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EXPERIENCING MOBILE LIBRARIES

Leveraging apps for research and learning: a survey of Canadian academic libraries

Robin Canuel
Humanities and Social Sciences Library, McGill University, Montreal, Canada, and
Chad Crichton
University of Toronto Scarborough Library, University of Toronto, Toronto, Canada

Abstract

Purpose – The purpose of this paper is to assess the response of Canadian academic libraries to the rapid proliferation of mobile application (apps), many of which are useful for research, teaching, and learning.

Design/methodology/approach – A survey was conducted to identify existing initiatives that address the use of mobile apps to facilitate research, teaching, and learning at the libraries of the 97 member institutions of the Association of Universities and Colleges of Canada (AUCC). Based on this survey, this paper describes how apps are promoted, curated, organized, and described by today's academic libraries. A review of the literature places this survey in its broader context.

Findings – In total, 37 per cent of AUCC member libraries include links to mobile apps in their web site. Larger, research-intensive universities, tend to leverage apps more frequently than smaller institutions. Examples of how academic libraries are promoting apps provide insight into how academic librarians are responding to the proliferation of mobile technology.

Practical implications – The results of this survey highlight trends with regard to this emerging service opportunity, help to establish current best practices in the response of academic libraries to the emergence of mobile apps, and identify areas for potential future development.

Originality/value – This is the first study of its kind to explore and describe how third-party apps are used and promoted within an academic library context.

Keywords Academic libraries, Survey, Mobile apps, Content analysis, Emerging service, Mobile technology

Paper type Research paper

Introduction

An important role for academic librarians in supporting information literacy development is to keep researchers abreast of current trends in information technology, such as the emergence of mobile applications (apps). Each year the New Media Consortium (NMC) produces a "Horizon Report" intended to identify new technologies and innovations with potential major impact on teaching, learning, and research. In 2014, NMC produced the first specifically library-focused edition of this report in order to highlight emerging trends of particular importance to academic libraries. This report identified mobile apps as an important development in technology which would have a significant impact on the work of academic librarians within a year's time (Johnson *et al.,* 2014). The report's authors cited ease of use, and the public's heightened awareness of mobile apps in their daily lives as factors contributing to the increasing

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use of apps in academic and research libraries, and emphasized the educational advantages of mobile apps (Johnson *et al.*, 2014). Given the impact that apps will likely have on academic libraries, it is essential that academic librarians keep abreast of relevant new and emerging apps.

In the fall of 2014, both Apple's App Store and Google's Play Store each contained over 1.2 million apps available for downloading (AppBrain, 2014; TechCrunch, 2014). Many university faculty and students are already using mobile apps in their day-to-day lives. From personal banking to news and social media apps, people use apps on their phones and tablets in a wide variety of contexts. According to the 2014 Study on Undergraduate Students and Information Technology from the Educause Centre for Applied Research, 86 per cent of undergraduate students owned a smartphone in 2014, and almost half (47 per cent) owned a tablet (Dahlstrom and Bichsel, 2014). In addition to personal ownership, the use of these devices for academic work also continues to grow, with smartphones and tablets being the fastest growing device categories among students for academic use (Dahlstrom and Bichsel, 2014). Academic librarians are increasingly developing specialized mobile resource guides, promoting specialized mobile library apps, and incorporating mobile technology into their instructional programmes to respond to these trends.

As mobile device use continues to grow, many discipline-specific apps are now available to students and researchers with features relevant to their research activities. Libraries, library vendors, and other content providers are accelerating the development of apps that allow quicker and easier on-the-go access to scholarly information. As part of the academic librarian's role in supporting information literacy development, keeping researchers informed about current trends in information technology, such as the emergence of mobile apps, is becoming essential to that role. In a recent survey of student mobile app use it was reported that students generally preferred using native mobile apps to a mobile web browser to complete their work (Bowen and Pistilli, 2012). Technological literacy is an important component of information literacy, and academic librarians should therefore not only keep abreast of the available apps that can help support research, but ensure that students and faculty are made aware of these advances, and the impact that mobile apps can have on their scholarly work.

Literature review

With the explosion in the popularity of mobile devices, a great deal of literature has been written discussing the use of mobile apps in the context of academic libraries. Most recently, in a paper forecasting library technology trends, Marshall Breeding lamented the fact that libraries have been slow to adapt their services to the new mobile reality, and emphasized that a tipping point has been reached whereby support for mobile access should be standard practice (Breeding, 2014). Apps have long been a popular means of delivering entertainment and information to consumers, in addition to being a particularly useful means of searching for and accessing online content (Notess, 2013). Librarians are now beginning to take advantage of the popularity of apps and recognize their importance as a means of connecting users to content. One indication of the increased recognition among librarians of the importance of mobile apps is that there are now books identifying those apps which are most appropriate for use in a library context (Hahn, 2013). In the scholarly literature on apps and libraries the focus is on determining user needs and preferences, analysis of mobile apps and the types of apps appropriate to specific research needs, and a discussion of the teaching

and information literacy implications of mobile apps. As the use of apps in academic libraries proliferates, the scholarship detailing the current use of mobile technology and apps in the provision of college and university library services is becoming more prevalent.

In 2014, Catherine Bomhold published a study of mobile services provided to patrons of these libraries classified as research universities with very high levels of research activity by the Carnegie Foundation. Bomhold's research focused on how these libraries provided access to mobile services, either through an app or through a mobile web site. She found that 71.2 per cent of the 73 libraries surveyed provided some type of mobile access to library services with 53.4 per cent having university apps with access to the library (Bomhold, 2014). Bomhold (2013) concluded that, "it is clear that mobile services have caught the attention of academic libraries". Caniano and Catalano (2014) surveyed students at Hofastra University in 2014 to examine their preferences in the use of mobile technology. They found that 51 per cent of respondents had used a mobile device to access library materials. Interestingly, this survey also found that 71 per cent of respondents who had accessed the library using a mobile device had done so from home, suggesting that, "the mobile device is becoming the primary gateway to the internet, and thus the library, with the desktop and the laptop as the extension" (Caniano and Catalano, 2014). In a survey of undergraduate students, Bomhold (2013) found that 76 per cent of undergraduates used apps to find academic information, and that the most frequently used apps were search engines. Studies such as these demonstrate the heightened importance of mobile devices and apps in a post-secondary environment, and show that both students and librarians are utilizing mobile technology more often for their research and teaching needs.

When librarians at Hong Kong Baptist University compared the use of their online video collection through their mobile app and their mobile web site, they found that their mobile app was used 48 per cent of the time, for over 2,903 viewings in a two-month period despite being available on only one mobile platform (iOS) (Wong, 2012). As apps become increasingly popular among users, librarians need to be aware of the differences in information-seeking behaviour that can exist specifically in a mobile context. Both the information needs of faculty and students, as well as their expectations regarding how to meet those needs can be significantly different when the searcher is using a mobile device, often in a specific location and context. In a recent qualitative study of information-seeking behaviour in a mobile environment, Andrew Walsh (2012) documented the ways in which people search for and use information differently when using mobile devices, including the use of apps, and the implications of these differences for librarians developing and promoting mobile services.

The library profession has a long history and tradition of reviewing books, databases, and other resources for our various communities. This tradition is also alive and well with regard to reviewing new and emerging apps. In the past few years there have been several scholarly articles published by librarians describing apps that are particularly useful within the context of our daily work activities (Power, 2013; Brown, 2012). Some of these publications focus on useful apps within specific disciplines. Many key databases and reference resources within the field of medicine, for example, have a corresponding app, and medical librarians have been publishing review articles highlighting these important tools used by doctors and medical students (O'Hagan, 2012; Prince, 2012). The medical field has always been an early adopter of mobile technology. However, other scholarly disciplines have started to incorporate mobile apps into their professional practice, and subject librarians are

documenting this trend in the library literature. In a recent paper about using tablets and apps in architecture school libraries, Cathryn Copper (2014) points out that "[…] there is an app for essentially every facet of architecture education". Another emerging trend is the publishing of critical in-depth reviews of specific mobile apps. Recently, Nastasha Johnson (2014) wrote a thorough evaluation of the Ebscohost app, which is available on iTunes and Google Play, for the *Journal of Electronic Resources Librarianship*. Reviewing apps is a valuable professional contribution through which we can build awareness of mobile apps, and of their vast spectrum of potential use to research and teaching.

In addition to raising awareness of the existence and uses of mobile apps, librarians are starting to incorporate apps into their information literacy instruction.

Johnston and Marsh (2014) used iPads and a variety of mobile apps to assist in embedding information literacy instruction into the curriculum of a post-secondary EFL foundations course. Beyond integrating the use of apps into pre-existing information literacy instruction sessions, many librarians are developing workshops specifically devoted to introducing students to the benefits of mobile technology and apps for their research and learning. Mobile-specific workshops can introduce participants to the nuances of finding, accessing, and managing information in a mobile environment (Canuel *et al.*, 2012). In her paper on the incorporation of mobile technology into reference and instructional services, Copper (2014) states that "tablets and apps are effective teaching tools, and the possibilities for their incorporation into the library and classroom are limitless", and places particular emphasis on the importance of librarians keeping abreast of the ever expanding selection of apps.

Beyond discovery and information literacy instruction, apps have great impact potential in other areas of academic librarianship. In Rachel Besara's (2012) article "Apps for assessment: a starting point", she describes the use of specialized apps for gathering and managing a wide variety of both qualitative and quantitative information in assessing library programmes and services. The incorporation of data-gathering tools such as microphones and cameras into mobile devices can allow well-designed apps to be powerful tools for the collection of original data. The geolocation features of many modern mobile devices also allow librarians to leverage the power of GPS data, in the discovery of user behaviour, and how that behaviour varies by location. The data can also be used to guide users through physical spaces based on the location information gathered by their mobile devices (Vecchione and Mellinger, 2012). Further to leveraging third-party external apps, librarians are also developing their own apps to offer innovative new services, an area of potential future development in the provision of mobile library services by academic libraries (Hahn, 2014; Pianos, 2012).

Purpose

The purpose of this study is to discover how Canadian academic librarians are responding to the rapid proliferation of mobile apps, and assisting their communities in leveraging these tools for research, teaching, and learning. The authors set out to answer several questions related to how mobile apps are being promoted, organized, curated, and described on the web sites and online research guides of Canada's academic libraries. How many academic libraries are linking to mobile apps online? Are academic librarians creating online guides dedicated to the use of mobile apps, or linking to the relevant apps within pre-existing subject guides, or both? What types of apps are most frequently referenced on the web sites of academic libraries?

Do academic libraries promote fee-based mobile apps or only freely available ones? Do academic libraries promote the apps designed to facilitate access to our subscription-based resources? To what extent do academic libraries promote apps for multiple platforms and operating systems, and which platforms are most prevalent? These questions formed the foundation of this investigation into the ways in which Canadian academic libraries are currently bringing mobile apps to the attention of their communities, in order that their students and faculty can successfully leverage apps to advance their research, teaching, and learning.

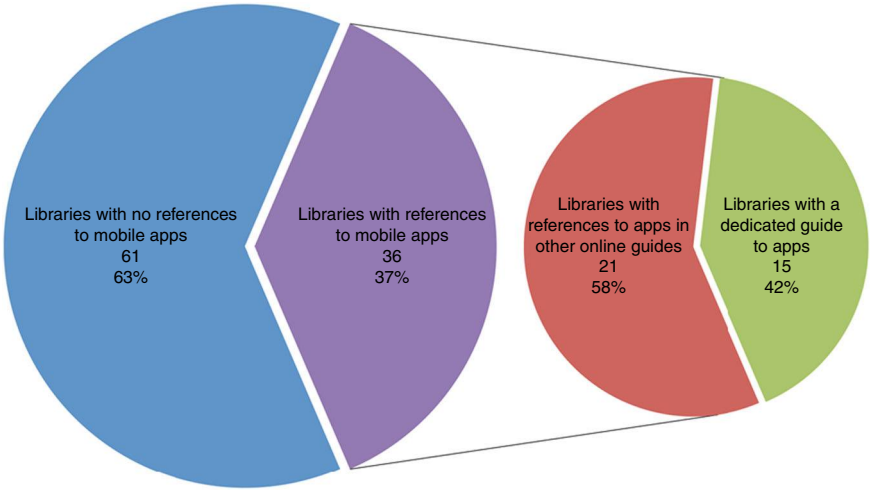
Methodology

We conducted a survey of existing initiatives that address the use of mobile apps to facilitate research, teaching, and learning at the libraries of the 97 member institutions of the Association of Universities and Colleges of Canada (AUCC). For the purpose of this study "mobile application" refers to an external third-party app such as the Ebscohost app, as opposed to an in-house app designed specifically to access library services and resources. Data were collected from the web sites of these academic libraries during the summer of 2014. In addition to browsing library web sites to identify the leveraging of apps, when a library web site search function was available, we searched the terms "app", "apps", and "mobile" to locate local initiatives. We noted when links to apps were available, but also, more specifically, if users were provided with a central guide to apps, or whether apps were simply made available within existing research guides or web pages. When guides to apps were present, we also recorded the various types of apps being made available (e.g. reading apps, database searching apps, citation management apps, cloud-based storage apps, etc.); access type (free, paid, or institutional); platforms supported (iOS, Andoid, Blackberry, Windows); the explicit marketing of specific apps (banner ads or other promotional techniques); and we recorded when guides to apps were subject specific.

Findings and discussion

Of the 97 member institutions of the AUCC we investigated, 36 (37 per cent) of their libraries included links to external mobile apps on their web site (see Figure 1). Of the 36 libraries that did make reference to mobile apps, 15 (42 per cent) had a dedicated guide specifically focused on mobile apps. The remaining 58 per cent of libraries who promoted apps did so within other existing subject-specific online guides, or elsewhere on the library web site (see Figure 1). Interestingly, 62 per cent of Canadian Association of Research Libraries (CARL) members include mobile apps in their web site, and 75 per cent of Association of Research Libraries (ARL) members in Canada include mobile apps in their web site. So, as one might expect, larger, research-intensive universities, leverage apps more frequently than smaller institutions. The relatively high number of academic libraries currently linking to external apps demonstrates the importance librarians have placed on highlighting these resources in research guides, and the extent of this emerging service being provided to their scholarly communities. Although a majority of the academic libraries at research-intensive universities are currently linking to mobile apps, there remains significant room for growth in this area among college and university libraries generally.

Through the course of conducting our survey we observed that librarians have organized their resource guides for mobile apps in a variety of ways. Dedicated guides to mobile apps are often organized according to academic discipline. However, some



Note: $n=97$

Figure 1. Association of Universities and Colleges of Canada (AUCC) library web sites that include app initiatives

universities organize their guides by other distinguishing features, such as mobile operating system, the type of service offered by the app, access fees (if any), or a combination of characteristics. The mobile app guides at McGill University and the University of Toronto are illustrative of the organization of apps by multiple means for the convenience of users (see Figures 2 and 3). Not all libraries with dedicated app guides have created guides that are multidisciplinary in nature. In some cases the only guide to mobile apps on a library's web site was a guide focused on the use of apps for research in a specific subject area. As might be expected from our review of the literature, and the longstanding use of mobile technology in the healthcare field, guides to apps in the health sciences were the most common of all discipline-specific app guides. Guides focusing on apps for business and management were the second most frequently found, closely followed by guides to education apps. Beyond guides dedicated to mobile apps, apps still appear on many academic library web sites within the pre-existing research guides for various disciplines. Within this set of guides, unsurprisingly, links to mobile apps were most prevalent once again in guides to health sciences, business, and education.

Our investigation of academic library web sites revealed a number of categories into which identified apps could be sorted. The four most frequently occurring categories were:

(1) reading apps (appearing in 69 per cent of sites);

(2) citation management apps (appearing in 50 per cent of sites);

(3) bibliographic database apps (appearing in 42 per cent of sites); and

(4) cloud-based apps (appearing in 28 per cent of sites).

The most commonly promoted type of app (69 per cent) found on AUCC library web sites were apps used for reading library subscription content, such as eBooks (e.g. eBrary), journal articles (e.g. BrowZine), and newspapers (e.g. PressReader). It is noteworthy that links to mobile apps for reading subscription content were found on

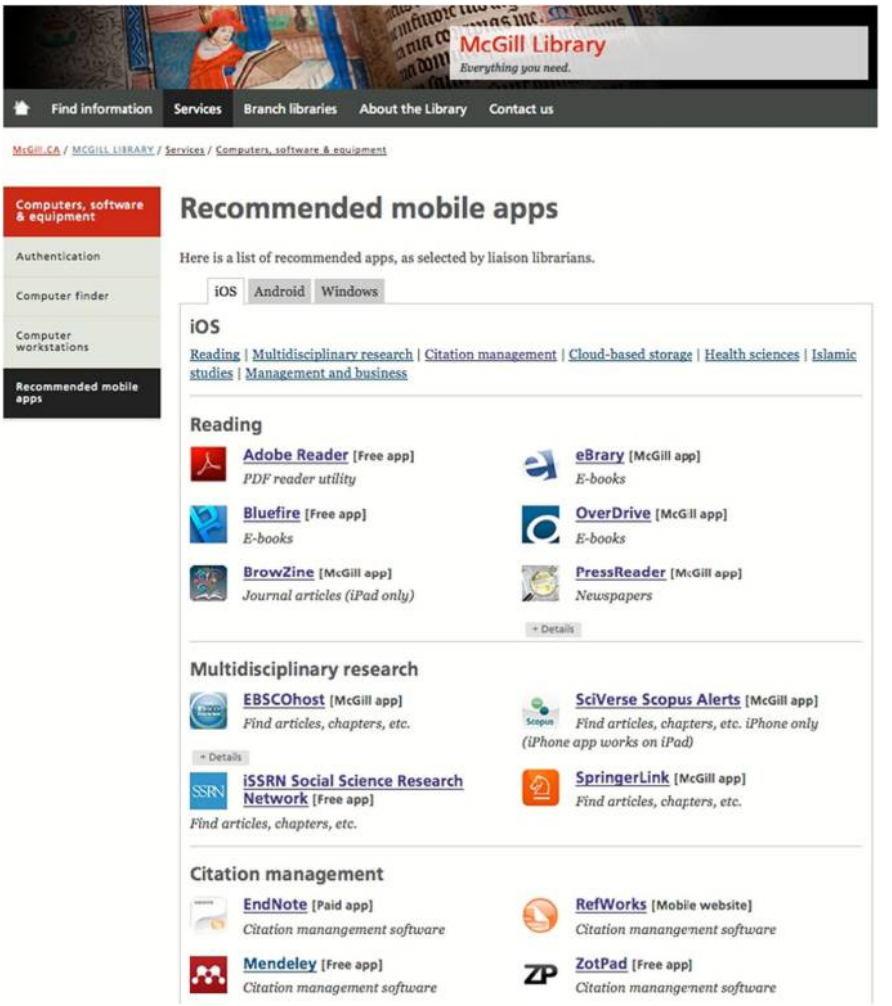
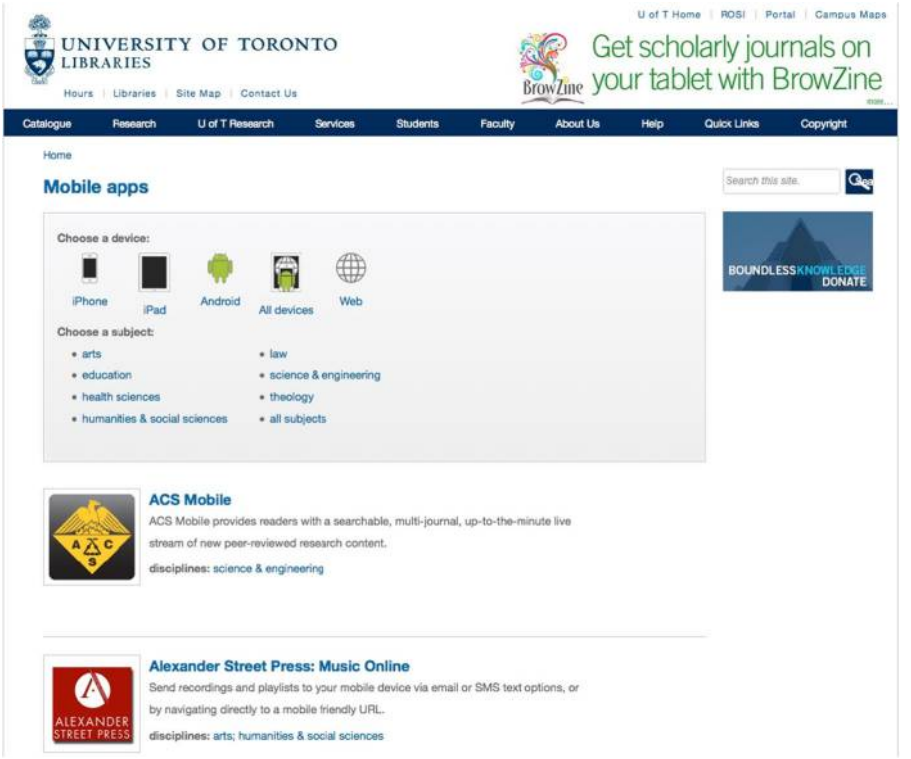


Figure 2.
McGill University mobile app guide

Source: www.mcgill.ca/library/services/computers/mobile

the majority of library web sites that referenced mobile apps. Citation management apps, such as EndNote, Mendeley, and ZotPad, were the second most referenced type of apps, and were present on 50 per cent of the web sites that listed apps. In other words, accessing and organizing online content is one of the key uses of mobile apps in a library context, and apps of this nature are found in the majority of library sites that reference mobile apps.

Many web sites included mobile apps used to search bibliographic databases, such as EBSCO, Springerlink, and Scopus. Vendors are increasingly developing mobile app versions of their web-based products, which they often include with institutional subscriptions to their platforms. College and university libraries are clearly beginning to promote these useful tools more widely to their constituencies, beginning, as one might expect, with apps for reading, searching, and citing materials, the lynchpins of



Source: http://onesearch.library.utoronto.ca/apps/

Figure 3.
University of Toronto mobile app guide

library research. Given that many of these apps come bundled with subscriptions that libraries are already paying for, promoting these apps to our faculty and students helps to ensure that libraries are getting the optimal value out of the resources that our budgets already support.

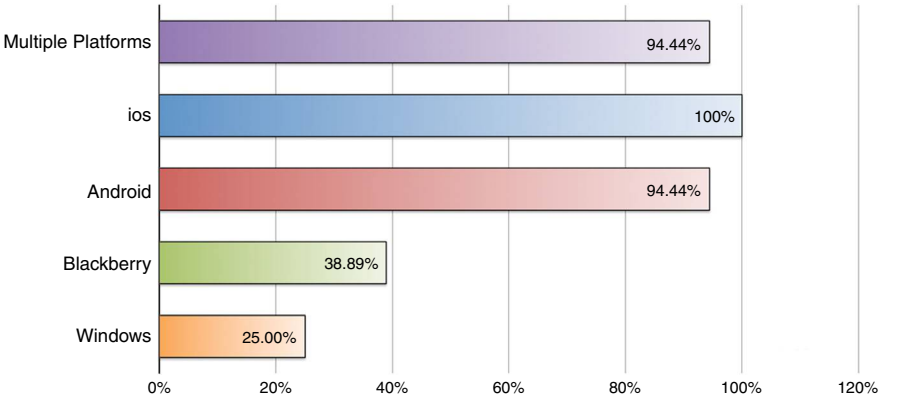
Additionally, apps which facilitate the storing of data online, "in the cloud", appeared in 28 per cent of surveyed sites, including Google Drive, DropBox, and Evernote. Cloud-based apps are of particular interest in that they allow users to leverage one of the most important advantages of mobile technology, the ability to work with content "on the go", and to move from device to device while working on a project. By storing data "in the cloud" students can free themselves of the tether of a wired connection, and truly take advantage of the "mobility" inherent in apps. Faculty can also take advantage of "the cloud" in their daily work, however, when dealing with the management of research data, faculty must also be made aware of the ethical, legal, and privacy concerns of storing research information on third-party servers, where they potentially lose some of the security and stability provided with locally managed and controlled data management systems.

When dealing with mobile technology it is very important for librarians to keep in mind the variety of devices, both smartphones and tablets, owned by our faculty and students, and the implications for the availability of apps across multiple proprietary operating systems. Apple's iPhone and iPad continue to be extremely popular, and

there are now literally dozens of smartphones and tablets that rely on Google's Android software. Many faculty and students own and use devices from Microsoft or Blackberry as well. In our investigation, among libraries promoting apps, 94 per cent do so for multiple operating systems (see Figure 4). Both iOS and Android were most common, with iOS apps being found in all cases where apps were promoted or discussed. When more than one operating system was promoted on a site, both IOS and Android were always present. A minority of sites referenced Blackberry or Windows apps, with Windows apps only appearing 25 per cent of the time. In many cases, certain mobile apps are simply not available on the Blackberry or Windows platform, accounting for the lack of representation of these platforms on academic library sites. Library vendors and other mobile app producers are clearly targeting the popular iOS and Android platforms for their development. It is nonetheless important that librarians keep in mind the variety of mobile platforms, and make an effort to include apps from the widest possible spectrum of platforms in order to cater to the broadest community of users.

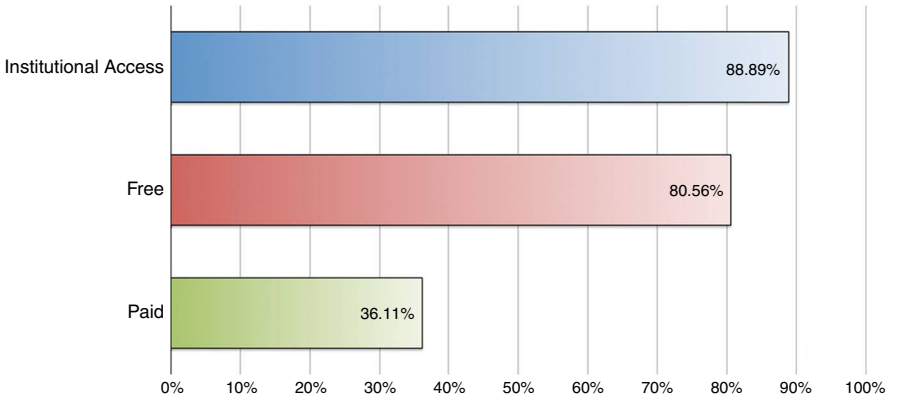
The majority of libraries promoting app content focus on apps that are freely available, or can be accessed for free through institutional authentication (see Figure 5). Apps requiring institutional access were the most popular, indicating that many librarians are aware of the need to promote apps that provide their students and faculty with convenient access to content that the library has already paid for. Relatively few libraries promote apps that must be purchased by the user. Only 36 per cent of libraries that made reference to mobile apps did so for fee-based apps. There are many useful apps that require payment from the user. There are, for example, a number of reference apps for the medical sciences and law that are of great use to the professionals in these fields, and to students studying to join the profession. Nevertheless, there is also a philosophical debate within the profession as to whether or not it is appropriate for libraries to promote resources that require user fees. This reticence to promote apps that require payment is reflected in the nature of the mobile apps promoted by most academic libraries.

In order to make certain that their communities are well aware of the mobile apps available to them to support their research and teaching, many libraries are also making sure to promote apps above and beyond their inclusion in subject and research



Note: $n=36$

Figure 4.
Percentage of mobile apps by operating system in library web sites with apps



Note: $n=36$

Figure 5.
Percentage of mobile apps by access types in library web sites with apps

guides. Through banner advertisements at the top of their web sites, on public display screens, and mentions on social media, libraries are raising awareness of mobile apps that their users can utilize for their work, as well as promoting the libraries' guides to these resources (see banner advertisement in Figure 3). These advertising strategies help to bring mobile apps to the attention of faculty and students who would otherwise potentially be unaware of their existence and utility.

Conclusions

The results of this survey highlight trends with regard to this emerging service opportunity, help establish current best practices in the response of academic libraries to the emergence of mobile apps, and identify areas for potential future development. A review of the literature confirms that academic librarians are rapidly engaging with mobile apps and bringing them to the attention of their colleges and universities. This trend in academic libraries will likely continue as mobile technology develops in sophisticated design and functionality, and librarians increase awareness of these useful resources. With this proliferation of mobile devices, academic libraries have a responsibility to keep faculty and students informed about the many apps to enhance their research, teaching, and learning. New apps are being developed every day, many of which have been designed specifically for academic purposes. Many vendors include access to apps with subscriptions to their resources and services. However, these need to be promoted by libraries to make certain that faculty and students can take advantage of them.

Since technological literacy is an increasingly important aspect of information literacy, it is essential that librarians in academic institutions keep up-to-date with technological advances, in particular, those in mobile technology that our students and faculty will find useful for their work. As experts in information literacy, librarians are uniquely placed to assist faculty and students in navigating the vast repositories of apps available for mobile devices. Curating these apps and producing guides to their use and potential impact can be of great benefit to the researchers, instructors, and students at our institutions. Given the potential added value to providing access to collections, resources, services, and tools via mobile apps, and the relative ease with which apps can be collated into online guides for the benefit of our academic

communities, librarians would be well advised to invest the time to learn about these tools, and to bring them to the attention of faculty and students at their institutions.

It is worth noting that although mobile apps can be very useful in many contexts, and free users from the tether of a wired connection, they often lack the full functionality of their desktop counterparts. For example, students can quickly find a few articles on their research topic using a bibliographic database app like Ebsco or Scopus. However, one would likely not want to conduct a thorough literature review using one of these apps due to the relative difficulty of performing more advanced searches using a mobile app, and the complications of performing a comprehensive evaluation of search results on a small screen. Advancements in technology and design will continue to improve the functionality of mobile devices and apps, increasing their utility, and making them a more essential component of our day-to-day scholarly activities.

This investigation of the current state of the leveraging of mobile apps at Canadian academic libraries provides a snapshot of today's mobile environment, but this is only part of the story. There are several interesting avenues for potential future research to improve our understanding of how mobile apps are impacting the work of today's students and faculty. How does the Canadian academic context compare to other examples internationally? How are apps actually being used by students and faculty for their research, teaching, and learning? In what disciplines are mobile apps being used most frequently, and how are they being used within these subject areas? How might the advanced features of mobile apps open up new possibilities for innovative qualitative and quantitative research? These and other research question will continue to form the basis of an interesting area of inquiry for academic librarians worldwide. Mobile technology continues to be a rapidly evolving phenomenon, and academic librarians should be encouraged to keep their fingers on the pulse of the mobile environment, and to develop an understanding of how these technologies are impacting the scholarship and learning in our post-secondary institutions.

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About the authors

Robin Canuel is the Liaison Librarian for Psychology, Anthropology, and International Development Studies Programmes in the Humanities and Social Sciences Library at the McGill University. Robin received a Bachelor of Arts Degree from the McGill University in 2000, and a Master's in Library and Information Studies in 2002 also from the McGill University. Robin Canuel is the corresponding author and can be contacted at: robin.canuel@mcgill.ca

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 the Queen's University in 1999, a Master's Degree in English Language and Literature from the Wilfrid Laurier University in 2000, and a Master's Degree in Library and Information Studies in 2002 from the McGill University.