

APPS FOR SCHOLARLY RESEARCH: IMPLICATIONS FOR DISCOVERY AND LEARNING

ROBIN CANUEL AND CHAD CRICHTON

INTRODUCTION

Many university faculty and students are already using mobile applications (apps) in their day-to-day lives. From personal banking, to news and social media applications, people use apps on their phones and tablets in a wide variety of contexts. At the same time, many discipline-specific apps are now available to researchers with features relevant to their research activities. These features include tools for collecting research data, analyzing data, and accessing reference and bibliographic materials. Libraries, library vendors, and other content providers are increasingly producing apps to make accessing scholarly information quicker and easier. Discipline specialists, meanwhile, are creating apps tailored to particular research needs, including the capturing of audio, video and photographic data. This paper will describe a number of specific apps that are useful for research and teaching, and which bring to bear the unique technological features commonly found in today's mobile devices. Discussion will also focus on the functionality and use of discipline-specific apps, which can be effectively used for academic research beyond the walls of the classroom. Finally, implications and opportunities for teaching and research will be explored.

THE MOBILE EXPLOSION AND APPS

There continues to be steady growth in mobile technology ownership. According to the Pew Internet & American Life Project (2013), 87% of American adults own a cell phone, and 45% of American adults now have a smartphone, which is significant because these devices allow for the downloading of mobile apps. Pew also reported that as of January 2013, 26% of American adults own an e-book reader, and 31% own a tablet computer, which are also capable of downloading apps. In the educational context, the Educause Center for Applied Research (ECAR) conducts an annual study to learn how undergraduate students use information

technology. ECAR recently reported that 62% of undergraduate students from 184 U.S. based institutions owned a smartphone, 15% owned a tablet, and 12% owned an e-reader (Dahlstrom, 2012). The annual Horizon Report from the New Media Consortium and EDUCAUSE also tracks technology trends in education, and strives to help those who work in education to understand emerging technologies, and their impact on teaching, learning, and research. The authors of this year's Horizon report identified tablet computing as having a major impact in the near-term (next 12 months) and pointed out that "equipped with WiFi and cellular network connectivity, high-resolution screens, and with a wealth of mobile apps available, tablets are proving to be powerful tools for learning inside and outside of the classroom" (Johnson et al., 2013). With all of these devices in the hands of our users, it's important that librarians familiarize themselves with these mobile technologies, and all of the available apps that we can leverage for teaching and research purposes, as well as to facilitate the use of library electronic resources.

There has been an impressive recent proliferation of apps available for downloading on mobile devices, such as smartphones and tablets. According to recent statistics, both the Apple App Store and the Google Play Store have approximately 800,000 apps available to download (Apple, 2013; Paul, 2013). Many of the apps available in app stores have library uses, and it is therefore important that librarians keep abreast of new apps which are potentially useful for our clientele, as they become available. Studies show that library users are interested in taking advantage of apps for accessing library materials. In a recent survey of Americans' attitudes and expectations with regard to public libraries, Zickuhr (2013) and colleagues reported that 35% of those surveyed would "very likely" use app-based access to library materials and programs, and another 28% reported they would be "somewhat likely" to do so. In a recent EDUCAUSE report entitled *Student Preferences for Mobile App Usage*, the authors point out that students prefer native apps for most mobile activities, over their mobile web

browser (Bowen & Pistilli, 2012). With this increase in app use, librarians must ensure that there is instruction available for their community on the variety of applications which can be used for research and learning. Many apps take advantage of the unique technological features available in modern mobile devices, such as GPS, compasses, microphones, and cameras. These features, among others, are creating new opportunities for engaging in research and learning that were not previously possible. Given these advances, technological literacy is an important aspect of information literacy, and it is essential that librarians incorporate information about mobile devices and apps in their instruction programs (Canuel & Crichton, 2012). In order to do this effectively, it is useful for librarians to understand how people search for, access, evaluate, and use information differently in a mobile environment, and how a level of mobile information literacy is necessary to fully function in today's modern information landscape (Walsh, 2012).

MOBILE APPLICATIONS FOR ACADEMIC RESEARCH

There are a wide variety of mobile applications that can be incorporated into the teaching and research activities of today's scholars. Very rapidly over the last several years, users of mobile technology have transitioned from not only accessing information with their devices, but to actually working directly with content and creating new content with mobile technology. Researchers can also collect research data using apps on smartphones and tablets in many ways, such as recording interviews, writing research notes, and taking photographs. Apps fall into a variety of categories according to functionality, but for the purposes of this paper three categories of apps will be described: productivity apps, ready reference apps, and discipline-specific specialized apps.

Productivity Apps

University students and researchers are using many productivity apps to complete their work. Librarians should be aware of these useful tools, and keep their clients informed of the latest innovations. Productivity apps include apps for reading and annotating text materials, citation management, cloud based storage, and apps for writing and note taking. There are many apps available for reading, annotating and organizing PDFs and EPUBs, such as the freely available *Adobe Reader* or *Bluefire Reader* apps, and paid apps like *Good Reader*. Library content providers also produce proprietary apps that allow users to easily access subscription-based content from their collections, such as the *Ebrary* and *OverDrive* apps. Citation management tools such as *Mendeley Reference Manager*, *Sente Reference Manager*, and *EndNote* also have specialized apps available for download in app stores. These apps allow you to synchronize your citation libraries with your laptop and desktop computers, access your citations and articles remotely, add references to your libraries, and edit and share your citations on the go. Apps for working on text or spreadsheet documents and presentation files are also becoming increasingly functional. In addition to the office programs for Apple computers (*Pages*, *Numbers*, & *Keynote*) being available as individual apps for

Apple devices, *Documents to Go* is another alternative for apple users, and *Polaris Office* and *Kingsoft Office* are useful office applications for those using Android devices. It is also now becoming commonplace to access your documents from wherever you are using free cloud based storage apps on mobile devices, such as *Dropbox*, *Evernote*, and *Google Drive*.

Ready Reference Apps

Remotely accessing academic reference materials is another powerful use of mobile technology for researchers. Specialized apps which allow users to search large bibliographic databases and access online collections easily and efficiently on mobile devices have begun to proliferate. Bibliographic apps from vendors like EBSCO, Springer, and ScienceDirect, allow users to easily search the contents of their bibliographic databases, and with proper institutional subscriptions can often link to the full text of citations. Many major encyclopedias and dictionaries are also available as mobile apps, such as the apps for *Encyclopedia Britannica* and for the *Oxford English Dictionary*, which allow users to easily search these canonical reference sources wherever and whenever they need them. While some of these reference apps allow for the downloading of the content being searched on to a device, it is important to keep in mind that many reference apps will require an active internet connection in order to search and display the texts in question. Third party applications are also beginning to be developed which allow library users to more easily access the wide variety of online materials that libraries purchase for their communities. *BrowZine*, for example, produced by the software company Third Iron, allows users to organize their favorite electronic journals in a virtual bookshelf, and to receive automatic notifications when new content is published. In addition, many subject specific reference apps are available, such as evidence-based tools for medicine, legal reference apps for law, and patent searching applications for engineers, to name just a few examples.

Discipline-Specific Specialized Apps

The customizable nature of mobile apps allows for the creation of apps specifically designed to account for the research needs of scholars in specific disciplines, and to facilitate the use of technological features that are unique to mobile devices for research purposes. For example, the camera on a mobile device can be used to capture images in the field. Captured images can also be used with an app such as *Google Goggles* to perform online searches for information related to the content of the image. Similarly, online images can be geo-tagged, allowing scholars to access contextual visual data related to a real-world site. These technological features of mobile devices allow researchers to interact with not only text material but also the real world around them in new and interesting ways that take in to account the needs of their discipline. Even when not designed with a specific disciplinary need in mind, apps with specific functionality can also be useful to researchers. Linguists, for example, could use voice-recording apps to help preserve dying languages. More and more, however, developers are designing mobile apps

specifically intended to meet the research needs of scholars working in specific fields.

Today, some apps are designed from the ground up to account for the needs of scholars in a particular discipline. For example, an archeologist can take advantage of *GPS Logger*, a survey tool for archeologists that uses the GPS abilities of a mobile device to map an archeological site and describe and tag the location of any finds. Historians might use an augmented reality app such as *Layar* to access historical photos of a city that they are researching, allowing them to see, superimposed on their screen, what the scene before them looked like 100 years ago. Biologists can use apps such as *iBird Pro* to assist in species identification by comparing recorded bird song with observations in the field, and making their own recordings of visual and audio data in the field for later analysis. Meanwhile an astronomer could use a GPS-enabled app such as *Night Sky* to help track the location of galaxies and other celestial bodies in the cosmos. In this still burgeoning area of development there is great potential for the creation of new discipline-specific applications that fulfill research needs in ways that even the subject experts themselves may not have considered. Librarians with responsibilities for specific disciplines need to be on the lookout for new apps as they emerge in a variety of fields, and to communicate periodically with faculty in their disciplines to ensure that they understand the types of research that their colleagues are engaged in, and the ways in which mobile technology might be used to support their research.

OPPORTUNITIES FOR RESEARCH

Mobile technology allows researchers to continue their work outside of the lab, removed from the institutional infrastructure of a wired connection to the vast resources of the Internet. Reference resources and other sources of data are available constantly at a researcher's fingertips, and well-designed apps allow easy access to such support, even allowing for the downloading of data on to a device, making it accessible even in remote locations, which are often the sites of field work. Beyond facilitating access to already available research data, mobile apps such as those described above also allow researchers to more easily record, collate, and analyze new data collected by scholars in a wide variety of formats. As smartphones, tablets and new forms of mobile technology emerge with new and improved functionality, app developers will continue to create unique tools to assist researchers in using these devices to fulfill the research needs specific to their fields of study.

OPPORTUNITIES FOR TEACHING

One of the most essential teaching roles for academic librarians when it comes to the use of mobile technology in research and learning is building awareness of the potential of these technologies, and to promote their use to students and faculty. Workshops continue to be developed to teach students and professors about finding mobile apps, installing and using them, and some of the unique implications of working with apps in a mobile environment. Librarians have also developed guides

to mobile apps, and finding aides designed to help researchers to navigate the hundreds of thousands of apps available for use.

Beyond teaching the fundamentals of mobile technology, librarians can also encourage the adoption of mobile technology by faculty to take their learning activities outside of the classroom. Mobile technology is still a new and exciting area of development for scholarly work, and new apps are being developed every day, many of which can be used for academic purposes. As with research field work, mobile devices allow for real-world educational opportunities in which students are immersed in the types of data collection and analysis as their professors. Even in an early stage of development, research apps that may not yet provide the full range of functionality needed for an experienced scholar engaged in field research can be a revelation to students. These apps can expose them more explicitly to the types of work that their instructors engage in, at a level that students can understand and appreciate. 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, and to ensure that they are able to find and utilize the best apps for their work and education.

CONCLUSION

As part of the academic librarian's role in supporting information literacy development, keeping researchers informed about current trends in technology, such as the emergence of mobile applications, is increasingly essential. Learning about and promoting mobile apps is one way in which librarians can provide faculty and students with enhanced access to scholarly resources and additional research support. Libraries must also tackle a number of challenges with regard to mobile apps, from ensuring that apps can properly connect to subscription-based content, to determining how to best facilitate the use of paid apps by researchers and students, and even making purchase decisions on sometimes costly vendor-supplied apps. Due to the wide variety of issues surrounding mobile apps, touching on the responsibilities of a variety of library departments (reference, acquisitions, circulation and access, and technical services) some university libraries have taken to creating cross-departmental app committees charged specifically with discussing, evaluating, selecting, purchasing, implementing and promoting mobile apps at their institutions. Placed as we are at the crossroads between research and teaching, it is important that librarians gain an understanding of the current uses of mobile applications for research and learning, and promote and help to facilitate the future development of these tools across a variety of subject areas.

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