Cross Platform Apps to Enhance Teaching and Learning

In the 21st century, the role of the library and the librarian is continually changing to incorporate the use of mobile technologies. As the mobile computing world grows at an exponential pace, it can be challenging to keep up with all of the applications or "apps" that mobile devices use to run programs. It can be useful for librarians to have a working knowledge of the different mobile device platforms and have a core set of educational apps that they can recommend to patrons to enhance teaching and learning. This paper will give an overview of how mobile devices work and examples of apps that can be used to assist with the research process.

A mobile device is a light (2lb or less) handheld computer which has a touch screen. Some mobile devices have optional keyboards that can be connected via Bluetooth technology. Examples of mobile devices are tablet computers like the iPad or Google Nexus; smartphones like the iPhone and Samsung Galaxy; and eReaders, like the Kindle Fire and Nook. Most mobile devices today have internet capability. As of May 2013, according the Pew Research Center, 56% of American adults have a smartphone, 34% of American adults own a tablet computer, and 26% of American adults own an eReader (Brenner, 2013). These numbers will only continue to grow over the coming months. While all mobile devices are considered portable mini-computers, the ways they are used and function depends upon their operating system.

Mobile Device Operating Systems

Mobile devices use operating systems to function. Two of the major operating systems which mobile devices run on are the Apple iOS for iPads, iPhones, and iPod Touches and the Android Operating system which runs on most other major brand smartphones and tablet computers. Additionally, the Microsoft Corporation's Windows Mobile operating system has gradually been gaining popularity, although they own a very small portion of the market and will not be discussed in detail here.

The Android operating system is owned by Google and the iOS is owned by Apple. Both are primarily designed for smartphones and tablet computers. Unlike the Apple iOS, which is a closed system where apps must be approved by Apple before they are made readily available, Android is open-source which allows the Android software and apps to be freely modified by developers and distributors. Android apps are primarily sold through the Google Play Store (https://play.google.com/store). Apple apps are sold through the iTunes App Store for iOS Devices

(https://itunes.apple.com/us/genre/ios/id36?mt=8). According to a recent study of user reviews and rankings, iOS apps rate slightly higher in quality than Android apps. Both app stores claim to have over 800,000 third party apps. (McCracken, 2013).

It is not readily possible to gain access to the back end file structure of an iOS device such as an iPad or iPhone. Therefore, less customization is possible and the environment in which you download apps is more controlled. With an Android device, you do have access to the back end of the device and greater customization is available both by the device manufacturer and by the consumer. Ultimately, it is up to the buyer to decide which type of device will best suit his or her needs.

In addition to the iOS and Android smartphone and tablet computers, there is also a market of eReader tablets, such as the Kindle Fire and Nook Tablet. These eReader tablets function similarly to Android tablet computers and actually run on an Android operating system. Originally, it was not readily possible to use the Google Play store to download apps like you would with other mobile devices running the Android operating system. Instead, Amazon.com (Kindle Fire manufacturer) and Barnes and Noble (Nook Tablet manufacturer) set up the devices so that the primary tools for downloading apps were their own websites. However, in May 2013, Barnes and Noble released a software update for Nook HD and HD+ tablets that allow these devices to directly access the Google Play store and get the full range of Android apps (McCracken, 2013). Kindle Fire tablets still require various "work-arounds" to use Google Play (Nield, 2013).

File Types Used in Scholarly Research

With all of the various mobile devices available on the market, it can be challenging to pick the right device. Even after you find the right device, integrating it into your everyday workflow can seem almost impossible! One must also take into consideration that libraries and educational institutions are increasingly producing scholarly content that needs to be available to users on all platforms. We need to find the right file formats and applications to make the content that we produce accessible across all operating system platforms. Two of the major file types which scholarly content is being produced in today are PDF files and EPUB eBook files.

PDF files have long been a standard file format for creating and distributing scholarly content. Most library databases like Academic Search and JSTOR rely on the PDF file format to store digitized magazine and journal articles. Also, many academic libraries are increasingly creating Digital Commons or institutional repositories where faculty publications are stored online - primarily as PDF files. However the traditional PDF file has limitations on

mobile devices. For instance, increasing text size means increasing the size of the entire document and it is not possible to change font style, format the display of tables and images, etc. To get a smoother reading experience on a mobile device, eBook file formats are needed.

The standard eBook file format is EPUB. These files have a .EPUB file extension and are becoming increasingly more commonplace online. The EPUB file format has a more fluid design that allows the user to change text size and style and allows the EPUB file creator more options for displaying images and tables. EPUB files are the default eBook file format for most of the major eReaders on the market, including the Barnes & Noble Nook and Sony eReader. Additionally, most tablet computers and smartphones have a variety of applications which can open and store EPUB files. The only major eReader on the market not to use the EPUB file format is the Amazon Kindle. Amazon uses proprietary file types although it is possible to read other files formats such as PDFs on most Amazon Kindle eReaders.

To reach their users, libraries that create scholarly digital content through Digital Commons and institutional repositories must do so in a variety of file formats like PDF and EPUB. An example of an academic library which has embraced this practice is the Digital Commons@RIC (http://digitalcommons.ric.edu/). Digital Commons@RIC is Rhode Island College's institutional repository. Recently an alumna of the college worked with the library to create a specialized publication called *A History of Named Places and Architectural Development: Rhode Island College, 1958-2012* (Warburton, 2012). This work, which was originally a print publication, has been digitized in a variety of file formats which are available for download on Digital Commons@RIC. The available file formats include .EPUB (the standard eBook file format), .MOBI (for Amazon Kindle eReaders), and a PDF version. By making many of its works available in a multitude of file formats, Digital Commons@RIC is supporting all of the different devices and which its users might wish to access scholarly content on.

Cross Platform Apps to Enhance Teaching and Learning

Now that we have looked at the different mobile device operating systems and the types of files they support, let us look at some examples of cross-platform apps that can run on both the Android and iOS operating systems and support reading and storing PDF and EPUB files. First it is important to define what is meant by the term app. An app is a software application that you can use online or on a mobile device or both. Many of the apps discussed below can be downloaded from the Google Play or iTunes App Store and accessed from a web browser on your desktop or laptop computer. Before you actually look at specific apps, you might want to ask yourself some of the following questions: 1. What function or task would you like your mobile device to perform? (Note taking, storing

PDF files, browsing the web, etc.) 2. Are you willing to pay for more advanced features? (While there are thousands of free apps, some have a pro version that will cost money and some apps must be purchased before you download them) The prices of pay apps generally range from $0.99 to $9.99 and occasionally higher.

Next try visiting either the Google Play Store or iTunes App Store (depending on your mobile device). You can also do a quick Google search for the type of app you are looking for such as "PDF reader apps" and look for web articles and videos from websites like CNET or TechCrunch. Additionally, there are a growing number of app search engines such as Quixey.com (https://www.quixey.com) that can help you sort through the thousands of apps out there (Enis, 2013, p. 36). It is important to remember that some apps work just on the Android platform or just on iOS platform. Also, if you are going to use the app to store documents and information, you will want to know if there is a web version of the app will open up on your desktop or laptop computer.

Below is a list of cross-platform apps that will run on both the iOS and Android platforms. Many are also usable through a desktop or laptop computer's web browser.

Examples of Cloud Storage Apps

Many cross platform apps utilize cloud storage. With cloud storage, you do not save your documents and notes directly on your device or computer. Rather, you are storing information through the app on third party data servers which you can access anywhere you have an Internet connection (Strickland, n.d.).

Dropbox (https://www.dropbox.com/): a cloud based file hosting service that allows for simultaneous synchronization across devices and platforms. It also allows for file sharing and can be installed on MAC and PC desktop computers. Similar products include CloudApp and Skydrive - but Dropbox is one of the most popular and easiest to use.

Google Drive (https://drive.google.com/): similar to Dropbox except that it utilizes Google's free, web-based Google Docs Office Suite to create content. It is possible to upload standard Microsoft Office and other file types as well to this system.

Examples of PDF Reader and annotation apps

Adobe Reader (http://get.adobe.com/reader/): This standard application for opening PDF files now has the ability to store your PDF files online and access them from any computer, laptop, or mobile device. Also includes limited annotation tools such as marker, strikethrough, pencil and pen, comment boxes, and e-signature features.

ezPDF: Designed for use on mobile devices only. The Pro version is a pay app for $3.99 and you get advanced features like connecting into Google Drive and Dropbox. There are more annotation tools, including the ability to draw shapes and upload a photo and overlay it onto an existing PDF file.

Examples of eBook Reader and storage Apps

While Amazon.com and Barnes & Noble both have apps for their own eReaders and eBooks that can be used across all tablet and smartphone platforms, there are additional apps that will work for EPUB and PDF eBooks.

Bluefire Reader (http://www.bluefirereader.com/bluefire-reader.html): Supports EPUB and PDF files and Adobe DRM protected eBooks that you purchase or download from your public library. It can even be installed on a Kindle Fire.

Google Play Books (https://play.google.com/store/books?hl=en): Google has updated its Play Books eReader apps for iOS and Android platforms to include support for EPUB and PDF files from outside the Play Store. This new feature allows users to either upload their own eBooks (not only those purchased through Google Play Books) via the Google Play Books website (http://play.google.com/books/uploads) or import them from their Google Drive storage. You can store up to 1000 files for free that are under 50MB each (Cipriani, 2013).

Examples of Note-taking Apps

Evernote (https://evernote.com/): is a suite of software and services designed for note-taking and archiving. A "note" can be a piece of formatted text, a full webpage or webpage excerpt, a photograph, or a voice memo. Notes can also have file attachments, like video content. Notes can be sorted into folders, then tagged, annotated, edited, given comments, searched and exported as part of a notebook. In addition to being a useful app, there is also an Evernote Web Clipper tool which can be installed as an add-on to all major web browsers including Firefox, Chrome, and Internet Explorer.

Skitch (https://evernote.com/skitch/): from the makers of Evernote, it allows you to draw and annotate images including photos and screenshots, PDF files, notes created in the Evernote app, and more. Both Skitch and Evernote connect into your Facebook and Twitter accounts and you can easily share your creations with others via web links. Both Evernote and Skitch are considered part of the Evernote Software Suite. The free version of this suite allows users a 60MB per month upload allowance. There is a premium version of the Evernote Suite which increases this monthly allotment and gives users advanced note-taking and annotation features.

File Managers and App Organization

The purpose of file explorers and file managers for mobile devices is to either provide access to or simulate access to the back end of a mobile device. In iOS devices, there is a "lack of a user-accessible file system" (Tabini, 2013) while in Android devices, users can access the back end file systems on their device and even on a desktop or laptop PC (Zukerman, 2012). Both the iTunes App Store for iOS devices and the Google Play Store have hundreds of choices. Another interesting option for app organization, which is not exactly a file manager, is Hojoki.

Hojoki (https://classic.hojoki.com/): is marketed as a team-messaging and task management system. It is essentially an RSS feed for many of the cloud based storage apps you may have loaded on your devices. Available for both iOS and Android platforms, it integrates with Dropbox, Google Drive, Evernote, and more. It sends you notifications and updates every time a document stored in one of these systems is edited, either by yourself or by a collaborator, making it possible to track changes in a collaborative work environment.

Conclusion

The above lists of apps are merely a starting point to use when searching for tools to improve the research workflow for yourself and your users. Libraries and librarians are continually working towards providing easier access to scholarly content which meet users at their point of need. To do this, it is important to have a general understanding of the mobile device platforms being used and popular file types through which scholarly information is electronically communicated. Additionally, having a base collection of cross platform apps at your fingertips can be useful when helping patrons access, store, and take notes during the research process.

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