance of hardware and software, make the task of keeping track of the "current state of affairs" in mobile technology a daunting one. Several groups perform regular environmental scans of the field in an attempt to produce an accurate snapshot of the mobile landscape. The Pew Internet and American Life Project is one such endeavour, conducting periodic surveys on topics such as wireless internet use and mobile phone use by teens (Horrigan, 2009; Lenhart, 2009). Lenhart's report (2009) tells us that in 2008, the majority of 12-13 year olds in the U.S. had their own cell phone, and by the age of 17, that number climbs to 84%.

For academic librarians, the work of Educause is essential in providing an assessment of the use of mobile technology within the educational context in particular. In collaboration with the New Media Consortium, Educause produces an annual "Horizon Report" to document the "time to adoption" for various technologies entering mainstream use on campuses, and placed "Mobile Computing" in their "one year or less" adoption horizon in 2010 (Johnson, *et al.*, 2010). In 2010, the Educause Center for Applied Research's *Study of Undergraduate Students and Technology* (Smith and Caruso) found that 74% of undergraduates either owned an internet capable handheld device or planned to purchase one within the next six months.

Librarians have also produced papers focused on identifying mobile trends and developments as they pertain to libraries generally, and to academic libraries in particular (Lippincott, 2010a; McKiernan, 2010). In addition, Alan W. Aldrich presented a study in *Educause Quarterly* which focused on the 111 English speaking members of the Association of Research Libraries, finding that 39 universities had a mobile website for either the university, the university library, or both (Aldrich, 2010). Interestingly, Aldrich explains that he chose to include not only university sites

in his survey, but also university *library* sites specifically, “because libraries have often been at the forefront of technology adoption” (Aldrich, 2010).

In addition to keeping abreast of the development of the mobile landscape generally, librarians are also engaged in documenting the many services they are implementing to respond to user demands for mobile content and services. Some articles focus on the use of a particular mobile device, such as the iPhone or the iPod, and how patrons might use these devices to support their research work in the library (Cuddy, 2008; Kendall, Nino and Stewart, 2010). Others focus on particular service areas, such as the provision of mobile reference services (Lippincott, 2010b; Murray, 2008), or the mobilization of online catalogues (Liston, 2009). Colleen Cuddy’s article, “Mobile Video for Education and Instruction”, discusses the transition of a resource that was not originally intended as a mobile-specific tool (video tutorials) to a new mobile context, and the particular ease with which video becomes an effective format for presenting content on a modern smartphone, PDA or tablet with little or no intervention on the producer’s part to “mobilize” said content (Cuddy, 2010). Research in mobile librarianship also explores services that use technologies that are unique to mobile and handheld devices, such as the provision of reference assistance through text-based SMS (Luo, and Bell, 2010; Pearce et al., 2010) or the use of quick response codes (QR codes) in delivering library instruction at the point of need (Walsh, 2010).

Academic librarians are developing mobile content and services in the context of the wider information industry, and while librarians and university researchers are becoming more comfortable in using mobile technology for advanced research activities, library vendors and publishers are responding to that trend (Murphy, 2010). Indeed, librarians and other researchers often make note of the variety of resources that vendors are beginning to develop for mobile devices, along with the traditional resources that are being reformatted for presentation in a mobile context (Blakesley, 2010; McKiernan, 2010). It is particularly important

for librarians to take a proactive approach to mobile development and the provision of content and services for mobile devices. R. Bruce Jensen has argued that “the commercial world is outpacing libraries in both awareness of and adoption of mobility,” and as Thomas Greenall points out, “libraries cannot afford to ignore this medium if they are to keep in step with their patrons. There has never been a more relevant user-driven technology for libraries to adopt” (Jensen, 2010, p. 6; Greenall, 2010, p. 16).

In a dynamic field like mobile technology, where the provision of content and services is very much driven by client demand, the attention of librarians naturally turns to user assessment. Surveys of patrons at Washington State University found that 58.4% of those polled would use small screen devices such as PDAs and web-enabled cell phones to search the library’s catalogue, an essential finding in determining whether to commit resources to mobilizing your online catalogue (Cummings, *et. al*, 2010). Similar surveys have also shown that patrons in post-secondary institutions may be more than twice as likely to adopt mobile technology as the general population, with faculty members potentially being more likely adoptees than students (Hu and Meier, 2010). In addition, their use of mobile content and services is highly contextualized, as their choice to use mobile technology, as opposed to a more robust stationary option, is often due to their location while browsing – i.e. away from a traditional internet connection (Lee, *et. al*, 2005; Kaikkonen, 2008). Librarians have been shown to be early adopters of mobile technology compared to the public in general (Spires, 2008a), but the public is likewise adopting the technology rapidly. When Ryerson University Library surveyed their patrons in 2008, 29% of respondents indicated that they owned an internet-capable handheld device; a year later in 2009, that number was 65% (Wilson and McCarthy, 2010).

In certain disciplines, particularly medicine, the rate of adoption of mobile technology is unusually high, and librarians must pay particular attention to tailoring content and services for the mobile user (Price, 2010; Cuddy, 2010). Libraries serving diverse communities may also

find that culture and gender affect how users interact with mobile technology and the purposes for which they use handheld devices (Hudson, 2010). Librarians may also need to consider how researchers use content differently when accessing it through a mobile device. Scholars may find that they can utilize an online encyclopaedia more efficiently through its mobile app on a touchscreen device than through a more traditional interface, or conversely, they may be frustrated at the inaccessibility of readable periodical literature for their smartphone (Hahn, 2010; Spires, 2008b). Understanding user expectations and the context in which they are accessing library content and services through handheld devices is crucial to creating an effective mobile strategy.

For librarians in academic libraries, mobile learning is an essential aspect of the mobile phenomenon. Given the rapid expansion of the availability of mobile technology and its ever increasing capabilities, librarians must keep abreast of the pedagogical implications of this revolution. How is mobile learning different from traditional learning? What are its benefits and challenges, and are professionals ready to address these questions? M-learning has been defined as nothing more complicated than “the intersection of mobile computing and e-learning” (Quinn, 2000). However, the potential benefits of the technology include providing support for new, more collaborative and accessible learning opportunities that integrate the broader world outside of the classroom and facilitate anywhere, anytime learning which could potentially reduce cultural and communication barriers and enhance interaction between students and instructors (Ally, 2009; Corbeill and Valdes-Corbeill, 2007; Hahn, 2008). M-learning projects in a post-secondary context can be as simple as facilitating active reading and note taking skills using annotation tools accessible through cellphones, or SMS text message research tips (Chao and Chen, 2009). More innovative projects acknowledge that “students no longer want to be passive recipients of information but to be joint participants in the creation of knowledge with their instructor and peers” (Fisher and Baird, 2007). The recent proliferation of conferences

focusing explicitly on M-Learning provides dozens of exemplary and innovative projects designed to facilitate users' skills to "apply knowledge and not just consume it...[and] provide instruments to provoke deep reflection, communication and cooperation" (Frohberg, *et. al*, 2009, p 323).

Methodology

How are academic libraries in Canada responding to all of these mobile trends? Are they responding at all? This study examines the mobile environment in Canada to determine the extent to which academic libraries have established a mobile presence and the nature of the content and services provided. The analysis began with a search for evidence of a mobile web presence within the university and library websites for member institutions of the Association of Universities and Colleges of Canada (AUCC). Once identified, each mobile website and mobile app was systematically catalogued. This data provides an overview of the current state of engagement by post-secondary libraries in the mobile environment in Canada and identifies the most frequently provided content and services, as well as notable gaps that should be addressed by Canada's academic librarians.

The research presented here evolved from earlier work by the authors in investigating the nature of mobile content and resources provided by post-secondary libraries in North America. Originally, institutions were selected for inclusion in that survey based upon the list of academic libraries offering mobile interfaces or apps on the M-Libraries page of the "Library Best Practices Wiki" (2010). Forty-two mobile academic library sites and two apps from the list were analysed for the presence of content and services across 12 categories (Canuel and Crichton, 2010). In the current study, the analysis focused on Canadian post-secondary academic libraries and a more granular investigation of the mobile content and services provided by these libraries. Twenty-two categories of content and services were established based on a review of the literature and an analysis of the mobile websites.

Beginning with a list of the 95 member institutions of the AUCC, a search was conducted between October 10th and October 24th 2010 to locate the mobile web presence within any of the institutions' libraries. The methodology for these searches was informed by the work of Alan Aldrich (2010), who performed a similar survey of universities and libraries in the Association of Research Libraries (ARL). These searches consisted of reviewing the homepage of the university or college, as well as the institution's main library homepage, for any links providing access to a mobile library website or other mobile-focused library content or services. Where no such link was discovered, a search was performed for the word "mobile" in any available "site search" feature found on the institution's homepage (or the homepage of their library) and the results were examined for evidence of a library mobile site, content, or services.

Additionally, in order to discover any apps not advertised prominently by the institution or its library, searches of the iTunes store and the Android marketplace were performed using the terms "library", "university", "université" and "college". Since the purpose of this research is to analyse the response of Canadian academic libraries to the opportunities and challenges of the mobile environment, and therefore also to do a preliminary assessment of the visibility of their mobile presence, the searches conducted were intended to mimic the searching habits of library users, rather than being comprehensive in nature. If mobile users can't find a mobile site quickly, they likely won't find it at all.

Findings and discussion

Of the libraries of the 95 member institutions of the AUCC, 13 were found to have some type of mobile-specific web presence. This included eight libraries with some manner of mobile website, two libraries with a downloadable mobile app, and three libraries utilizing both the mobile web and a downloadable application (see Figure 1). For the purpose of this study, "mobile website" refers to any web presence accessible through the browser of a mobile device

and which has been tailored in some way to the mobile context. This could include a specialized graphical layout designed to perfectly fit the 480x320 pixel screen of an iPhone 3Gs, or a simple text interface that renders legibly on a wide variety of phones.

Take in Figure 1

Mobile searching for data collection purposes was performed with an iPhone 3Gs and a Motorola Milestone, and the “mobility” of a website’s content and services was judged in this context from the perspective of the Apple iOS4 and Google Android 2.1 operating systems. Sites were not required, for example, to render properly on an internet enabled “feature phone” with a small screen and limited browsing capabilities. As long as the library in question possessed a site specifically intended for use with a mobile device, that library was considered to have a mobile website, regardless of the breadth of devices capable of taking advantage of that presence or the depth of services offered on the site. The term “app” could be problematic, as the notion of a “mobile application” can denote anything from a full-featured, interactive, mobile experience to a simple text-based online catalogue interface. Once again, a broad definition of “app” was applied to all searching, namely that any library with any downloadable content intended for use on a mobile device was considered to have a “mobile app”.

Perhaps the most interesting finding of this survey is the fact that mobile library websites were discovered for less than 12% of AUCC members (see Figure 1). One explanation for this seemingly low-level of implementation may in fact be the breadth of AUCC membership. While the AUCC does include large research intensive universities, it also includes a number of small institutions for whom a well-developed mobile web strategy may not be a high priority. Current data for the AUCC members who are also members of the Canadian Association of Research Libraries (CARL) shows that 34% of CARL member libraries have some type of mobile web presence. This number is consistent with a recent study showing that 35% of Association of

Research Libraries (ARL) members have a mobile presence (Aldrich, 2010). In addition, while the Aldrich study includes mobile sites for both libraries as well as their parent institutions, this Canadian study focuses entirely on mobile library content and services.

Once found, mobile sites and apps were analysed to identify the presence of up to 22 different categories of mobile library content and services. For the purpose of this analysis, websites were examined separately from apps to ensure that comparisons between institutions would be limited to equivalent formats (i.e., ensuring that potentially more robust apps were not grouped with simpler websites). The only item universally available on all surveyed websites was access to the library catalogue (see Table 1). Nine of eleven sites included information on library hours for their mobile patrons. Contact information and library account access were also popular mobile services to offer, each occurring on 81.8% of sites. Information on library location rounded out the top five most frequently encountered types of mobile content on the sites studied, appearing on 72.7% of websites. This category included not only sites that provided links directly to Google Maps to provide directions (an excellent feature for mobile users with smartphones, who are likely holding a GPS-enabled navigation aid in their hands) but also sites that simply provide the library's written address in text form. Given the highly context-driven nature of mobile interactions, certain services seem particularly appropriate for mobile use. The ability to reserve study rooms or see real-time library computer availability, for example, are exactly the type of service that a mobile user might wish to use while traveling to campus. These services were found on 27.2% of sites. In the final analysis, four of the twenty-two examples of content sought out did not appear in any of the eleven identified websites or five apps. Interestingly, no library analysed included any library videos, maps or floor plans of the library, podcasts, or webcams, all categories of content that have been seen in some American post-secondary mobile library sites. Overall, the Canadian mobile academic library environment is highly varied with some institutions providing patrons with everything from optimized mobile

graphical interfaces that mimic the user environment found in major smartphone operating systems, to others offering only simple standalone text-based catalogue search interfaces. Some of the more advanced sites may offer a glimpse of possible future directions of mobile librarianship in Canada.

Take in Table 1

In order to provide a more detailed look at the presentation of mobile content and services on Canadian mobile academic websites, we will discuss the mobile sites created at the authors' institutions as examples of Canadian efforts in this area (see Figures 2 and 3). Both sites display some of the more commonly seen conventions for the presentation of mobile content online, and in many aspects they illustrate the current state of development of mobile librarianship in Canada. Both institutions have mobile sites that use a graphical interface for presenting content, with images employed as buttons in a manner similar to the design of touch-based mobile operating systems such as Apple's iOS platform or Google's Android operating system. Both sites provide users with access to the library catalogue, though in different ways. The University of Toronto site currently allows users to search the library catalogue directly from a search box on the libraries' mobile homepage, but the searches are run through the traditional full-sized catalogue system. McGill, meanwhile, requires users to click on a link to access the catalogue, which then presents a version of the online catalogue optimized for mobile use. Both sites prominently present library hours, library locations and contact information, while the U of T site includes all five of the most frequently-found mobile content found in the study by also including access to patrons' library accounts.

Take in Figure 2 and Figure 3

Each of these institutions also demonstrated some unique features not found in other mobile sites produced by Canadian academic libraries. The McGill University Library mobile site was

the only site in this study to include links to social media, and indeed has a prominent “Follow” button on the main library mobile site encouraging patrons to follow the library on Twitter and “Like”, the library’s Facebook page. McGill’s site was also the only mobile site to provide patrons with explicit access specifically to the library’s Course Reserves catalogue, which includes direct links to all course readings that are available electronically. The McGill mobile library website was also the only site of all 11 surveyed that included a list of FAQs for patrons, in this case focused on troubleshooting connection issues related to connecting devices to the McGill University wireless network and configuring the Virtual Private Network. While these may seem minor issues, it is important to keep in mind that for the mobile user, one’s connection is one’s access to all of the library’s services and resources. Facilitating access to content and services through Wi-Fi connectivity and virtual private networks that permit access to the library’s licensed resources, librarians can open up a world of resources and assistance to their patrons.

The study found five Canadian post-secondary libraries that included a downloadable mobile app but the nature of these applications was highly varied. Two of these “apps” were simply an implementation of the generic catalogue access app tool “BookMyne” (in use at the University of Calgary and the University of Sherbrooke). No library-specific mobile app exists at the University of Saskatchewan or at Ryerson University, but the downloadable mobile app for these universities as a whole do include prominent links to the library’s resources. In the case of Ryerson University, this essentially repackages the content of the library’s mobile website, while the U of S app simply takes users to a mobilized version of the University of Saskatchewan online catalogue, created using the popular AirPAC catalogue mobilization tool.

The University of Toronto Libraries on the other hand, while not providing any category of information or service that was unique within the context of the study, did stand out at the time of this analysis as being the only academic library in Canada to provide mobile access to

patrons through both a mobile website as well as through a robust downloadable library app. The feature-rich mobile application is prominently advertised on the U of T Libraries mobile website. The U of T app provides access to virtually all of the same functionality as the library's mobile website, as is common practice in this early stage of mobile application development, although interestingly, the U of T Libraries app adds a "New Books" function that is not available from the mobile site, while the link to the RefWorks bibliographic management software which can be found on the mobile website is absent from the downloadable app. Of course, the development of mobile apps is still a very new phenomenon (Apple's famous "App Store" has only been open since July of 2008), which may explain why the University of Toronto is the only Canadian post-secondary library to offer such a service. Apps can, of course, be more resource intensive than mobile websites, and can require a much higher degree of in-house expertise (or outside assistance) to plan and create. Consequently, many libraries will no doubt begin with a mobile website to establish their mobile web presence: and establishing such a presence should be a priority. However, downloadable apps are generally considered to be an important part of the future of the mobile web, as they: 1) allow content to be accessed by patrons through the additional access point of an app store; 2) package content in a manner more specifically designed and controlled for the mobile environment, and, 3) eventually, leverage a device's application programming interfaces (APIs) to take advantage of the special features unique to mobile devices, such as using cameras for scanning barcodes and Quick Response (QR) codes, and built-in GPS systems to enable real-time navigation and for library services to be contextualized geographically (Miller, 2010).

Research Limitations

Despite the proliferation of literature in the field, it is important to keep in mind that mobile librarianship is still a very new and rapidly evolving discipline. For context, consider that Apple's iPhone, now in its fourth generation, was first introduced in January of 2007 and has only been

available in Canada since July 2008. Even Canada's own Research In Motion, makers of the ubiquitous Blackberry, have only been in the smartphone business since 1999. Another limitation for research in this area is the small data-gathering sample size upon which to base conclusions. This is due to the relative novelty of the field. Even when searching through a collection of institutions as large and diverse as the 95 members of the AUCC, one is still left with the relatively small sample of only 11 websites (see Table 2) and 5 apps to analyse. The rapid evolution of the field suggests that even while mobile technology may seem to have been available for a long time in its present modern form, mobile librarianship is, nevertheless, an extremely new endeavour and an area that should be of continued interest to researchers, with many new developments surely still on the horizon.

Take in Table 2

Conclusions

While today only 14% of academic libraries at AUCC institutions have a mobile web presence, the field would appear to be growing rapidly. A close monitoring of the mobile academic library environment for four months has revealed a steady growth of sites even in this relatively short period. Four new mobile Canadian academic library sites have just appeared in mid-2010, a small increase perhaps, but nonetheless an increase of over 44% to the collection of sites. It seems likely that in the future every library will have a mobile website or app, just as today we expect every library to have a conventional website.

One anticipated realization is the increased development of mobile apps by and for academic libraries in Canada. While, as reported, only the University of Toronto currently offers an app that users of current smartphones such as the Apple iPhone or the Motorola Milestone would recognize as such, research suggests that the combination of increased functionality, improved design and more intuitive usability make apps an attractive option over mobile websites.

However, such conclusions are difficult to substantiate in a library context where there are very few mobile apps for comparative study or research

In addition to the rapid expansion of available mobile content and services, there is also great potential for growth in the *quality* of such material. The hardware and software of mobile devices are rapidly improving, allowing for ever more robust user experiences and the addition of specialized mobile services (barcode scanning, geolocation, video). The potential expansion of mobile service opportunities (e.g., self-scanning of books for automated checkout, online book renewals, study room reservations, real-time computer availability information) could lead to libraries leveraging mobile opportunities to offer library patrons essentially 24/7 library service with less staffing required.

Librarians will also want to consider how mobile technology might enhance the delivery of information literacy instruction and how the profession might take advantage of the teaching and learning opportunities of mobile devices and develop those opportunities to enhance their work in the classroom. Practical matters such as the need for more widely-available and appropriately-formatted database access for mobile devices will need to be addressed for mobile technology to move forward in truly fulfilling its potential as a robust tool for academic research in Canada's universities and colleges.

Librarians in Canada, as elsewhere, should be encouraged to become more familiar with modern mobile handheld devices in order to help spur development in this emerging area of library service and teaching. While smartphones may seem nearly ubiquitous on university and college campuses, this is an area of technology that is still in its early days, and its application in the area of librarianship is yet in its infancy. Leveraging technology to access and use data in new ways can greatly modify and enhance methods and techniques of information searching and retrieval and incorporate it into our lives and research. Academic libraries worldwide can

benefit greatly from continued experimentation in this area as we attempt to optimize our resources and services for a new context that our patrons, and the public at large, have begun to embrace en masse. The mobile environment is still a fluid one, and there is a great deal of potential yet to be explored, and gaps to be filled. Now is the perfect time for libraries to enter the fray of what is becoming, truly, a mobile revolution, lest our academic libraries be left behind by their peers, and their patrons.

Acknowledgements

The authors of this paper would like to thank Lonnie Weatherby and Megan Fitzgibbons for reviewing and commenting on previous versions of this manuscript, and for their ongoing support.

We would also like to thank Marie Jennifer Somera and Matthew Canuel for their love and patience.

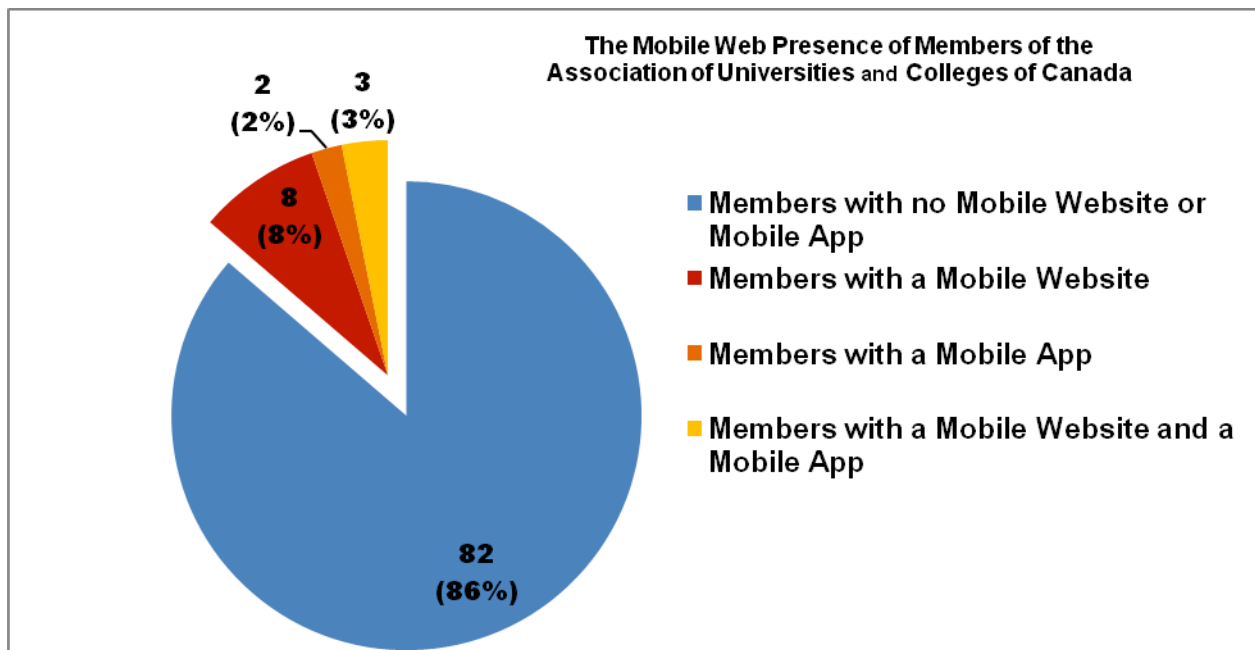


Figure 1

Table 1 - Mobile Site Content by Percentage of Adoption by Canadian Academic Library Websites	
Library Catalogue	100.0%
Library Hours	81.8%
Contact Information	81.8%
Account Access	81.8%
Library Location	72.7%
Library News	54.5%
Main Library Website Link	45.4%
Reference/Research Help/"Ask a Librarian"	36.3%
Computer Availability	27.2%
Study Rooms	27.2%
Feedback	27.2%
E-Databases	18.2%
Bibliographic Management Software	18.2%
Workshops	18.2%
Course Reserves	9.1%
Full-Text Article Finder	9.1%
Social Networking	9.1%
FAQs	9.1%



Figure 2

Figure 3

Table 2 - Canadian Academic Library Mobile Websites

University Library	Mobile Website Address
Athabasca University Library	http://aupac.lib.athabascau.ca/airpac/jsp/airpacIndex.jsp
McGill University Library	http://m.library.mcgill.ca/
Ryerson University Library and Archives	http://www.ryerson.ca/library/mobile
Thompson Rivers University	http://m.tru.ca/library_index.php
University of Alberta Libraries	http://m.library.ualberta.ca/
University of British Columbia Libraries	http://www.library.ubc.ca/m/index.php
University of Lethbridge	http://www.uleth.ca/lib/mobile/
University of Ottawa Library	https://m.uottawa.ca/mobile/library.php
University of Saskatchewan Library	http://sundog.usask.ca/airpac
University of Toronto Libraries	http://m.library.utoronto.ca
University of Western Ontario Libraries	http://m.lib.uwo.ca/

References

- Aldrich, A.W. (2010), "Universities and libraries move to the mobile web", *EDUCAUSE Quarterly*, Vol. 33 No. 2., available at: <http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/UniversitiesandLibrariesMoveto/206531> (accessed 20 October 2010)
- Ally, M. (2009), *Mobile Learning: Transforming the Delivery of Education and Training*, AU Press, Edmonton, AB.
- Association of Research Libraries (2009), *Transformational Times: An Environmental Scan Prepared for the ARL Strategic Plan Review Task Force*, Association of Research Libraries, Washington, DC, available at: <http://www.arl.org/bm~doc/transformational-times.pdf> (accessed 20 October 2010).
- Blakesley, E. (2010), "Going mobile", *Public Services Quarterly*, Vol. 6 No. 1, pp. 33-5.
- Canuel, R. and Crichton, C. (2010), "Librarians, smartphones, and mobile learning: a Canadian perspective", poster presented at the Annual Meeting of the American Library Association, June 24-29, Washington, DC.
- Chao, P. and Chen, G. (2009), "Augmenting paper-based learning with mobile phones", *Interacting with Computers*, Vol. 21 No. 3, pp.173-85.
- Corbeil, J.R. and Valdes-Corbeil, M.E. (2007), "Are you ready for mobile learning?", *EDUCAUSE Quarterly*, Vol. 30 No. 2, pp. 51-8.
- Cuddy, C. (2010), "Mobile video for education and instruction", *Journal of Electronic Resources in Medical Libraries*, Vol. 7 No. 1, pp. 85-9.
- Cuddy, C. (2008), "The iPhone in medical libraries", *Journal of Electronic Resources in Medical Libraries*, Vol. 5 No. 3, pp. 287-92.
- Cummings, J., Merrill, A. and Borrelli, S. (2010), "The use of handheld mobile devices: their impact and implications for library services", *Library Hi Tech*, Vol. 28 No. 1, pp. 22-40.
- Fisher, M. and Baird, D.E. (2007), "Making mLearning work: utilizing mobile technology for active exploration, collaboration, assessment, and reflection in higher education", *Journal of Educational Technology Systems*, Vol. 35 No. 1, pp. 3-30.
- Frohberg D., Goth, C. and Schwabe, G. (2009), "Mobile learning projects – a critical analysis of the state of the art", *Journal of Computer Assisted Learning*, Vol. 25 No. 4, pp. 307-31.
- Greenall, R.T. (2010), "Mobiles in libraries", *Online*, Vol. 34 No. 2, pp. 16-9.
- Hahn, J. (2010), "Information seeking with Wikipedia on the iPod touch," *Reference Services Review*, Vol. 38 No. 2, pp. 284-98.
- Hahn, J. (2008), "Mobile learning for the twenty-first century librarian", *Reference Services Review*, Vol. 36 No.3, 272-88.

- Horrigan, J. (2009), *Wireless Internet Use*, Pew Internet & American Life Project, Washington, DC, available at: <http://www.pewinternet.org/Reports/2009/12-Wireless-Internet-Use.aspx> (accessed 20 October 2010).
- Hu, R. and Meier, A. (2010), *Mobile Strategy Report: Mobile Device User Research*, California Digital Library, available at: https://confluence.ucop.edu/download/attachments/26476757/CDL+Mobile+Device+User+Research_final.pdf?version=1 (accessed 20 October 2010).
- Hudson, A. (2010), "Measuring the impact of cultural diversity on desired mobile reference services", *Reference Services Review*, Vol. 38 No 2, pp. 299-308.
- Jensen, R.B. (2010), "Optimizing library content for mobile phones", *Library Hi Tech News*, Vol. 2 No. 2, pp. 6-9.
- Johnson, L., Levine, A., Smith, R. and Stone, S. (2010), *The 2010 Horizon Report*, The New Media Consortium, Austin, Texas, available at: <http://wp.nmc.org/horizon2010/> (accessed 20 October 2010).
- Kaikkonen, A. (2008), "Full or tailored mobile web – where and how do people browse on their mobiles?", in Proceedings of the international Conference on Mobile Technology, Applications, and Systems in Yilan, Taiwan, September 10-12, 2008, Mobility 08, ACM, New York, NY, available at: <http://doi.acm.org/10.1145/1506270.1506307> (accessed 20 October 2010).
- Kendall S., Nino, M. and Stewart, S. (2010), "Using the iPhone and iPod touch @ work", *Computers in Libraries*, Vol. 30 No. 2, pp. 14-9.
- Lenhart, A. (2009), *Teens and Mobile Phones Over the Past Five Years: Pew Internet Looks Back*, Pew Internet & American Life Project, Washington, DC", available at: <http://www.pewinternet.org/Reports/2009/14--Teens-and-Mobile-Phones-Data-Memo.aspx> (accessed 20 October 2010).
- Lee, I., Kim, J. and Kim, J. (2005), "Use contexts for the mobile internet: a longitudinal study monitoring actual use of mobile internet services", *International Journal of Human-Computer Interaction*, Vol. 18 No. 3, pp. 269-92.
- Library Best Practices Wiki: M-Libraries page (2010), available at: <http://www.libsuccess.org/index.php?title=M-Libraries> (accessed 20 October 2010).
- Lippincott, J.K. (2010a), "A mobile future for academic libraries", *Reference Services Review*, Vol. 38 No. 2, pp. 205-13.
- Lippincott, J.K. (2010b), "Mobile reference: what are the questions?", *The Reference Librarian*, Vol. 51 No. 1, pp. 1-11.
- Liston, S. (2009), "OPACs and the mobile", *Computers in Libraries*, Vol. 29 No. 5, pp. 6-11, 42-47.
- Luo, L. and Bell, L. (2010), "Text 4 answers: a collaborative service model", *Reference Services Review*, Vol. 38 No 2, pp. 274-83.

- McKiernan, G. (2010), "Worldwide mobile phone adoption and libraries", *Searcher*, Vol. 18 No. 3, pp. 48-51.
- Miller, R. (2010), "Apps: exploring the next content frontier", *EContent*, Vol. 33 No. 5, pp. 18-22.
- Murphy, J. (2010), "Using mobile devices for research: smartphones, databases, and libraries", *Online*, Vol. 34 No. 3, pp. 14-8.
- Murray, D.C. (2008), "iReference: using apple's iPhone as a reference tool", *The Reference Librarian*, Vol. 49 No. 2, pp. 167-70.
- Pearce, A., Collard, S. and Whatley, K. (2010), "SMS reference: myths, markers, and modalities", *Reference Services Review*, Vol. 38 No. 2, pp. 250-63.
- Price, M. (2010), "Searching PubMed on an iPhone or iPod Touch", *Journal of Electronic Resources in Medical Libraries*, Vol. 7, No. 1, pp. 42-51.
- Quinn, C. (2000), "mLearning: mobile, wireless, in-your-pocket learning", available at: <http://www.linezine.com/2.1/features/cqmmwiyp.htm> (accessed 20 October 2010).
- Smith, S. and Caruso, J. (2010), *The ECAR Study of Undergraduate Students and Information Technology, 2010*, EDUCAUSE Center for Applied Research, available at: <http://www.educause.edu/Resources/ECARStudyofUndergraduateStudent/217333> (accessed 25 October 2010).
- Spires, T. (2008a), "Handheld librarians: a survey of librarian and library patron use of wireless handheld devices", *Internet Reference Services Quarterly*, Vol. 13 No. 4, pp. 287-309.
- Spires, T. (2008b), "Handheld serials: how wireless device technologies impact electronic journal publishing now and in the future", *Serials Librarian*, Vol. 53 No. 4, 141-53.
- The Nielsen Company (2009), "Nielsen is first to provide mobile internet audience measurement for the Canadian market", available at: http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/06/canadia_mobileq12009.pdf (accessed 20 October 2010).
- Walsh, A. (2010), "QR Codes – using mobile phones to deliver library instruction and help at the point of need", *Journal of Information Literacy*, Vol. 4 No. 1, pp. 55-64.
- Wilson, S. and McCarthy, G. (2010), "The mobile university: from the library to the campus", *Reference Services Review*, Vol. 38 No 2, pp. 214-32.