The Skeptical Technophile: iPad Review

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When I joined the faculty of the Radiology Department in April 2011, part of my onboarding included a computer budget for my office. Since I had just finally consolidated my life onto a MacBook Air which came with me everywhere, I had no interest in an office desktop, even if the University was paying for it. In the spirit of scientific inquiry, I used some of the money to buy an iPad and let the rest lapse back into the University's coffers.

I had been skeptical of the iPad as a useful tool for radiologists, and now I could find out for myself in a hands-on way. Here is my 6-month report.

General Usability

Hardware

The iPad runs on Apple iOS, which is the same operating system that runs the iPhone and most apps that work with the iPhone work with the iPad (the converse is less true because of the larger screen of the iPad, some apps do not scale down). Macs run Apple's OS X (the current version is 10.7, nicknamed Lion). All iPads come with Wi-Fi and Bluetooth, but 3G Internet capability costs another US\$130 at purchase and an additional monthly data contract (currently US\$20 per month with AT&T Mobile). Both Wi-Fi and Bluetooth functionality work fine. The virtual keyboard is only a little smaller than a netbook keyboard when the screen is placed in landscape orientation, which is a big improvement over an iPhone, but there is no feel for the keys so a touch typist (which I am

not) still has no feel for a keyboard. The completely silent on-screen keyboard allows a user to type in settings where even the click of a mechanical keyboard is distracting. I sometimes use a Bluetooth keyboard, which works fine.

Accessories

Apple's Smart Cover is very functional and clever, turning the iPad on and off, allowing it to stand up like a desk photo frame, to tilt up off the desk like a keyboard, and protecting the screen when it is not being used. Several other keyboard/stand combinations are available that will allow you to stand the iPad behind a keyboard to simulate the laptop experience (my current favorite is the Origami Workstation from Goincase (<http://goincase.com/products/detail/origami-workstation-cl57934/1>)).

The Bluetooth headset used for your phone will work with the iPad, although different headsets have different ways of pairing with two devices—some work well, some don't. External speakers can be plugged into the headphone jack.

Enabling your mobile phone to function as a Wi-Fi hot spot will provide your Wi-Fi iPad online access when out of Wi-Fi contact (For me, the per-month cost for the personal hot spot is equivalent to the per-month cost of Internet access for the iPad (if I had a 3G iPad), but also provides the flexibility of being able to link up to five devices, including my laptop, to the Internet in the same fashion).

Many auxiliary battery packs are available for iPhones. They connect through the universal connector on the bottom of the phone and supply power from there. I found that same external battery pack powers an iPad. My backup, rated at 1,200 mAh, has about 20% of the capacity of the iPad's internal battery and so I would expect it to power the iPad for an hour or so.

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Free Apps

Numerous useful free apps are available, as in the smartphone environment. Calculator Pro and Nightstand Central Free are downloads that fix inexplicable omissions by Apple of a calculator and a clock in the basic set of iPad apps. Clean Writer is a simple text editing app. Tactillus is a simple drawing application allowing you to create, save, and share line drawings. Wunderlist and Evernote are information managers, of which there are several available. Both apps will sync with your laptop and iPhone. Evernote is particularly flexible and elegant, with the ability to add pictures and Web pages to your notes; however, it does not integrate calendar functionality, so it doesn't really work for reminders or "to-do" lists. Skype functions the same way on the iPad as it does on a laptop. I found that US\$30 a year will buy the ability to use Skype on the iPad (or any other device with Skype) for nearly unlimited calling to any cell or landline in the USA from anywhere in the world, creating much of the functionality of a cell phone. Dropbox is a free application that provides cloud storage for files and convenient access from any online device, synchronized with computers (Windows or Mac), as well as mobile devices. You can share Dropbox folders with others, which is a more convenient way to collaborate than e-mailing documents back and forth. The iPad Dropbox app gives access to your Dropbox files while online and allows you to select favorite files to save on the iPad for offline access. However, you cannot save to, delete, or rearrange online Dropbox files from the iPad. A free service, sendtomydropbox.com, allows you to e-mail a document to Dropbox, getting around this shortcoming in Apple's file management system.

Paid Apps

iWork, Apple's Microsoft Office equivalent, is available in individual low-cost components. Pages, Keynote, and Numbers are all somewhat limited in functionality when compared to their OS X equivalents but sufficient for most basic or intermediate purposes. Synchronizing documents can be done in several ways: iCloud syncs automatically if you are using iWork on an updated Mac. Otherwise, you can assign documents to synchronize through iTunes when you sync the iPad with your computer or e-mail them to Dropbox using sendtomydropbox.com.

Documents To Go is one of the first PDA applications to handle Office-type files and has been continuously developed over the years, to provide a very usable way to edit files on portable devices and synchronize them with a desktop. While I have not used it on the iPad, I expect that it would be a worthwhile investment.

Jump is a remote desktop access application for iPad that works like Microsoft RDC client, but can also access Mac computers that have the freely available Jump Desktop

application. On a recent trip to Europe, I was able to access my home laptop to do a small but necessary task using Jump and the hotel Wi-Fi.

SplashID is perhaps the most important app I have. It stores passwords and other confidential data (credit card, passport, social security numbers, etc.) in a single, password-protected database so you only need to remember one password instead of hundreds (I currently have well over 200 records in mine). Such an application helps to avoid the bad habit of using the same password in many settings. It can also be invaluable in hospital settings where password rules have become complex and inconsistent. SplashID also comes in iPhone and desktop versions which can all be synced.

PDF reader applications abound, but my current favorite is iAnnotate PDF. It has library organization functionality, allowing you to import, rename, and sort files into folders. The reader allows you to have several files open at once, separated by tabs. You can annotate PDFs with key words, typed comments, bookmarks, highlighting or free drawing, which can be saved and subsequently moved if needed. Most impressively, it allows you to search for text within a document or throughout your entire library, making a customized searchable medical library simple to maintain.

Medical Usability

Specific clinical applications aside, medical apps can be divided into content, news, and journals. Much of the content and news flow through free, ad-supported aggregators and can be useful for a quick scan of topical highlights. Some societies have freestanding apps that have the same content as their Web sites, and many medical journals and society newsletters have iOS editions. I have found that many online textbooks, or the Web versions of the major texts available today, use Flash for their sophisticated display functionality, which Apple has so far adamantly refused to support on iOS devices. This makes them pretty useless when using Safari or any other Web browser in the iPad.

Hospital EMR other enterprise applications can be accessed using Citrix or other VPN solutions. Reviews uniformly indicate that complex, point-and-click Windows-based applications are unwieldy to use on the small touch screen iPad. Apple has built in consumer level security into the iOS, which is insufficient to meet the requirements of HIPAA. This means that the iPad cannot store data securely enough for many hospital security policies, so it is difficult to run applications natively that use patient data.

Free Apps

PubMed On Tap Lite works incredibly well, searching efficiently, and identifying many of the articles, which are

available as PDF downloads, free or otherwise. You can open a downloaded article in iAnnotate PDF, add it to the library, and index it with the rest of your library.

Medscape is frequently updated with news and pharmaceutical reference materials, but I rarely find it useful.

Medical Calculator has virtually all of the formulas you would need listed alphabetically. You can build a list of your favorites for faster reference, such as GFR or BMI.

Wheel RE is a cute app that reproduces the circular cardboard gestational age estimator many of us remember from medical school. An inexpensive paid version has more functionality than I need.

Paid Apps

Eponyms is an inexpensive database that has been maintained for years with excellent short explanations of 1,751 (at last count) medical eponyms from all specialties. I have found it frequently useful for decoding clinical histories.

Radiology Usability

This is the area that has had the greatest hype but falls shortest of the mark. There are several DICOM viewers available, but the only one that has been FDA approved is MobileMIM (voted the best new radiology software in the 2011 Minnies competition), and in order to make it work, you need to have their DICOM server. Some major PACS vendors have proprietary DICOM viewers requiring proprietary servers, including Centricity Radiology Mobile Access from GE, which I have used. It does a credible job connecting to the server and retrieving a study, but the experience is frustrating for a radiologist who instinctively uses more tools than are available on the iPad. Consumer level security built in to the iPad means that patient data should not be stored on the device, limiting the utility of natively run DICOM viewers (such as Osirix). Beyond that, my question is “Why?” Why do I want to access the PACS archive from an iPad? Certainly not for daily work. The proverbial restaurant consultation is always trotted out, but I doubt that is enough of a base to support application development. I have accessed my hospital network and used the full PACS using Jump, which may be a little slower in terms of responsiveness, but has the advantage of being familiar and fully functional. The lack of a mouse causes some problems, most of which can be circumvented with menu options.

Free Apps

Radiology, Radiographics, and RSNA News are available as stand-alone apps and JDI will be available soon as well. Several case collections and didactic apps are available,

including iRadiology, Radiology 2.0: One Night in the ED, Radiology Assistant, Radiopaedia Volume 1: Brain Radiology Teaching File Lite. These are good for perusing, but I have not found them to be compelling resources.

Aunt Minnie has a mobile-optimized Web site available through Safari which improves the usability of their extensive content from news to case-of-the-day.

Brain MRI Atlas has nicely labeled brain images, but only in the axial plane. Numerous DICOM viewers are available. I have actually installed and tried Centricity Radiology Mobile Access from GE and MIRC Viewer, but have not found a use for them once I had them loaded and working.

Radiology Toolbox Lite is a radiology-specific database and calculator with items such as GFR calculator, isotope half-life table and Fleischner society recommendations for pulmonary nodule follow-up (the paid version has more such tools). It seems well thought out, but I haven’t actually integrated it into my daily practice.

Paid Apps

Most medical publishers now have ePub or Kindle versions of many of their major texts available. These are generally ports of the print books, lacking features that use the iPad’s capability.

Monster Anatomy has issued a truly elegant anatomy atlas application. The upper and lower extremities are the only modules available at this time, but they offer thoroughly annotated multiplanar MRI anatomy. Each module costs US \$20, but the creators have certainly earned it. As it was made in France, there are occasional differences in terminology between common US usage and what is presented, but that is a very minor issue. e-Anatomy is a fairly comprehensive cross-sectional atlas, available for purchase in specific modules so you can get the sections you need.

The AIRP (formerly AFIP) Syllabus is available in an engagingly fresh format from the ACR, containing lecture notes and excellent images covering the entire radiology–pathology correlation course offered in Washington DC at an extraordinary price (US\$149 at RSNA).

The iPad version of Osirix is fully DICOM compliant and supports several DICOM protocols. The viewer has limited functionality but performs well. It scrolls smoothly, allows two series to be displayed at a time, and has basic W/L, pan and zoom and linear and ROI measurements (although it will only allow one measurement to be made at a time). I have been able to load patient CDs onto my laptop, import exams into Osirix and then transfer them to the iPad using DICOM send and view them in that way (you must extend the iPad’s Auto Lock period in the Settings section to something longer than the default 2 min or your transfers will get cut off).

Laptop Comparison

The biggest advantage that the iPad has over a laptop computer is the form factor: it is lightweight and small, compared to most laptops. Many netbooks close to the size of the iPad are pretty awkward to use as well. However, the MacBook Air is only slightly larger and heavier than an iPad. Both have the feel in the hand of a clipboard when carrying them around a hospital. As the iPad can be held with one hand and controlled with the other, it is more useful when the user is moving around or a flat surface is unavailable for the laptop. On a desk, it has a smaller footprint, compared to a full-sized laptop, but the difference is minimal compared to a 13-in. model. It can run up to 6 h on a charge, depending on how many transmitters you are running (Wi-Fi, Bluetooth, and 3G each consume battery power constantly), which is similar to the Air. Both are reasonably sturdy and have survived minor drops to the floor. The iPad can have a connectivity advantage out of Wi-Fi range if you buy a 3G model.

I suspect the iPad is more tolerant of exposure to liquids than the Air; the coffee I spilled across the keyboard of the

Air would have been easily wiped off the screen of the iPad, as long as it stayed on the glass (The Air recovered, but that is a story for another column).

Conclusion

In the end, I remain ambivalent towards the iPad for use as a radiologists' tool. It is yet another elegant Apple product with the capability of emulating many but not all of the features of a laptop or desktop personal computer. It is best used as a sophisticated "peripheral brain" for storage and retrieval of information or for the user without a work surface on which to rest a laptop. While it has many attractive nonmedical uses, it does not do much that a laptop cannot (one exception being its excellence as an e-reader). If you have a larger laptop, the iPad may improve your mobility and battery life, but compared to the MacBook Air, the improvement does not warrant the additional purchase at this time, in my opinion. However, applications are rapidly evolving, and I am sure that newer apps will be developed which make use of the iPad's unique features.