Chapter 1

App Literacy for Librarians

Abstract

Library Technology Reports *(vol. 50, no. 8), "Selecting and Evaluating the Best Mobile Apps for Library Services," begins with a discussion of why app literacy is important for librarians and goes on to cover the various aspects of it. It's important to understand these basics when evaluating mobile apps for library use. App literacy includes knowledge of mobile operating systems, ecosystems, core apps, natural user interfaces, mobile device capabilities, accessibility features, and jailbreaking. Also included is a glossary of terms.*

Introduction

Mobile apps are everywhere, and their number is increasing every day. At the same time, many libraries are getting iPads and other tablets, and users are coming to the library with their smartphones and mobile devices.

The 2014 *NMC Horizon Report* (library edition) identifies mobile apps as an important development in technology for academic libraries. It also identifies as a key challenge the task of rethinking the role and skills of academic librarians.[1] In the higher education edition of the same report, the shift from students as consumers to students as creators is identified as a key trend.[2] Also in 2014, the American Library Association announced that it supports makerspaces in libraries.[3] The makerspace movement encompasses not only 3-D printing, but all kinds of content creation—everything from supporting local writers to offering digital media labs for creating multimedia content. Libraries are becoming more integrated into their communities by offering services like these.

When the iPhone and iPad were first announced, many saw them mainly as media-consumption devices. However, that has clearly changed with the proliferation of many quality apps that enable content creation. Content creation with iPads is now being routinely integrated into K–12 education and is becoming part of today's digital literacy skill set.[4] That's why mobile app literacy is important for librarians—these apps can help us facilitate content creation by our communities.

With all of this change, it's not surprising that you might feel overwhelmed. You may have questions like these:

- How do you keep up with the latest apps?
- How do you identify and recommend the best ones (in the midst of many low-quality apps that are available)?
- Do the same principles that you use to evaluate books, journals, and multimedia apply to apps?
- What do you need to know about mobile technologies in order to effectively evaluate apps?
- How might you integrate mobile apps into library programs and services?
- Can mobile apps be part of the move towards facilitating content creation by our users?

This report answers those questions and more. It's an introduction to app literacy for librarians in all types of libraries.

It covers the following:

- **Chapter 1: App Literacy for Librarians**—In this chapter I summarize what you need to know about mobile devices and interfaces in order to effectively evaluate mobile apps.
- **Chapter 2: Evaluating Apps**—Here I discuss why app reviews are needed, offer a checklist for reviewing mobile apps, and discuss where to find quality app reviews and where to submit your own app reviews.
- **Chapter 3: Mobile Apps in Library Programs**—In this chapter I offer a list of ideas for integrating mobile apps into your programs and services. Whether your library already offers some of these programs, or whether you are just getting started with mobile apps, this can serve as a starting point for sparking additional ideas of your own.
- **Chapter 4: Summary and Further Resources**—This final section includes thoughts about the next steps for mobile technology, including wearable technology and the "Internet of Things." It goes on to cover resources for your own further exploration, including blogs, articles, books and websites about apps, online courses, and a list of core mobile apps that are important to know about.

By the time you finish this report, you'll have a thorough introduction to these topics and good ideas for where to go next in your learning process.

Mobile Operating Systems

There are various mobile operating systems available, with the most popular being iOS (Apple's platform for its mobile devices) and Android (Google's platform for mobile devices). Other platforms include Windows Phone (Microsoft), Symbian (Nokia), and numerous others, which you can read about in the *Wikipedia* article "Mobile Operating System."[5]

I recommend that you focus your attention on iOS and Android as those are what the majority of users currently use.

iOS—Apple

iOS is the operating system that runs on Apple devices such as the iPhone, iPad, iPod Touch, and Apple TV.[6] It's designed to allow direct manipulation of the interface with touch, including gestures such as swipe, tap, pinch, and reverse pinch. It usually receives a major update every year.

Apple's apps are sold in the iTunes App Store, which is available on Apple's mobile devices and on Mac desktops and laptops. Apple also has a Mac App Store, which is a marketplace for buying apps for the Mac OS (desktops and laptops).

iOS apps are divided into the following types, depending on which devices they run on:

- **iOS universal**—This is Apple's term for apps that are optimized for all screen sizes, including iPad. Buy the app once, and you can run it on all your Apple mobile devices. In the iTunes store, these are designated with a small plus sign and the sentence "This app is designed for both iPhone and iPad."
- **iOS iPad only**—These apps are available only for the iPad and don't have a version for iPhones or other devices. In the iTunes store, these will say, "compatible with iPad."
- **iOS**—Some iOS apps are offered with different versions for iPhone and iPad (with different prices). Other iOS apps are designed only for the smaller screen of an iPhone or iPod Touch. These apps can also run on iPads in a small window, which you can tap on to double the size and fill the screen.

When selecting apps, the best choice is a universal app, if one is available.

Android—Google

Android is an open-source operating system by Google that runs on many different brands of smartphones and also on game consoles, televisions, and other electronic devices.[7] It's designed to allow direct manipulation of touchscreens with touching, swiping, pinching, and reverse pinching. It is updated frequently, and the versions have nicknames such as Gingerbread, Honeycomb, Ice Cream Sandwich, Jelly Bean, and KitKat.

Android apps are sold in the Google Play store,[8] as well as many other marketplaces. The Google Play store is the most popular store and probably the safest from viruses and other malware. Experts recommend avoiding unknown sources of Android apps because of the threat of viruses. Amazon also has an Appstore with a smaller selection of apps for its Kindle tablets and its Amazon smartphone. This is a safe source and the best to use if you have an Android-powered Kindle tablet or an Amazon Fire smartphone.

There aren't as many apps available for Android as for iOS, but there are usually good alternatives if an app that runs on iPhones isn't available. Often app developers will create their apps for iOS first because people who own Apple devices tend to spend more money on apps. Many of the best apps are available for both platforms.

Comparing iOS and Android

Google's Android is often loved by people who like to customize and tweak their devices. It has many

options for adjusting settings, and it's a good option for those who want to experiment with new mobile technologies that aren't yet allowed on Apple's platform. The trade-off is that it's a little less user-friendly and a little less secure.

Apple's iOS is often preferred by people who want the easiest and most elegant user experience. Apple has a Volume Purchase Program to make it easy for educators to buy apps for an entire classroom,[9] and many educational institutions have selected Apple's devices as their platform of choice.

For a good explanation of the pros and cons of each platform, see "Pros and Cons: Why I Switched from iPhone to Android, Part 3" by Andy Ihnatko.[10] Keep in mind that he is a tech guru with lots of experience on both platforms. He discusses fragmentation, malware, stability and reliability, apps, price, power management, and camera (he prefers the iPhone camera).

Often, people will have more than one mobile device, such as an Android smartphone and an iPad. So it's good to know about the best apps that can be used on both platforms.

Ecosystems: Native, Mobile Web, Desktop

The word *ecosystem* is frequently used when discussing mobile technology. In this context it describes how different types of apps work together on different platforms and devices.

Native App versus Mobile Web App

It's helpful to know the difference between a native app and a web app.

A native app is an app that has been designed to run on specific mobile devices (such as an iPad) and is purchased or downloaded from an app store. Native apps can take advantage of special features of mobile devices in ways that mobile web apps cannot (though this is changing).[11] They are well integrated into the user experience of the device, filling the screen and offering aspects of the interface that can't be experienced when running an app in a browser window. Native apps are easy to find and install—just go to the app store on your device.

Mobile web apps are apps that run inside a mobile web browser. They are built with standards-based technologies such as HTML5 and CSS3. An advantage of these is that once the app is launched on a modern mobile device with a modern browser, it runs the same way on any platform. Mobile web apps aren't always easy to find; you need to know that they exist, and you need to have a direct link. Then you can save the bookmark on your home screen for easy access in the future.

To see an example of this difference, you can try Google Maps. Download the native app from your app store (if you're on Android, it will be pre-installed). For the web app version, visit this link in your mobile web browser: http://maps.google.com. Compare your experience of using it in the native app to using it in your mobile web browser.

If a developer creates a paid version of a mobile web app, there isn't one central place to buy it as there would be if it were a native app. You'll have to enter your credit card into whatever payment system the developer provides. This is part of the reason that native apps are more common right now. It's very easy to find them, install them, and purchase them. Either Apple or Google will have your payment information already on file so you don't need to pull out your credit card each time.

Most users don't care whether an app is native or mobile (and may not even realize there is a difference). It's good to understand this difference, though, when thinking about app ecosystems.[12]

Mobile Apps Working Together with Desktop Apps

One of the best user experiences is offered when you can use the same app on all of your different devices, with everything in sync.

Here's an example. Evernote is a very good app for organizing your notes.[13] You can enter notes by typing, speaking into your smartphone, or using the camera to take a photo note. You can organize your notes into folders and also add tags. This makes it very easy to find all of your notes in one place. Evernote has many other useful features and is free for basic use.

Evernote provides an integrated ecosystem because it has versions available for any device, such as Mac OS X, Windows Desktop, Windows 8 (Touch), iPad, iPhone, iPod Touch, Android, Windows Phone, and BlackBerry. It also has a web app version at http://evernote.com. You can download native apps for free for all of your mobile and desktop computers. You can use the web app when you are on a public or shared computer. As long as you're signed into your account, you can access and create your notes.

As you can imagine, this is extremely useful. It means your data is available from anywhere you have online access. You can also choose to keep as many of your notes as you like stored offline on your devices. Evernote syncs between your devices so that your notes can be accessed from anywhere.

This type of ecosystem is something that the best apps have and is something to look for when selecting and evaluating apps.

In the future, with the increase in wearable technologies such as wristbands for tracking your fitness,[14] we'll see this ecosystem approach connecting

devices beyond desktop computers and smartphones integrated into clothing, accessories, cars, household devices, and more.

Best practices for multi-device user experiences are discussed in the book *Designing Multi-Device Experiences*, by Michal Levin.[15] The author frames it usefully as "3Cs"—"consistent: each device acts as a solo player, creating the entire experience on its own," "continuous: multiple devices handle different pieces sequentially, advancing the user toward a common goal," and "complementary: multiple devices play together as an ensemble to create the experience."[16]

As you can see, the word *ecosystem* is useful when describing our experiences with technology.

Familiarity with Core Apps

Just as in desktop computing—where most people are familiar with certain core applications, such as Microsoft Word, Excel, PowerPoint, Adobe Acrobat, Photoshop, and the like—it's important to be familiar with core apps for mobile as well.

Certain apps have emerged as popular, stable, useful, and long-lasting. I would define an app as "core" if the following are true:

- It has been around for more than a year, and usage is growing.
- It is part of an ecosystem that offers a native mobile app, a web app, and possibly a desktop app.
- It offers easy ways to send information into and out of the app.
- It covers a basic, useful thing that people want to do with their mobile devices.

In chapter 4, you'll find my list of about twenty core apps that are good to be familiar with. They are the apps I always install first on a new device.

If you would like to go beyond those twenty apps, get my book, *Apps for Librarians: Using the Best Mobile Technology to Educate, Create, and Engage*.[17] It's a guide to over one hundred quality apps in a wide range of topic areas, with many examples of how librarians can use these apps.

If you are an academic librarian you may also find useful my e-book, *Best Apps for Academics,* a guide to the best apps for academic work in the areas of productivity, reading and annotating, research and reference, taking notes, writing, studying, collaboration and sharing, presenting, lecturing, and publishing.[18] Along with the app descriptions, it contains many examples of how academics are using these apps. It's also useful for school librarians who work with secondary school students. Both of these titles will save you time by recommending the very best apps for particular tasks so you don't have to wade through the millions of apps available in the app stores.

If you would like an easy way to keep up with news about apps, you can subscribe to my e-mail newsletter, *Mobile Apps News,* http://nicolehennig.com/mobile-apps-news. It comes out about twice a month and makes it easy for you stay current with the world of mobile apps.

Natural User Interfaces

We've all heard the term *GUI*, which stands for *graphical user interface*. Now there is a new term, *NUI*, for *natural user interface*.

A graphical user interface relies on metaphors, such as desktops, folders, or trash cans, and pointing devices, such as mice or trackpads. The graphical aspect was developed in contrast to a command-line interface. Having menus where you could select from a list of choices, rather than having to remember obscure commands, was a step forward in ease of learning. We take these concepts for granted if we grew up using a GUI, like the Mac or Windows operating system, but it was a system that we all had to learn at some point, and it's not easy for someone unfamiliar with computers to learn for the first time.

With natural user interfaces, the goal is for your interaction with the computer to feel natural, such as touching something on the screen to move it as you would with a physical object. Another interaction that feels natural is talking to your device, using speech recognition technologies. It puts the human first and makes the computer adapt to us, rather than the other way around.

The movement toward natural user interfaces is a boon for everyone, especially those with vision or hearing impairments, or mobility issues. This is because it makes your task or content central, with the interface almost invisible, so that devices are easier to use. With the advent of all these new ways to interact with computers, some say that the keyboard and mouse will become obsolete.[19]

To learn more about natural user interfaces, read the excellent short article, "The Future of UX/UI: The Natural User Interface," by Alex Chong.[20]

Mobile Device Capabilities

How Apps Use Mobile Device Capabilities

Another important aspect of app literacy is developing an understanding of how apps take advantage of the capabilities of mobile devices.

An example of a mobile app that takes advantage of the device's capabilities in a unique way is RoomScan, an app for automatically creating a floor plan of a room.[21] With this app on your iPhone, you walk

around and tap the phone on each wall of your room until you hear a beep. The app automatically creates a floor plan, accurate within about half a foot. (The Pro version lets you specify exact distances). This app takes advantage of the built-in GPS and gyroscope to do its magic.

There are many such apps that do tasks not easily done with a laptop. That's why it's not such a useful question to ask whether a tablet can be a laptop replacement. The answer is always, "It depends." Deeper knowledge of the wide array of serious work that can be done with mobile devices, out in the field, away from your desk, shows that mobile devices are complementary to laptops and may not replace them for everyone.

Important Mobile Device Features

The following features, available in most smartphones and tablets, are worth understanding. If you are evaluating apps, it's good to examine how the app makes use of these features.

FRONT AND REAR CAMERAS (STILL AND VIDEO)

The cameras in mobile devices are used not only for photography, but also for live video conversations with Skype or FaceTime, mobile scanning apps such as Genius Scan, and barcode scanning apps such as Red Laser.[22]

BUILT-IN MICROPHONE

The microphone is used not only for phone conversations, but also for apps that use speech recognition, such as Dragon Dictation, which translates your voice to text.[23] It's also used for apps that recognize music that is playing around you, like SoundHound.[24]

BUILT-IN SPEAKERS AND HEADPHONE JACKS

Having sound output via the built-in speakers or external speakers and headphones is useful on mobile devices. It's possible to connect to external speakers in several ways: wire from headphone jack to external speakers; Bluetooth wireless speakers (see Bluetooth connectivity, below); or Apple's AirPlay feature, which allows streaming audio and video out to Apple TV, Apple's Airport Express (which itself could be plugged into a speaker system), or AirPlay-enabled speakers.[25]

ACCELEROMETER

The accelerometer measures the force of acceleration, whether caused by gravity or by movement. This feature allows your device to sense which way the screen is being held so it can adjust the orientation. It is used when you want to watch a video or read an e-book in either landscape or portrait. It's also used in many games.

GYROSCOPE

A three-axis gyroscope, paired with the accelerometer, makes a device capable of advanced motion sensing. It allows the device to sense how far, how fast, and in which direction it has moved in space. It's most often used in augmented reality apps, games, photography apps (for panoramic photos), and health-related apps, such as those that track your run or bike ride.[26]

COMPASS

Digital compass technology tells you in real time which way your device is facing. It's used in map apps, compass apps, and specialized apps such as astronomy apps that show constellation information superimposed on the night sky.[27]

LOCATION AWARENESS

This technology delivers information about your device's physical location to other users or apps. A device's location is usually determined by one of three methods: by GPS satellite tracking, by cell tower triangulation, or by the device's address on a Wi-Fi network. This is how the maps apps and many other apps can show where you are and tailor information to your location (such as nearby tweets).

TOUCHSCREEN

A touchscreen display allows user control by touching the screen with one or more fingers. It allows direct interaction with what's on the screen, rather than using a mouse, trackpad, or other pointing device. Multi-touch screens can recognize the presence of two or more points of contact with the surface. This allows for easy control by pinching, zooming, long press, and other gestures.[28]

DATA STORAGE

Mobile devices either come with a fixed amount of data storage or are expandable, usually with microSD memory cards. Apple's devices are fixed, usually 16GB, 32GB, 64GB, or 128GB. Higher capacity allows for storing more movies, music, and other large files. Some interactive book apps, for example, take a lot of storage space for their multimedia features. Android devices often come with expandable storage, usually with a microSD card.

WI-FI AND CELLULAR CONNECTIVITY

Wi-Fi is standard on smartphones and tablets. Smartphones use cellular networks by default. For tablets, if you want to be able to connect to the Internet using networks such as those from AT&T, Sprint, T-Mobile, or Verizon, you'll need a model that includes cellular capabilities, such as 3G, 4G, or LTE. iPads with this feature are contract-free, allowing you to pay only for the months in which you use the cellular service.

Android tablets are sometimes sold with contracts in a way similar to smartphones.

BLUETOOTH CONNECTIVITY

Bluetooth is a wireless technology standard for exchanging data over short distances, using radio waves. It's a very convenient way for devices to connect without wires, such as between your tablet and a wireless keyboard or your smartphone and a wireless speaker.

NFC (NEAR FIELD COMMUNICATION)

This is a set of standards that allows devices to establish radio communication with each other when users touch them together or bring them into close proximity. As of this writing, the technology is available in many Android devices and in Apple's iPhone 6 and 6 Plus for use with Apple Play. It's commonly used for mobile payment systems, where you touch or wave your smartphone over an NFC-enabled pay terminal. Google Wallet uses this technology. It's also available in San Francisco parking meters.

Accessibility

Apple's iOS is known for design that includes many excellent accessibility features that help with vision, hearing, physical motor skills, and learning and literacy.[29] In this section we'll focus on Apple's platform since it does such a good job with accessibility.[30]

VOICEOVER

A screen reader tells you what's happening on the screen.

SIRI

Apple's "intelligent" assistant allows you to give voice commands or ask questions (integrated with VoiceOver).

SPEAK SELECTION

Highlight text in any app, and this feature reads the text out loud to you.

DICTATION

Tap the microphone button on the keyboard, and your spoken words will be translated to typed text for use in any app.

ZOOM

A built-in magnifier will zoom anything on the screen in any app from 100 to 500 percent.

LARGE TEXT

This allows you to select a larger font size that works across most built-in apps and some third-party apps.

INVERT COLORS

This setting is for those with low vision where higher contrast helps them see everything on the screen more clearly.

BRAILLE DISPLAYS FOR IOS

This setting is for use with Bluetooth wireless Braille devices.

FACETIME

This feature enables video calls between iOS devices. It is great for those who communicate with sign language.

CLOSED CAPTIONS

When you buy or rent captioned movies or download captioned podcasts, you can view the captions.

MESSAGES WITH IMESSAGE

Text-based communication is great for those who are deaf or blind (using VoiceOver).

MONO AUDIO

If you are deaf or hard of hearing in one ear, you may miss one channel of a stereo recording. This feature allows you to switch to mono so everything will come to both sides of your headphones.

VISIBLE AND VIBRATING ALERTS

This allows you to be notified by different vibrations or flashing lights about incoming e-mail, messages, phone calls, and calendar events.

MADE FOR IPHONE HEARING AIDS

Apple has some hearing aids designed specifically for iPhone.

ASSISTIVE TOUCH

If you have difficulty performing some gestures, such as pinch, you can make them more accessible with a tap. This includes many different settings for those with an iPhone mounted on a wheelchair or those who use separate assistive devices that help them interact with their iPhone.

KEYBOARD SHORTCUTS

This feature allows you to create abbreviations for words or phrases that you frequently type, saving you many keystrokes. Type the shortcut and the whole phrase will be auto-typed for you.

GUIDED ACCESS

This feature helps people with autism or various attention challenges to stay focused on the task. A parent or teacher can limit the device so it stays in one app or limit the touch input on certain areas of the screen, preventing accidental taps.

DICTIONARY
Dictionary definitions are integrated into iOS. Users can get help with spelling, grammar, and definitions from within any app.

SAFARI READER
This feature reduces clutter on webpages by stripping away the ads, navigation, buttons, and navigation bars, making it easier to focus on the content itself. It is great for those who easily feel sensory overload.

These features are working so well for users with disabilities that we're seeing inspiring examples in articles like these:

- "Re-Enabled: iOS's Impact on Those with Impairments Isn't Just a Marketing Slide; It's Profound," by Steve Aquino.[31]
- "How the Blind Are Reinventing the iPhone," by Liat Kornowski.[32]

Both articles frame the iPhone as a revolutionary development for people with disabilities. They discuss using Guided Access as a way to keep kids on task and talk about how students are more attentive and engaged with course materials when using an iPad.

I encourage everyone to explore these features because they are useful in many situations, whether you have a disability or not. Turning on Zoom is one of the first things I do whenever I get a new iPhone or iPad.[33] It allows you to zoom in on any part of any screen, inside of any app.

To learn more about all of the accessibility features, I recommend the book *iOS: Access for All: Your Comprehensive Guide to Accessibility for iPad, iPhone, and iPod Touch* by Shelly Brisbin.[34]

Jailbreaking

What Is Jailbreaking?

Jailbreaking is a process that changes the system on your iPhone in order to allow the installation of third-party apps from non-Apple stores, such as Cydia.[35] This is not the same as "unlocking," which means changing your smartphone to allow it to work on multiple carriers.

Is It Legal?

Even though the word *jailbreaking* sounds scary and illegal, it's not (on smartphones). Here is what you need to know:

- In 2010, the Copyright Office of the Library of Congress deemed that it's fair use to jailbreak a smartphone.[36]
- These rules get reviewed every three years, and in 2012, the Library of Congress updated the ruling to exclude tablets. The word *tablet* was considered too ill-defined to allow the exception because people might conclude that it's allowed to jailbreak portable gaming consoles, e-readers, and laptops. So as of 2012, it's not legal to jailbreak your iPad.[37]
- These rulings are something to watch since they are reviewed every three years.

Why Jailbreak?

If you jailbreak, you can take advantage of some very useful apps that add functionality, such as turning your iPhone into a mobile Wi-Fi hotspot, for no extra charge other than the one-time cost of the app ($20).[38] You can also experiment with new technologies that aren't yet available on the iPhone but may be used in the future. Sometimes a jailbroken app innovates in a way that Apple later adopts after more testing.

How Difficult Is It to Jailbreak an iPhone?

It's fairly easy to do, and if anything goes wrong, you can easily restore your iPhone to its factory settings by resetting it in iTunes and restoring your files and apps from a backup.

Since the information on how to jailbreak changes with each update, I recommend searching for the latest information at the time you decide to try jailbreaking. Search for "how to jailbreak an iPhone" or something similar. Find the newest articles from trusted sources, like *Macworld*.[39]

Cons of Jailbreaking

Be aware that jailbreaking will make your iPhone a bit more geeky and less user-friendly since it adds more options with some ugly settings screens and so on.

Whenever Apple comes out with an updated version of iOS, you won't be able to update your phone (and stay jailbroken) until there is a jailbreak for the new version. This can be from a few weeks to a couple of months later. So you may not be able to benefit from certain fixes or new features right away.

Like most choices, jailbreaking is a trade-off. You get a wide choice of useful apps, but you need to be a bit more of a techie and have the patience to deal with some not-so-user-friendly interfaces for finding and installing jailbroken apps.

Why Learn about Jailbreaking?

Even if you have no desire to jailbreak your iPhone, it's good to be aware of what's possible and why people

do it. If you or someone on your staff has this experience, you can recommend the best apps and tools to a user who is interested in doing this or has a need for a specialized app available only on Cydia.[40]

Some people keep an older or secondary device just for the purpose of this experimentation while still having access to their main device in a non-jailbroken state. And remember, if something goes wrong, you can completely erase your device and re-install everything from a backup you made before jailbreaking.

Glossary of Terms

Android—Google's open source operating system. It's designed primarily for mobile devices, such as smartphone and tablets, and also enables specialized user interfaces for cars, televisions, and watches.

accelerometer—An electronic component that measures tilt and motion. A device with an accelerometer knows what angle it is being held at. The device can also measure movements, such as rotation, and motion gestures, such as swinging, shaking, and flicking. One common use in smartphones is to detect whether the phone is upright or sideways and to automatically rotate the graphics on the screen accordingly. Another common use is to allow the user to control games and other applications (such as a music player) by moving or shaking the phone.

AirPlay—Apple's technology for wirelessly streaming audio, video, or photos between devices.[41] For example, an iPhone can stream audio from a number of different music or radio apps to an Apple TV on the same Wi-Fi network. Another use would be to play a video you just shot on your iPhone on a large-screen TV hooked up to Apple TV.

Bluetooth—A short-range wireless technology used to pair gadgets that are near each other. For example, you can pair your mobile phone with a Bluetooth speaker to play music wirelessly. It can also be used to pair your mobile device with a wireless keyboard or to send photos and other files from one mobile device to another. Most laptops also have Bluetooth technology.

EPUB (and other e-book formats)—An open standard for e-books. Files have the extension .epub. It's designed for creating reflowable and resizable text. It's supported by a wide variety of e-readers and e-reading apps (such as iBooks, Nook, and Kobo), with the exception of Amazon's Kindle, which uses the MOBI or AZW format. Other e-book formats to be aware of include iBOOKS (used by Apple for multimedia e-books created with iBooks Author), and PDF ("portable document format"—an electronic image of text and graphics designed to look the same as the printed page). File extensions for these formats are .epub, .mobi, .azw, .ibooks, and .pdf.

in-app browser—A web browser built into an app. Many apps have a web browser built in so that when you follow a link to a website, you don't need to leave the app and go to your mobile device's browser (such as Safari). News readers, such as Reeder or Feedly, often use in-app browsers so that you can read the full story from a news feed without leaving the app.

in-app purchase—The purchase of additional features from within a paid or free app. For example, games often are set up so you can buy more levels for extra money. Painting and drawing apps often allow the in-app purchase of extra virtual pens or brushes.

iOS—Apple's operating system that runs on iPhone, iPod Touch, iPad, and Apple TV.

jailbreaking—Modifying Apple's iOS in order to install apps other than those that are approved by Apple in the iTunes store. It allows you to run unofficial code, such as themes, hacks, and apps that add functionality. Despite the name, it is legal to jailbreak your iPhone (but not your iPad).[42]

location awareness—The ability to show information about the physical location of a device. The most familiar example is in mapping apps, like Google Maps, where you can tap an icon to see where you currently are on the map. It's also used in apps like Foursquare that allow you to "check in" to a restaurant, park, or store in order to show your friends where you are. It has many other uses, such as geotagging your photos; making a map of your walk, bike ride, or hike; and tracking a lost mobile device or laptop.

multi-touch—The ability of a touchscreen or trackpad to recognize the presence of multiple points of contact. It's used for technology such as "pinch to zoom" or two-finger scrolling to control your device.

skeuomorphism—A design practice that involves using ornamental elements of past iterations of an object, such as wood bookshelves in an e-reading app or faux-leather stitching in a calendar app. In the early days of mobile app design, this was used often, but it has now fallen out of favor. When a technology is new, skeuomorphism is used as a mental aid to make new technology feel familiar by imitating physical objects.

universal app—An iOS app designed so that you need to purchase it only once and it will be optimized to run on both the iPhone and iPad in a way that suits the display size of each device.

Notes

1. *NMC Horizon Report: 2014 Library Edition*, www.nmc.org/publications/2014-horizon-report-library.
2. Larry Johnson, Samantha Adams Becker, Victoria Estrada, and Alex Freeman, *NMC Horizon Report: 2014 Higher Education Edition* (Austin, TX: New Media Consortium, 2014), 14, http://cdn.nmc.org/media/2014-nmc-horizon-report-he-EN-SC.pdf.
3. American Library Association, "America Library Association Supports Makerspaces in Libraries" (news release), June 13, 2014, www.ala.org/news/press-releases/2014/06/american-library-association-supports-makerspaces-libraries.
4. For good examples of innovative project ideas that use mobile apps in the classroom, see "Innovative

Projects and Lessons," EdTechTeacher website, accessed June 26, 2014, http://edtechteacher.org/innovative.

5. "Mobile Operating System," *Wikipedia*, last modified August 9, 2014, http://en.wikipedia.org/wiki/Mobile_operating_system.
6. Apple's iOS: www.apple.com/ios.
7. Google's Android: www.android.com.
8. Google Play app store: http://play.google.com/store/apps.
9. Apple Volume Purchase program for apps: http://volume.itunes.apple.com/us/store.
10. Andy Ihnatko, "Pros and Cons: Why I Switched from iPhone to Android, Part 3," TechHive, March 7, 2013, accessed June 26, 2014, www.techhive.com/article/2030168/pros-and-cons-why-i-switched-from-iphone-to-android-part-3.html.
11. Ryan Matzner, "Why Web Apps Will Crush Native Apps," Mashable, September 12, 2012, http://mashable.com/2012/09/12/web-vs-native-apps.
12. For more details, see Priya Viswanathan, "The Pros and Cons of Native Apps and Mobile Web Apps," About.com, accessed August 18, 2014, http://mobiledevices.about.com/od/additionalresources/qt/The-Pros-And-Cons-Of-Native-Apps-And-Mobile-Web-Apps.htm. Some predict that web apps will win in the end; see Matzner, "Why Web Apps Will Crush Native Apps." Others encourage a focus on native apps; see Gregory Kennedy, "Hybrid Apps vs. Native Apps: The Verdict Is In, Go Native and Give Users Something They Will Love," Tapsense blog, September 30, 2013, http://tapsense.com/blog/2013/09/30/hybrid-apps-vs-native-app-the-verdict-is-in-go-native-and-give-your-users-something-theyll-love.
13. Evernote: http://evernote.com.
14. Example of a fitness wristband: www.fitbit.com.
15. Michal Levin, *Designing Multi-Device Experiences: An Ecosystem Approach to Creating User Experiences across Devices* (Sebastopol, CA: O'Reilly, 2014), http://shop.oreilly.com/product/0636920027089.do.
16. Ibid., 128–29.
17. Nicole Hennig, *Apps for Librarians: Using the Best Mobile Technology to Educate, Create, and Engage* (Westport, CT: Libraries Unlimited, 2014), http://apps4librarians.com/thebook.
18. Nicole Hennig and Pam Nicholas, *Best Apps for Academics: A Guide to the Best Apps for Education and Research*, self-published, 2014, http://bestappsforacademics.com.
19. Steve Clayton, "A World of NUI: Steve Hodges," *TechNet Blogs*, Microsoft, January 26, 2012, http://blogs.technet.com/b/next/archive/2012/01/26/a-world-of-nui-steve-hodges.aspx#.U4-PSJRdWYk.
20. Alex Chong, "The Future of UX/UI: The Natural User Interface," Pivotal Labs, August 14, 2013, http://pivotallabs.com/the-future-of-uiux-the-natural-user-interface.
21. RoomScan: http://locometric.com.
22. Apple's FaceTime: www.apple.com/ios/facetime; Genius Scan: http://thegrizzlylabs.com; RedLaser: http://redlaser.com.
23. Dragon Dictation: www.nuance.com/for-individuals/mobile-applications/dragon-dictation/index.htm.
24. SoundHound: www.soundhound.com.
25. Apple's AirPlay: www.apple.com/airplay.
26. For examples, see this list of apps that use this feature: Victor H., "Gyroscope Apps and Games," phoneArena.com, December 14, 2010, www.phonearena.com/news/Gyroscope-apps-and-games_id15299.
27. For examples, see this list of stargazing apps (many make use of the compass): "Apps for Stargazing," AppAdvice, accessed June 26, 2014, http://appadvice.com/appguides/show/astronomy-apps.
28. See a list of these gestures, with video demonstrations, in the Wikipedia article "Multi-touch," accessed June 26, 2014, http://en.wikipedia.org/wiki/Multi_touch.
29. iOS Accessibility features: www.apple.com/accessibility/ios.
30. You can find out about Android's accessibility features on Google's site: "Using Google Products: How to Use Accessibility Features," accessed August 18, 2014, www.google.com/accessibility/products.
31. Steve Aquino, "Re-Enabled: iOS's Impact on Those with Impairments Isn't Just a Marketing Slide; It's Profound," *The Magazine*, no. 9, January 21, 2013, http://the-magazine.org/9/re-enabled.
32. Liat Kornowski, "How the Blind Are Reinventing the iPhone," *The Atlantic*, May 22, 2012, www.theatlantic.com/technology/archive/2012/05/how-the-blind-are-reinventing-the-iphone/256589.
33. "How to Zoom the Entire Screen on Your Smartphone or Tablet," Gizmo's Freeware, updated February 19, 2014, www.techsupportalert.com/content/how-zoom-entire-screen-your-smartphone-or-tablet.htm.
34. Shelly Brisbin, *iOS Access for All: Your Comprehensive Guide to Accessibility for iPad, iPhone, and iPod Touch*, Version 1.0, May 2014, self-published e-book in EPUB format, www.iosaccessbook.com.
35. Cydia app store: http://cydia.saurik.com.
36. You can download a summary of the ruling from the website of the Electronic Frontier Foundation: Library of Congress Copyright Office, "Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies," 37 CFR Part 201, Docket No. RM 20088, July 20, 2010, www.eff.org/files/filenode/dmca_2009/RM-2008-8.pdf.
37. Rob LeFebvre, "New Ruling Continues to Let You Jailbreak Your iPhone, But Not Your iPad," Cult of Mac, October 5, 2012, www.cultofmac.com/198298/new-copyright-office-ruling-allows-you-to-legally-jailbreak-your-iphone-but-not-your-ipad.
38. Lifehacker usually has good articles about the best apps for a jailbroken phone, like this one: Thorin Klosowski, "The Best Jailbreak Apps and Tweaks for iOS 7, Part II," January 22, 2014, http://lifehacker.com/the-best-jailbreak-apps-and-tweaks-for-ios-7-part-ii-1506144309. Since this information goes out of date every time iOS is updated, be sure to do a new search for articles like this one for the version of iOS that you have.
39. Christopher Breen, "How to Jailbreak Your iPhone," Macworld, February 19, 2013, www.macworld.com/article/2028546/how-to-jailbreak-your-iphone.html.
40. To learn more about the Cydia store, and the difference between apps, tweaks, widgets, and themes,

read Thorin Klosowski's "I'm New to Jailbreaking; Can You Help Me Wrap My Head Around Cydia?," Lifehacker, May 18, 2012, http://lifehacker.com/5911486/im-new-to-jailbreaking-can-you-help-me-wrap-my-head-around-cydia.
41. Apple's AirPlay: www.apple.com/airplay.
42. Paul Miller, "Library of Congress Adds DCMA Exception for Jailbreaking or Rooting Your Phone," Engadget, July 26, 2010, www.engadget.com/2010/07/26/library-of-congress-adds-dmca-exception-for-jailbreaking-or-root; Rob LeFebvre, "New Ruling Continues to Let You Legally Jailbreak Your iPhone, but Not Your iPad," Cult of Mac, October 5, 2012, www.cultofmac.com/198298/new-copyright-office-ruling-allows-you-to-legally-jailbreak-your-iphone-but-not-your-ipad.