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Tablets as Powerful Tools for University Research: Teaching the Relevant Skills

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Abstract

The increasing popularity of tablet computers in recent years is beginning to transform the way that library users, and in particular postsecondary students and faculty, find and engage with digital content. In response to these changes, university librarians are tailoring information literacy instruction to highlight the advantages of these technologies to their constituencies and to ensure that their users understand the myriad issues involved in effectively leveraging these advantages to improve the efficiency and effectiveness of their research. Chapter 6 of Library Technology Reports *(vol. 48, no. 8) "Rethinking Reference and Instruction with Tablets" examines the creation of university library workshops developed to introduce students and faculty to these concepts, including mobile learning advantages, online connectivity issues, the process of finding and managing content with tablet devices, and the many new and innovative ways of searching for and manipulating digital information made possible by these new technologies.*

About the Authors

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Introduction

The teaching work of academic librarians today is focused primarily on ensuring that students become

information-literate lifelong learners. When discussing information literacy, librarians are essentially referring to the skill set needed to find, retrieve, analyze, and use information.[1] Technological literacy is an essential component of information literacy instruction for university faculty and students. The mobility and flexibility of modern devices and the ubiquity of high-speed wireless Internet access have changed information-seeking behavior and have altered the definition of *information-literate*; therefore, it is essential that academic librarians embrace the challenge of educating users about new methods of accessing information and the implications of these advances for research and lifelong learning. Librarians now deal with issues related to mobile technology on a daily basis, and this is transforming librarianship, the nature of our collections, and the services we provide.

Teaching users how to make use of mobile resources on their devices and how to leverage the advantages of tablet computers is an important aspect of our role as teachers and as advocates for an information-literate society. At McGill University, librarians have developed workshops designed to introduce students, faculty, and staff to the concept of mobile learning and the use of tablets for research. The workshops incorporate practical discussions of electronic formats and their advantages and disadvantages, the plethora of ways to access content and services using tablet computers, and some of the unique advantages of accessing material through handheld devices. There is a strong focus on enhancing the technological literacy of the audience, an important component of modern information literacy. The following sections will present the McGill Library's workshop experience as a case study of incorporating tablets in information literacy instruction.

Mobile Learning and Information Literacy

According to the Pew Internet & American Life Project, by 2020 mobile devices will be the primary means of connecting to the Internet for most users.[2] Moreover, Pew found that the percentage of American adults who own tablets almost doubled over the 2011 holiday season, from 10 percent to 19 percent, as did ownership of e-book readers.[3] Since university faculty and students are increasingly using mobile devices as a tool to connect to e-resources, academic libraries must take the initiative and be present in the mobile environment where users are doing their work. Librarians can play an increasingly important role by providing access to resources tailored to mobile devices and services guiding users to these resources.

Despite mobile technology's increasing importance in the lives of library users, librarians should also encourage equitable access to knowledge and the technology that facilitates access to that knowledge. For those library users who don't own personal mobile devices, borrowing an e-reader or an iPad from a library provides an opportunity to access this technology. For example, the McGill Library began lending Sony e-readers to clients at the beginning of 2010 and launched an iPad lending pilot project in early 2012.[4]

Given the increase in mobile technology use, a new concept has emerged over the last decade called *mobile learning*. There are many definitions of mobile learning, but Quinn describes it simply as "the intersection of mobile computing and e-learning."[5] Most recently, Savova and Garsia argued that the essence of mobile learning is "to meet learning objectives in ways that transcend geographical limitations and to pursue the use of technologies that best facilitate this aim."[6] In order to facilitate mobile learning, academic libraries are now giving increased attention to the development of mobile-specific Web presences[7] and to the development of subject guides focused on the ever-expanding variety of mobile resources and services.[8]

All of this activity in the mobile environment is changing the interaction of students and faculty with online information and the nature of the resources and services available to them. It is also initiating new types of questions at reference desks and changing the nature of the instructional requests coming to information literacy librarians in academic institutions. It was in reaction to these changes that librarians at McGill decided to create an information literacy workshop focused on emerging mobile technologies and their use in an academic context.

Developing a Workshop

The workshops at McGill incorporate a deliberate emphasis on the management of content in a mobile environment, either through downloading and organizing data using specific mobile applications or through managing material that remains forever "in the cloud." The management of intellectual property is also explored through discussions of the implications of digital rights management in a mobile context.

The first step was to develop a workshop specifically for librarians at McGill, as the number of reference and research questions regarding tablets and mobile learning were expected to increase along with growing use of mobile devices on campus. The workshops were then offered to students, faculty, and staff at McGill. The workshops were delivered by a public services librarian and a collection services librarian with considerable personal experience using mobile devices. This cross-departmental collaboration had the advantage of combining the technical expertise of the collections librarian and the information literacy and instruction experience of the public services

librarian. The following sections will describe the topics discussed with attendees at McGill's tablet-focused information literacy workshops and the importance of these issues to academic research and postsecondary education.

Connectivity

When discussing mobile technology, it is extremely important to make a clear distinction between devices with a mobile data plan and Wi-Fi–only devices. Mobile 3G or 4G data plans make the user independent and allow for Internet access virtually anywhere, anytime. However, data plans come with a cost for the user. Furthermore, the process of authenticating institutional credentials as a prerequisite to accessing licensed online content can be complicated when an academic user is connected to the Internet through a personal data connection rather than through an institutional connection. IP-based authentication through the use of VPNs (virtual private networks) becomes extremely complicated, and often practically impossible, primarily due to the complexities of configuring the device to access institutional VPNs. This limitation can be overcome through the use of Web-based authentication, such as authentication through a university proxy service, which allows faculty and students to easily access licensed scholarly content through their personal mobile devices. With Web-based authentication, any tablet with any type of Internet access and a mobile web browser is capable of accessing the wide variety of scholarly material that academic libraries license. With this licensed content no longer tethered to the university's physical location, access becomes truly "mobile." This extremely convenient access point for licensed content can increase the material's value to scholars and promote its use.

E-formats and DRM

The wide variety of electronic formats for text, audio, and video information can be a complicating factor in the use of mobile devices in an academic context, and these issues therefore constitute a particular focus of McGill Library's information literacy workshops. A common example used to introduce these issues comes from the world of music, where students and faculty alike are often familiar with the travails of moving digital content from one device to another. It makes a big difference to students, for example, if the audio recording that they need to listen to before the next class is streaming audio, which requires an active Internet connection, or an MP3 file that they can download and listen to on their music player while they commute to campus. Both appear in the McGill Library catalog as "e-Recorded Music" but represent a different type of resource.

Accessing text electronically through a tablet also presents its own challenges. PDF is the most popular format in which scholarly texts are published. This format's main advantage is that it mimics the look of the content in print by preserving its original formatting, graphs, and charts—and is therefore ideal for representing the content accurately. However, for that same reason, PDFs do not display well on a small screen because the standard PDF document is in fact a static image of text that cannot be dynamically resized to accommodate varying screen sizes. While it is possible to zoom in and out of a PDF image as a whole, the text will not adjust to fit the dimensions of a particular screen as more advanced reflowable formats do. When the text size is increased (or decreased) in a reflowable format document, it automatically readjusts to fit the screen. This feature seems trivial, but it is of vital importance to the reading experience on a small screen.

Academic publishers are increasingly aware of these issues and have begun to more frequently offer content in reflowable formats such as EPUB and PDF/A. However, the majority of online academic content is still published in PDF format, and it is important to find ways to improve its readability on mobile devices. One possible solution is to convert standard PDFs into e-reader-friendly formats using vendor-specific or independent applications before loading them on a portable device.[9]

Apart from file format, the use of many online materials can be limited by digital rights management (DRM) technology, an issue often confusing to students and faculty. DRM is a technology that is used to control what a user can do with digital content, no matter where the work is located, ostensibly to protect the copyright holders' intellectual property.[10] The workshops address the different types of DRM and the specific restrictions they can impose on the use of electronic materials—for example, length of access, number of simultaneous users, download capability, and compatibility with portable reading devices.

An important part of the workshop discussion is the controversy surrounding DRM. On the one hand, publishers and authors need to be compensated for their work, and many consider DRM to be the most effective antipiracy protection; on the other, DRM and licenses restrict the rights of owners of legally purchased e-books to resell or lend e-books—rights granted to the owner of a lawful copy of a copyrighted work by the first-sale doctrine.[11] For libraries this obstacle is particularly important, since it directly contradicts their raison d'être. Some types of DRM (like the Adobe DRM) support time-limited licenses, which allow libraries to lend e-books for a predetermined period of time. DRM also creates additional barriers to accessing information by increasing the level of technological knowledge required in order to download and transfer an e-book to a portable device.[12]

Accessing Content

Publishers, vendors, and even governments continue to expand the array of information accessible through Internet-capable handheld devices. In a university context in particular, academic libraries have been prioritizing the acquisition of electronic resources. Mobile technology provides a new and convenient means of accessing this wealth of information, but access is not without barriers and concerns. There was a time in collection development when the only distinction that librarians considered was whether an item was physical or electronic. Today, in order to assess the real value of our collections to users, particularly in a mobile context, librarians also need to answer the following questions:

- Is the electronic content downloadable for use offline, or does it require an active Internet connection at all times?
- Is it compatible with all operating systems?
- Is it specifically compatible with mobile devices? Which ones?
- What is the experience the user can expect when using this item on a mobile device?
- How will the presence of DRM affect the use of the item?

The answers to these questions, as much as the nature of the content, can ultimately determine whether library users will be willing to, or even able to, use libraries' collections. Another major access challenge derives from the inability of current library catalogs to distinguish between downloadable e-books and those that are available only online. Even the newest cataloging rules (i.e., RDA) do not make provision to identify items that can be downloaded.

Furthermore, librarians should be aware of the functions of specific apps devised by private developers with more resources, time, and technical expertise than libraries. They can also begin to mobilize unique content from library collections in order to add value to the resources, increase their accessibility, and more widely promote them.

When discussing access to content on tablets, the primary focus of the workshop presenters is explaining the various methods used in importing content onto a tablet. There are three primary means of accessing content through a tablet—direct online access, direct downloading, and downloading and transferring. Accessing material directly online involves simply searching, browsing, and viewing content while connected to the Internet via wireless or a mobile data plan. In this case, no files are transferred or stored permanently on the device.

The second access method is downloading content directly from the Internet and saving it on the device. This method allows for the particularly useful option of viewing the material offline at a later time, perhaps when no Internet connection is available.

Finally, some e-content must first be downloaded to a computer before being transferred to a tablet or other mobile device for viewing. This option has the advantage of later offline viewing, but none of the convenience of accessing the content while on the go.

Managing Content

The workshops developed at McGill incorporate a deliberate emphasis on the management of content in a mobile environment. Once online content is found in a format appropriate for a tablet, how does a user efficiently engage with that content and add value to it through note taking, highlighting, bookmarking, and the like? A number of apps allow for researchers to manage their e-content in this manner, be they e-book reader apps, PDF management apps, or vendor-specific apps tied to particular digital collections. When material is downloaded onto a device, the management and manipulation of that content within the apps becomes relatively simple. However, even when the content in question is accessible only online through an active Internet connection, applications are often available that allow users to manipulate the data using a personal account in order to mark up content with personalized additions which can be saved online for future reference and use (such as highlighting, annotating, and bookmarking).

New Ways of Searching for Information

It is important for information literacy workshops dealing with mobile technology to highlight the ways in which this technology is changing the way we search for and engage with digital content. With a tablet in hand, researchers have access not only to an Internet connection, but also to a variety of hardware that they can use in their research: a microphone, a camera, location-aware functionality, and a screen capable of displaying not only text, but also still images and video information. Although it is not practical to provide attendees with in-depth live demonstrations of these search technologies in a relatively short workshop, it is extremely important for researchers to be made aware of these technological developments as they have the potential to enhance their search for, and interaction with, digital information.

Voice Search

With the proliferation of modern smartphones, perhaps one of the more obvious advantages to accessing information with a handheld device is the ability to

enter search queries using a phone or tablet's built-in microphone. Google's Android operating system offered one of the first examples of this capability, which was explicitly designed into a device's search functionality. Google introduced a microphone icon on the virtual keyboard for all mobile devices using Android, a feature which was later added to Google's "traditional" home page. This icon allows users to easily enter search queries with their voice, which the OS translates into text. Its frequent appearance also promotes the notion of voice search to users any time that they move to enter text by typing it in with the on-screen keyboard.

A tablet's built-in microphone can be used for more than simply text input. Many mobile applications allow for the entry of a variety of audio inputs for research purposes. Some apps allow users to identify a song playing nearby simply by capturing the song with the handheld device's microphone. In a more academic context, applications have been developed to identify bird songs using similar functionality.[13] In the future, as voice recognition software improves, it will add further convenience to the searching process and contribute to research efficiency, greatly impacting the work of librarians and the search experiences of our users.

Visual Search

As with a microphone's role in enabling voice and audio inputs to facilitate searching, a modern tablet's built-in camera allows students and researchers to use visual information as a search input as well. Applications such as Google Goggles enable a user to perform a search for information related to an image and to the wide variety of information contained within an image. Goggle's technology can both match an image to any online reproductions of that same image, but it also (and perhaps more importantly) is able to scan the contents of an image to find information relevant to that content. For example, Goggles can not only recognize a particular painting of Toronto's CN Tower and display a listing of any online reproductions of that painting, but it is also able to recognize that the subject of that painting is the CN Tower and provide the searcher with links to information about the tower and the city of Toronto.

Context-Specific Search Results

In addition to allowing users to take advantage of new search inputs, mobile devices permit search results to be contextualized to the searcher's location and environment. GPS technology (built in on most modern tablets) enables a variety of applications to add a geographic dimension to the presentation of the information being searched for. By knowing a searcher's current location, a tablet or other mobile device can provide search results that account for this dimension of the user's experience.

For example, geolocation information could be used by a search application to translate a search for *battlefield* into a map of local historic war sites or to provide other contextual historical data relevant to a search entered from a particular location. In a library-specific context, WorldCat's mobile app allows searchers to identify the libraries nearest to their current location that hold the material retrieved by searching the catalog. In addition to this, many university library systems with multiple branches offer location-based services, such as incorporating the ability for students to be directed to the nearest available computer labs with unoccupied workstations or to the closest available study spaces on campus.

Barcode and QR Code Scanning

Another use of a tablet's on-board camera is to visually scan the user's surrounding environment for specific visual cues designed to lead searchers to more information about their environment or physical items located therein. The most prevalent of these cues is the now somewhat ubiquitous barcode. A variety of apps, for example, allow a tablet's camera to scan the barcode of a book in order to provide the tablet user with more information about the title. Abstracts, reviews, author biographies, and additional metadata about a title can be placed at the tablet user's fingertips simply by pointing the tablet's camera at the barcode on its back cover.

In addition to the barcodes already found on many products, the rise of digital scanning apps has led to an increase in the use of Quick Response (QR) codes. QR codes combine the functionality of barcodes with an ease of creation that puts their use within the grasp of nonprofit institutions, including libraries. QR codes have begun appearing regularly in print advertisements, in billboards, and even on television programs to encourage viewers to access additional information about a product, service, or program by simply scanning the code. However, while these codes are frequently seen, many tablet and smartphone owners are not familiar with the purpose and use of QR codes, and academic librarians are ideally positioned to raise awareness of the usefulness of this device for clients' information-seeking tasks.

Augmented Reality

QR codes are sometimes referred to as "marked augmented reality," meaning that the codes allow the code-maker to augment the physical reality of a searcher by "marking" items in the real world in order to facilitate the sharing of digital information about those real-world objects. However, perhaps the most promising development in enhancing the connection between digital information and the real world it describes is the

advent of "markerless" augmented reality.

With true "augmented reality" applications, the scanning and image recognition functionality of an app like Google Goggles is combined with the real-time information-retrieval functions of QR code scanning to provide a digitally augmented view of the user's surroundings without the need for those surroundings to be "marked" ahead of time with pre-affixed artificial visual tags. With an augmented reality application, a tablet or smartphone's camera simply recognizes the features of the world around the user and augments that view with additional digital information. Combined with contextual location data from GPS, this can provide the user with a powerful tool for accessing contextual data in real time. Hold up a tablet at a street corner, for instance, and an augmented reality app can superimpose images onto the tablet's viewfinder to indicate where the nearest public transit stops are located, and in addition display timetables indicating when the next bus is scheduled to arrive at each stop. By superimposing this digital information on top of a live image of the real world, the usefulness of the data is greatly enhanced through added context and immediacy.

In a scholarly context, augmented reality apps have been used to superimpose images of historical photographs over live views of modern locations or to indicate the placement of advancing armies from past battles onto the modern scene of these conflicts. Libraries could use augmented reality applications to create guided tours of their facilities, and some universities are already using "AR" for campus guides to provide newcomers to the school with information about local buildings and their surroundings.

Conclusions

Given the proliferation of tablet computing and the unique new searching functionality that mobile technology puts at users' fingertips, it is important for librarians to educate their constituencies in the use of these technologies and the implications for research. While wireless mobile devices provide searchers with a constant and convenient connection to a world of digital information, users need to be made aware of the issues surrounding connectivity and the limits inherent in a mobile Internet connection. Similarly, the digital format of the material takes on new implications in a mobile environment, complicating a user's access to some content. Copyright protection technology such as DRM is a particular barrier to accessing content. This is not fully understood by many mobile technology users. Librarians at McGill University recognize the importance of these issues, and this recognition led to the development of the workshop described here.

In 2011, Cody Hansen stated, "If I have one prediction about the future of mobile computing, it's this: The future of mobile is the future of computing."[14] Technological advances are beginning to fundamentally change the way that library users interact with digital information, and it is therefore essential that librarians become engaged with the relevant technology and leverage their role as teachers in order to help ensure their continued relevance in the lives of clients in the twenty-first century. It is likely that our digital experience in the future will be one of simply moving from screen to screen to screen, with little or no difference between one's laptop, tablet, TV, desktop computer, and cell phone, beyond simply size. In this context, the ubiquity and mobility of data quickly become a given, and workshops such as those held today at McGill will no longer be seen as covering a specialized niche topic, but will simply be a typical component of traditional information literacy instruction.

Notes

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