

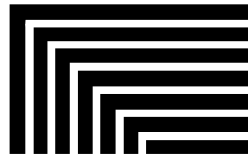
# Library Technology

R E P O R T S

Expert Guides to Library Systems and Services

## **Gadgets and Gizmos: Libraries and the Post-PC Era**

*Jason Griffey*



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## Abstract

After the publication of "Gadgets and Gizmos: Personal Electronics and the Library" back in 2010, it became obvious that there was a lot to say about the use of personal electronics in libraries from both a patron-support standpoint and the perspective of internal library management of the devices for patron and staff use. Personal electronics like the iPad, Kindle, Nook, and other gadgets that are becoming windows into all of our informational needs are designed for individuals and not for institutions. Making these sorts of devices work within the systems we have for managing objects is nontrivial because these devices are more than just objects—they are the center of an information ecosystem that almost, but not quite, doesn't play well with libraries.

This issue of *Library Technology Reports* will attempt to give basic information about tablets, e-readers, and other personal electronic devices and, more important, will discuss their management and how they can fit in libraries. It also takes a look at some emergent technologies, such as 3D printing and printers, that libraries should be watching and may have interesting effects on the world around us. If you are looking for a primer on the management of personal electronics in the library, as well as a glimpse into the near future of technology and how libraries might use these new tools with patrons, this issue is for you.

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# Introduction

## Abstract

*Since my first issue on gadgets back in 2010, there's been enormous change in the world of personal electronics. This chapter looks back at the previous "Gadgets and Gizmos" issue of Library Technology Reports, judging how well I did with my predictions back then and setting the stage for why libraries should care about gadgets for the next couple of years.*

Way back in April 2010, *Library Technology Reports* published "Gadgets and Gizmos: Personal Electronics and the Library," but it was January of the same year when I turned in the manuscript for editing and effectively locked down the content. That report covered a lot of very exciting technology for the time, focusing on e-readers, personal media players (PMPs), media capture devices, and a few odd or unusual pieces of gadgetry that seemed interesting.

Nearly every single thing about it is now irrelevant at best, and downright ridiculous at worst.

There is a small mention of the iPad in that original report, but only because it had been announced just a week or so before the manuscript was locked down for publication. Imagine that: I wrote and published a report on personal electronics that came out in 2010, and it didn't have any real information about the iPad in it. As anyone reading this in 2012 or later knows, the iPad has been the most successful new personal electronic device in history, selling more units in less time than anything that came before it. More important, it redefined an entire genre of computing, setting a standard for information interaction that is still being worked out. I published a guide to technology that missed the biggest tech shift of the decade and talked about how companies like Copia, Plastic

Logic, Spring Design, Blio, Flip, and Zune might be things you wanted to watch.

Boy, did I ever screw that up.

Copia and Blio have become also-rans in the e-book race, with the major providers (Amazon and Barnes and Noble, with a side of Apple) effectively owning the market for e-books. The Plastic Logic QUE e-reader and the Spring Design Alex were dead out of the gate, with the QUE never even making it to the gate: it was never even released to the public as a product. Microsoft finally killed its Zune products this year, so those are dead, and Flip was purchased by Cisco and subsequently killed. The portable video camera market is mostly getting consumed by the cellular phone, as is the pocket camera market.

Of the twenty-three or so gadgets that I mentioned in my original report, at best and being very kind to myself, only eight or so are still viable products on the market that I would still recommend purchasing.

This just goes to show how hard it is to see where the technology future is leading us. I'm not claiming to be Nostradamus, but I pay a lot of attention to these things. And if I screwed it all up as badly as all that, what hope does someone who couldn't tell a Kindle from a Nook have? That's why it's more important than ever that libraries and librarians act as information filters for their community. When patrons ask if they should buy the new Kindle they heard about, someone in your library needs to be able to answer basic questions about it. That person should try to provide some resources that might help patrons determine if the Kindle or the Nook is a better fit for their reading habits, or if they should splurge and get that iPad thing they've been seeing the commercials for.

So while I do my best to present what I think are interesting and intriguing technologies for libraries

and librarians to think about, history has shown that it's hard to predict exactly what's going to take off and what's going to flop. It's even harder to make that distinction for libraries, since our needs are so distinct from those of the average individual buying a piece of personal electronics. For instance, the fact that the Flip video camera is dead for consumers and the demand for small, cheap video cameras is disappearing thanks to the rise of the mobile phone with camera built in doesn't immediately reduce the need for the device in the library. People still want to check out a video camera occasionally, and the Flip is the perfect option for us to check out. Library demand for gadgets doesn't follow the consumer curve all that closely, and we often have needs that are served by older technologies.

With that said, the best way to prepare for the future is to understand what's coming. While the timeline for sunseting technology in a library is longer than that for the general public, we are still expected to know and understand what's going on in the personal electronics space as long as our patron base is interacting with iPads, Kindles, Nooks, and other tech outside the library. In my previous Library Technology Report on gadgets, I identified three reasons why libraries should be paying attention to these technologies:

**1. Patrons use them and increasingly expect libraries to be aware of them.**

As libraries move from "temples to the book" to a service-based collection of information resources, using the things that your patrons are familiar with is more and more important. Especially as we move to digital collections, we have to stay on top of the methods of accession of those digital collections, which are almost universally personal electronics these days. Gadgets and libraries are going to become much more tightly integrated as we move through the digital conversion in the next decade or so.

**2. They often change the nature of information interactions.**

You have a much richer, multimodal experience with a number of these gadgets than you do with the traditional print world. When it's possible for you to read text, click a link to a video, and then leave a comment correcting something about the original text, your relationship with the consumption of media has changed. Libraries and librarians need to understand this changing landscape, and the windows through which we interact with this new world of information are gadgets.

**3. They provide interesting opportunities for the delivery of content, something libraries should always be interested in.**

Libraries have always been the democratizers of content. We step in to distribute the economic burden of information and allow access to those who could not afford to own the information themselves. As our content becomes increasingly digital, these gadgets give us the delivery mechanism for the content. In the traditional library, the content and the delivery device were one and the same: the book, the magazine, the journal. In the digital world, the two are distinct, but that doesn't give libraries the liberty of continuing to be interested in only one of the two pieces of the access puzzle.

Since writing the original text in early 2010, I've had the opportunity to present on this topic around the United States. Doing these presentations helped me to distill the message down to the essence of why I think this is an important topic for libraries. That distillation has been said again and again by me, from state to state, regional library group to national conferences, and that distillation is that "experiences become expectations."

"Experiences become expectations" is just shorthand for the idea that our patrons have experiences with information systems and their personal electronics outside the library walls. These experiences then set their expectations for information interactions when they come into the library. This is the reason that we as librarians have worked so hard for the last ten years to emulate Google in our search for the perfect federated or discovery-layer system. It's not because they give objectively better results (they almost never do, when measured against traditional measures of accuracy). But they are what our patrons expect because they are used to getting incredible results from Google, and they don't understand (nor should they) why our library resources aren't the same.

One thing that hasn't changed in the two years since the first "Gadgets and Gizmos" is that personal electronics are becoming an ever-more-necessary focus of libraries. Our patrons are increasingly coming to expect that our resources will be available and easily used on their devices, and our role as a democratizer of technology is stressed as libraries try to ensure that everyone has the ability to use the latest and greatest in electronics. Libraries are the democratizer of information, and as information is increasingly amorphous digital content, we need to be familiar with the containers that give our digital bits form and substance.

# The Rise of the Tablet



**Figure 2.1**  
iPad

## Abstract

*The rise of the tablet form-factor as a computing device reached new heights after the 2010 introduction of the iPad. It wasn't the first tablet, but the combination of hardware and software cracked some code for commercial success that had been dormant previously. This chapter examines the iPad, as well as Android tablets, and looks at management and buying choices.*

In the year since I wrote this original text, an entirely new class of personal electronics has taken off: the tablet. While there were tablet computers before the

iPad, it isn't a stretch to say that the iPad sold more in the first year of its existence than all preceding tablet computers put together. During Apple's 2011 Worldwide Developer Conference keynote, Apple CEO Steve Jobs said that Apple had sold more than 25 million iPads in the first 14 months of its commercial availability.<sup>1</sup> Since then, the growth hasn't slowed. Through the end of 2011, Apple sold a total of 55.28 million iPads worldwide.<sup>2</sup> When something that popular hits the world of personal electronics, it's going to have an impact on expectations. So this chapter will be about this new tablet resurgence, and how the iPad has ushered in what Jobs called the "post-PC era" of computing.

It was way back in 2000–2001 that Microsoft popularized the term *tablet* for a computer that lacked a keyboard, instead relying on a screen for input. Indeed, a tablet could be accurately described as being only a screen with the input and the display being the entirety of the device. Microsoft was so certain that the tablet computer was the future that CEO Bill Gates told CNN, “The tablet takes cutting-edge PC technology and makes it available whenever you want it, which is why I’m already using a tablet as my everyday computer. . . . It’s a PC that is virtually without limits—and within five years I predict it will be the most popular form of PC sold in America.”<sup>3</sup>

Microsoft went about producing tablets, but aside from uptake in some specialized fields such as medicine, where the tablet form factor was incredibly useful, the adoption of tablets elsewhere, especially in the general consumer market, was practically nonexistent. There are many reasons that these early tablet computers didn’t take off among consumers, but a quick list would include these: early tablets were often a price premium over standard notebooks, they ran an operating system designed around the keyboard and mouse, and they often required the use of a stylus or other input device.

## Apple iPad

Gates was off by a few years, and he was also wrong about who would be making the tablets. A decade later, Apple released something called an “iPad” (figure 2.1) that became the fastest-selling non-phone electronic device in history.<sup>4</sup> Announced in January 2010 and available in April of the same year, the original iPad was a thin slab of aluminum and glass driven by Apple’s iOS operating system. It was available in a variety of configurations, with two choices for connectivity (Wi-Fi only, or Wi-Fi + AT&T 3G) and three choices for storage capacity (16, 32, or 64 GB of internal flash storage).<sup>5</sup>

The iPad has been so popular and has defined the market for tablets so thoroughly that some technology pundits have quipped that there is no “tablet” market, there is really only an iPad market. Marco Arment, creator of the iOS app and website Instapaper, said, “There’s an iPad market, and the iPad could be classified as a tablet, from a hardware-centric viewpoint. But the market for non-iPad tablets is about as big today as it was before the iPad, which isn’t nothing, but it’s close enough to nothing that Apple doesn’t need to worry about it.”<sup>6</sup>

Most people think of the iPad as a follow-up to the iPhone or iPod Touch and believe that Apple took its mobile phone OS and upsized it for the tablet. That’s not actually true, as iOS was originally developed for the tablet form factor and then scaled down when

Apple realized that the phone market was its priority. So Apple took its in-development tablet operating system and scaled it to work on a mobile phone, which turned out to be a great move. With the iPad, Apple returned the user experience to the full screen size it was originally designed for, and it’s been a huge, huge hit.

In March 2011, Apple released the second-generation iPad, called simply the iPad 2. While the new device has the same screen and runs the same operating system as the previous generation, it is significantly thinner and lighter and has similar battery life despite having a more powerful processor. Apple chose to include both a front and a rear camera on the iPad 2 and extended the models to include one that was capable of 3G connectivity with Verizon, bringing the number of different unique models of iPad 2 up to nine.<sup>7</sup>

Why has the iPad been such a success? In designing the tablet, Apple gave consumers a sort of “magic window” that could transform into whatever information device that they needed. It is equally adept at browsing the Web, reading a book, playing a game, or watching a movie. While laptops and their smaller, cheaper cousin, the netbook, could do these things as well, the iPad gave people a user experience that many preferred. The speed and flexibility of the iPad, combined with the convenience of the form factor, filled a need that people didn’t realize they had. Well, maybe need is too strong a word; the iPad definitely is filling a space in computing that previously wasn’t being filled as well as eating into the sales of low-end laptops. It isn’t at all unusual for people at this point to consider an iPad in lieu of a netbook or even a more fully featured laptop. For Web browsing, e-mail, Facebook, and a couple of games, the iPad is perfect, and that covers about 90 percent of most people’s use of their computers.

With the success of the device came an explosion of apps for it. At this point in time, if you can think of a website, information service, retailer, or service provider, it probably has an app available for iOS devices. Governmental agencies are using apps to reach out to citizens, financial institutions have apps that allow for the management of your portfolio, and every retailer from Amazon to Wal-Mart has an app designed to make it easy to shop. One of the strengths of the iPad has been its media capabilities, with apps like Netflix, HBO GO, ABC, Hulu Plus, and more providing video from just about every possible online source. Music and other audio is equally present, with services from Pandora to MOG to Spotify and hundreds more just a click away.

And then we come to books. iOS devices are currently the only devices that give users the ability to purchase and read books from all of the major booksellers online: Amazon, Barnes and Noble, and Apple itself—not to mention all of the other possibilities like Copia, Blio, and Kobo. In addition, through an app like Bluefire Reader you can sideload any books from



	AT&T	Verizon
250MB	\$14.99	
1GB		\$20
2GB		
3GB	\$30	\$35
5GB	\$50	\$50
10GB		\$80

**Table 2.1**

Comparison of costs for AT&T's and Verizon's 3G data plans for the iPad 2. Sources: "Apple iPad 2 with Wi-Fi +3G," AT&T website, accessed February 17, 2012, [www.att.com/shop/wireless/devices/ipad.jsp](http://www.att.com/shop/wireless/devices/ipad.jsp); "iPad 2 on the Verizon Wireless 3G Network in Stores Nationwide on March 11," news release, Verizonwireless.com, March 10, 2011, <http://news.verizonwireless.com/news/2011/03/pr2011-03-09y.html>.

any bookstore that uses Adobe DRM for its EPUB files. There is even an app directly from OverDrive that allows for the loading of OverDrive books from library collections. If there is a bookstore or service that provides e-books, it's almost certain that there is an iOS app that will take care of it. In our current e-book landscape, where titles are being offered by a dozen or so different storefronts, iOS is the only option for being able to access them all.

### Hardware Details

As mentioned above, there are several different models of iPad 2 currently for sale, but all of the differences boil down to memory and connectivity. You can purchase an iPad 2 with either 16, 32, or 64 GB of local storage and with either Wi-Fi-only data or two different 3G data providers, AT&T or Verizon.<sup>8</sup> In both cases for 3G, no contract is required, and the data is purchased in monthlong chunks of total usage, as seen in table 2.1.

Without a contract, you can choose to activate the data plan one month (when you're traveling) and then not the next (when you're mostly in places with Wi-Fi). It's a really good option for rural libraries, where Wi-Fi might be scarce but there's the potential for picking up a stray couple of cellular signals.

The only significant difference between the 3G and the Wi-Fi-only models (aside from the data capabilities indicated in the names) is that the 3G iPad contains a GPS chip, while the Wi-Fi-only doesn't. This doesn't mean that the Wi-Fi version doesn't have any location abilities. It does, but it is limited to geolocation via the Wi-Fi access point it is connected to, rather than being able to locate itself on the globe sans any data connectivity. The GPS chip in the 3G models allows the iPad to be used as a stand-alone GPS with the right app, something that may be needed in certain use cases.<sup>9</sup>

### iOS and Everyday Use

As with all personal electronics, moving them from a "personal" implementation to an enterprise implementation is fraught with choices and drawbacks. These devices are, for the most part, designed to be owned by a single person, synced to a single computer, and used by a single person. Using iPads and other iOS devices in a library setting can be challenging. Here are a few tips and tricks to make dealing with them a bit easier.

### iOS for Library Staff

If your library is providing iOS devices for your staff to use in the library, managing them is reasonably straightforward. You can attach any number of iOS devices to a single iTunes account, as long as Automatic Download isn't turned on for said devices. Automatic Download is a feature on iOS that syncs purchases across devices: if you have Automatic Download on and you buy an app on one device, it automatically downloads to your other devices that have it turned on. However, if you don't turn on Automatic Download, you can still manually download apps via iTunes to as many iOS devices as you'd like. If you choose to activate this on your devices, you are limited to ten iOS devices per iTunes account.<sup>10</sup> So, the moral of the story is don't turn on Automatic Download if you are going to have more than ten iPads or other iOS devices attached to a single iTunes account.

If you are a member of library IT and are tasked with upkeep, management, security, and other IT issues with iOS devices for either staff or patron use, Apple provides a huge number of resources to help. It has an entire site dedicated to using iOS in an enterprise setting, which covers everything from setting up Microsoft Exchange on iOS devices to setting up VPN access. It also has instructions on over-the-air profile delivery that automatically sets up a new iOS device with all of your settings—restrictions on device features (disabling the camera, for example), Wi-Fi settings, VPN settings, e-mail server settings, Exchange settings, LDAP directory service settings, and more.

#### *Enterprise iOS support*

[www.apple.com/support/iphone/enterprise](http://www.apple.com/support/iphone/enterprise)

#### *Over-the-Air Profile Delivery and Configuration*

<https://developer.apple.com/library/ios/#documentation/NetworkingInternet/Conceptual/iPhoneOTAConfiguration/Introduction/Introduction.html>

Unfortunately, one of the things that libraries would most like to be able to do, purchase and check out media onto a tablet, is almost impossible. Libraries have more or less one vendor, OverDrive,

that is focusing on providing media to library patrons through a tablet app. Nearly every other provider of personal content on the tablet (Amazon, Netflix, Hulu, et al.) have terms of service that preclude libraries from using them. This isn't to say that patrons couldn't use these apps with their own accounts. If you circulate the iPad in a "raw" state where none of the apps is attached to an account, patrons could check out the iPad and log in to their own Netflix account just fine.

### Native Apps

Built into the operating system of the iPad are a number of apps that are native to the device and can't be removed. These include Mail, Maps, Contacts, Calendar, Messages, Notes, YouTube, Safari, Reminders, iTunes, App Store, and Camera. The Maps app is an iPhone-specific incarnation of Google Maps, and YouTube is simply a specialized viewer for the same, but the rest of the apps are directly Apple in nature. Mail acts as a universal inbox, allowing you to add a number of different e-mail boxes to the device and have them shown to you all at once. Calendar and Contacts all sync with a variety of sources (Google, Microsoft Hotmail, Microsoft Exchange via Microsoft ActiveSync, iCloud), while the Mail app handles Gmail, Yahoo Mail, AOL Mail, Hotmail, iCloud, and any other standard IMAP or POP mail client that you may have.<sup>11</sup>

Reminders, new for iOS 5, is a location- and time-aware to-do list that can alert you when specific conditions are met. Need to be told to take the garbage out when you get home? Reminders can do that, as long as you enter your home address into Contacts, by querying the GPS for your location and using iOS Notifications when you get within a few dozen feet of your address.

### Apple and Textbooks

On January 19, 2012, Apple held a press conference at the Guggenheim in New York City, announcing its entry into the world of electronic textbooks.<sup>12</sup> Apple has decided to attempt yet another media disruption, this time focusing on reinventing the textbook market. This move was foretold in the biography of Steve Jobs, where Walter Isaacson wrote, "He wanted to disrupt the textbook industry, and save the spines of spavined students bearing backpacks by creating electronic texts and curriculum material for the iPad."<sup>13</sup>

The details of the announcement should definitely interest anyone in libraries, but especially school libraries (and, I think, academic libraries as well). The first announcement was the simple fact that Apple is getting into the electronic textbook market, providing tools for making electronic textbooks with rich media embedded and selling them in the iBooks store for the iPad. Apple also announced that it had signed three of

the largest producers of textbooks in the United States to be partners in the project: Houghton Mifflin Harcourt, McGraw-Hill, and Pearson.<sup>14</sup>

Three different software products were announced as well: iBooks 2, iBooks Author, and iTunes U for iPad. iBooks 2 gives you access to the textbook store, as well as adding features like highlighting and note taking, definitions, lesson reviews, and study cards.<sup>15</sup> The iTunes U app is a shortcut into the previously iTunes-focused iTunes U portal for free curricular content from a number of colleges and universities across the world.<sup>16</sup> iBooks Author is the most interesting of the products, as well as being the one that's generated the most discussion, almost entirely because of its end-user license agreement.

iBooks Author allows for the creation of media-rich e-books for the iBooks store or exportable to PDF or TXT files without the fancy media embeds.<sup>17</sup> Unfortunately for everyone, Apple chose to not support the emerging EPUB 3 standard for import and export. This is an Apple-only playground for the time being, with no import facilities at all. You start from a template and build out an e-book using tools that are reminiscent of Apple's own Keynote presentation software: it's by far the best interface I've seen for creating complicated e-books. It's a real shame that Apple chose to restrict the output to working only in iBooks: understandable from their point of view, but overall, I think, the wrong call.

The real controversy comes in the EULA for Author. Included in the agreement is a section that reads

- B. Distribution of your Work. As a condition of this License and provided you are in compliance with its terms, your Work may be distributed as follows:
  - (i) if your Work is provided for free (at no charge), you may distribute the Work by any available means;
  - (ii) if your Work is provided for a fee (including as part of any subscription-based product or service), you may only distribute the Work through Apple and such distribution is subject to the following limitations and conditions: (a) you will be required to enter into a separate written agreement with Apple (or an Apple affiliate or subsidiary) before any commercial distribution of your Work may take place; and (b) Apple may determine for any reason and in its sole discretion not to select your Work for distribution.<sup>18</sup>

The commercial clause is the one that has most people worried and seems to be unique in the world of EULAs. You'd be hard pressed to find another piece of software that limits your ability to sell the output of said program. They exist, but this is far more direct and

draconian than any previous license that I'm aware of. For authors who want to use the tool, this locks them in to distribution via the iBooks store, which means that libraries and librarians are going to be cut out of purchasing them for collections in any real way. On the other hand, it means that if libraries themselves want to use the tool to produce tools to help users and distribute them for free, they can easily and quickly do so with iBooks Author.

Apple is starting its textbook rollout with titles designed for high school (grades 9–12 in the United States), which is surprising given the intense political and educational decision making that goes into choosing public school textbooks in the United States. I had expected Apple to start with college and university textbooks, where the decision to use or not use is almost entirely up to the professor teaching the class. This is almost certainly just a preliminary trial, and I suppose if Apple hooks the high schoolers, then the expectation of iPad textbooks might trickle up to the world of higher education.

These are far from a sure thing, but as the last fifteen years shows us, it's not a good bet to bet against Apple when it comes to selling things to consumers. Libraries should be ready to answer questions about these things over the next year or so as Apple tries to make textbooks into another conquest in its personal electronics and services empire.

## Android, Android Everywhere

While Apple redefined what a tablet could be, it's not the only tablet game in town. At the time of the iPhone's launch in 2007, Google had been working on a phone operating system for a few years. That operating system came to be called Android, and Google has been providing the core of the operating system as open source software for handset makers to use on their hardware. Given that it was being overseen by one of the largest technology companies in the world and that it is open source, it's only natural that hardware makers looked to it as a solution for an OS for the burgeoning tablet market.

There are dozens of varieties of Android tablet on the market, from more than a dozen different manufacturers such as Sony, Dell, Lenovo, Samsung, Asus, Motorola, Archos, Toshiba, and Vizio. They run the gamut of connectivity options, screen sizes, memory availability, and more. Some are even designed with integrated keyboards, bringing into question how to properly define the tablet category. Android tablets have many of the same features as an iOS tablet, including apps for standard computing functions (mail, calendar, music) built in. But the distinction in operating systems means that apps written for iOS don't work on Android, and vice versa.



**Figure 2.2**  
Samsung Galaxy Player 5.0

As a result, Google has its own app store, the Android Market, where you can download apps onto Android devices. But certain manufacturers, most significantly Amazon, have forked the Android app ecosystem and have their own app store that is completely separate from the Google one; apps must be submitted separately, and Amazon has approval over that process, rather than the free-for-all that takes place in the larger Android Market. This means that there are apps you can find only in certain places, and because of the hardware variety, there are apps that function only on certain Android devices. As an example, the Amazon Kindle Fire doesn't have GPS or a camera, and there are a great many apps that rely on those for functionality.

There are dozens and dozens of Android-based tablets on the market, so how do you make the decision which to experiment with or implement in your library? Here are my recommendations, as well as why I think they are the best in class. I've broken them up into categories that fit specific use cases, but can't possibly cover all of them. I hope this is a solid introduction to the possibilities, though.

### Best Android Device for Roaming Reference

I'm going to go a bit out on a limb with this one, but for roaming reference sorts of uses that revolve around

helping people on the go, mostly with a web browser, I'm going to pick something that isn't even billed as a tablet: the Samsung Galaxy Player 5.0 (figure 2.2). Samsung bills this as a \$270 media device, but it's a full Android tablet, just in a five-inch form factor. Wi-Fi-only, it's just big enough that the screen is easy to use for web browsing, but small enough to be pocketable (barely).<sup>19</sup> It's got good battery life and would work very well as a "let me help you with that" device.

It's not a full-sized tablet, however, so reading PDFs and other "big screen" tasks are likely to be uncomfortable at best. But if you wanted to play with an Android device for providing services, this is a good, low-cost/high-impact choice.

### Best Android Laptop Replacement

This one is easy, although not available yet. At CES 2012, Asus announced the Asus Eee Pad Transformer Prime TF700 (figure 2.3), an update to its currently available Asus Eee Pad Transformer Prime TF201. (Don't you just love these names?) So what's so great about the TF700? The first thing is that it's a hardware beast, with a quad-core processor (most powerful yet in a tablet) and a massive HD screen that runs at 1920 × 1080. It's got power like a laptop, but runs the very latest Android OS, Ice Cream Sandwich.<sup>20</sup> (Aside: Android operating system releases are code-named after deserts, alphabetically; the first commercially available version was Cupcake, then Eclair, Froyo, Gingerbread, Honeycomb, and now Ice Cream Sandwich.)

But the main selling point for those wishing to replace a laptop with a tablet (not a plan I'm going to endorse, but it seems to be a popular one) is that the Transformer line from Asus has a keyboard dock that makes it look more or less exactly like a laptop. The dock even includes another battery that can recharge or power the main battery in the tablet, making it easy to take notes and such in a business environment, but still pop the screen off and have the convenience of the tablet form factor.

### The Baby Bear Android Tablet: Not Too Big, Not Too Small

The Asus Eee Pad line gets another win here, with the MeMo ME370T (figure 2.4). (Did I mention how unhelpful these names are?) What it lacks in snappy moniker, it makes up for in form factor. The MeMo is a seven-inch Android tablet that does most everything its big brother the Transformer does, just in a size that will go in a purse or jacket pocket. It's also about the same price as the Galaxy Player listed above, as the retail looks like it will be in the \$250 range.<sup>21</sup> This makes it a really good sweet spot for Android tablets: screen is big enough to give you enough real estate for



**Figure 2.3**

Asus Transformer Prime TF700

PDFs and web pages but small enough to be portable and easily handled.

I'm a big fan of the seven-inch tablet, as it mimics the size of a hardback book very well and is a comfortable size to interact with. The MeMo is one of a group of seven-inch tablets that I think could be very useful in libraries, a couple of which I've lumped into the discussion below on e-readers: the Nook Tablet and the Amazon Kindle Fire.

If your use case doesn't include needing a stock Android tablet, read on and see if the Nook Color, the Nook Tablet, or the Kindle Fire is a better choice. For most libraries that want to play with a tablet, any of the choices from Barnes and Noble or Amazon are solid choices.

### Android Apps and Management

Much like the iOS operating system that runs the iPad, Android is built with the expectation that there is a single owner of the device in question. It's not designed for shared or public use in the same way that computers have been for the last three years. Android tablets must be attached to a Google account in order to download apps from the Market and for large portions of the built-in functionality like the Gmail client and other native Google apps.

If you have access to Google Apps for business, education, or government, there is a My Devices app that allows for web-based control of Android devices attached to a single account. This allows for a variety of policies, including password strength, to be enforced and for locking and locating the tablet or other device. This functionality requires a corresponding Google Apps Device Policy app to be installed on each tablet. The app is free and can be found in the Android Market.





**Figure 2.4**  
Asus MeMo ME370T

These tools don't provide a full suite of management tools for Android, but there are businesses that are filling that gap and will handle enterprise-level rollouts of Android devices if needed. One such business, Zenprise, handles the above services as well as the creation of a curated app bundle for users to download and install. There are many other businesses that do similar things if your library or system is trying to find a commercial solution to large-scale rollouts.

*Google Mobile: Manage My Devices*  
<http://support.google.com/mobile/bin/answer.py?hl=en&answer=1235372>

*Android Market: Google Apps Device Policy*  
<https://market.android.com/details?id=com.google.android.apps.enterprise.dmagent>

*Zenprise: Android Management*  
[www.zenprise.com/solutions/android-management](http://www.zenprise.com/solutions/android-management)

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# E-Readers Now, E-Readers Forever!



**Figure 3.1**  
Kindle family

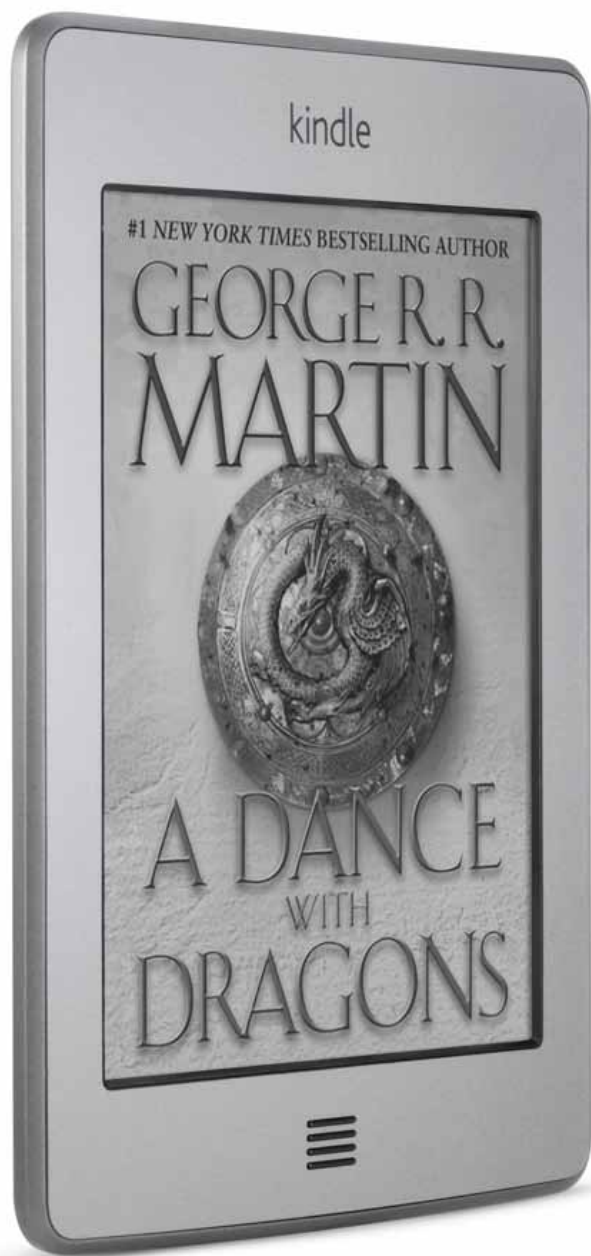
## Abstract

*While a tablet is a sort of “magic window” that becomes whatever you want via apps, the e-reader is a device almost entirely dedicated to a single function, that of reading long-form text. E-readers such as the Kindle and the Nook do this job very, very well and deserve their own attention, separate from their do-anything tablet brethren.*

In 2010, e-readers using E Ink screen technology were at the height of their hype, and there were dozens of models in the production pipeline. The big three that I focused on in 2010 are still the industry leaders:

Amazon, Barnes and Noble, and Sony. That order is also their U.S. market share, with Amazon and its various Kindle models being the leaders among the general public for e-reader adoption.<sup>1</sup> Barnes and Noble and the Nook family are holding on and appear to be a clear second place as far as sales go. The Sony Reader line is a distant, distant third, and anyone else that’s still competing in the market (Kobo and a few others) are distantly behind them.

In my previous “Gadgets and Gizmos” report, I went into detail about how E Ink works and the pros and cons of that generation of e-readers. Most of the pros and cons stay the same, but the lineup is quite



**Figure 3.2**  
Kindle Touch

different. Most different of all are the prices. In early 2010, you could expect to pay more than \$200 for any model of e-reader, while now you can purchase a Kindle from Amazon for \$79. A Nook will run you just \$20 more, at \$99.<sup>2</sup> Here's a quick summary of the e-readers I would recommend now, in early 2012.

## Amazon Kindle

The Amazon Kindle, the base model of Kindle (figure 3.1), operates with mechanical buttons for page turning

and doesn't include a keyboard, instead relying on a five-way switch and an on-screen keyboard that you must click through in order to type. However, if you don't do a lot of note taking while reading and you buy most books online and have them delivered to your Kindle, this is by far the cheapest way to get into the Amazon ecosystem at \$79 (with ads) or \$109 (without ads).<sup>3</sup>

## Amazon Kindle Touch and Barnes and Noble Nook Touch

Amazon's Kindle Touch (figure 3.2) and Barnes and Noble's Nook Touch are such nearly identical pieces of hardware that the only real decision is which ecosystem you prefer. Both use the same screen and the same technology to make the screen respond to touch; around the bezel of the screen are a series of infrared sensors that are activated when something physical interrupts the beam. Since this isn't reliant on capacitive touch in the same way that the typical tablet screen is (where the screen relies on sensing an electrical sign caused by the capacitance of your skin), you can use this form of touchscreen with gloves, with a stylus, or really anything that can touch the screen. This is good and bad, since anything touching the screen (a sleeve, a blanket, etc.) can cause the page of the book you're reading to turn.

There is no physical keyboard for either, but the touch-based keyboard is responsive and easy to use. The keyboard just appears when you need it and disappears when you don't. It's certainly not as fast as a physical keyboard, but some of this is just a result of the lag of the E Ink screen updates. These screens are enormously better than the models of Kindle and Nook from 2010 in nearly every way, but E Ink simply isn't capable of the instantaneous response you get from an LCD screen.

With the Kindle Touch, there are a few decisions to be made as to the right model for your needs. There are, in effect, four distinct types of Kindle Touch (see table 3.1).

The choices come down to how the device connects to the Internet and Amazon's "Special Offers," better known as "advertisements." On the Kindles with advertisements, there are ads delivered by Amazon in the place of a screensaver and to the lower part of the screen when you are browsing the home screen. There are never ads during the reading process or inside the text of a book. When you have purchased a Kindle with "Special Offers," you can elect to pay the difference in price directly on the Kindle or at a later date to turn off the ads.

For personal purchases, the advertisements probably aren't terribly intrusive, but for a library planning to circulate Kindles, I can't imagine circulating them with advertisements that the library can't control. If you are

	With "Special Offers"	Without "Special Offers"
Wi-Fi Only	\$99	\$139
Wi-Fi + 3G	\$149	\$189

**Table 3.1**

Prices of different types of Kindle Touch. Sources: "Kindle Touch," Amazon.com, accessed February 17, 2012, [www.amazon.com/Kindle-Touch-e-Reader-Touch-Screen-Wi-Fi-Special-Offers/dp/B005890G8Y/1ERW8Y](http://www.amazon.com/Kindle-Touch-e-Reader-Touch-Screen-Wi-Fi-Special-Offers/dp/B005890G8Y/1ERW8Y); "Kindle Touch 3G," Amazon.com, accessed February 17, 2012, [www.amazon.com/Kindle-Touch-e-Reader-Touch-Screen-3G-Special-Offers/dp/B005890G8O](http://www.amazon.com/Kindle-Touch-e-Reader-Touch-Screen-3G-Special-Offers/dp/B005890G8O).

buying for your library, plan on paying the "No Special Offers" premium if you're buying a Kindle. The Barnes and Noble Nook doesn't have ads at all, which makes that \$99 price point a little more attractive as compared to the \$139 Kindle with the same specs.

The other choice is the one of connectivity. Here the decision is just between a Kindle that can connect to only 802.11x Wi-Fi or one that has a built-in cellular modem that will connect to 3G signals when out of range of Wi-Fi. What will likely drive your choice here is the infrastructure of where you live and the service you offer to your patrons. If you are checking out the device to patrons and they are downloading their own books onto it, and if you are in an area of the country with very low broadband penetration rates, you'll probably want to give patrons a 3G Kindle to increase their likelihood of being able to connect to Amazon. If you don't expect patrons to be able to download books themselves, connectivity after you check it out is less important, so you can almost certainly get by with the Wi-Fi-only model.

## Getting Library Content onto the Kindle

Amazon just recently announced a tool specifically for moving local, private files onto the Kindle, including the Kindle app, called Send to Kindle.<sup>4</sup> Currently only for Windows PCs (but with Mac support forthcoming), it is a seamless way to deliver files from a PC to any Kindle device or app. It acts as a right-click option in Windows Explorer, letting you right-click on any of the supported file types and choose Send to Kindle, and it delivers the file to the device via Amazon's servers. The supported file types are

- Microsoft Word (.doc, .docx)
- HTML (.html, .htm)
- RTF (.rtf)
- JPG (.jpeg, .jpg)
- Kindle Format (.mobi, .azw)

- GIF (.gif)
- PNG (.png)
- BMP (.bmp)
- PDF (.pdf)

This Send to Kindle option could be a very useful one for certain workflows in libraries. Any situation where we're loading library content onto Kindles could be enhanced by this functionality. There are numerous other ways to get content onto a Kindle, ranging from direct loading via USB to the e-mail gateway that every Kindle gets when it's registered.

For the ideal reading experience, content that is moved to a Kindle should be in MOBI format. Most versions of the Kindle will handle PDFs well, with the exception that the screen is often smaller than ideal for display, and zooming and panning are less convenient on an E Ink screen than on an LCD. Most library content won't be in MOBI format natively, but where possible, there are tools that can do the conversion for you. The most popular of these is the e-book management tool Calibre, which will convert to and from almost any e-book format.

*Calibre*  
<http://calibre-ebook.com>

This is ignoring the most popular way to get library content onto a Kindle: that is, via the OverDrive e-book service that integrates directly with Amazon. As that's the easy way to do it and is vendor-supported, I assume most libraries that are using OverDrive are comfortable with this solution.

## E-Reader to Tablet

Both Amazon and Barnes and Noble have moved past the E Ink readers to make e-reader models that have traditional LCD screens. These products, the Barnes and Noble Nook Color and Nook Tablet (figure 3.3) and the Amazon Kindle Fire (figure 3.4) blur the line between e-reader and tablet, with some functionality from each. These three devices are all Android-based tablets with nearly every aspect of the interface altered in order to produce the experience that each wants.

In Amazon's case, the Kindle Fire is optimized for media consumption via Amazon's various channels; books from the Kindle Store, movies and television from the Amazon Instant Video service, and music from Amazon Cloud Player. With the LCD screen and Wi-Fi connectivity, you can purchase and stream media directly from Amazon anywhere you can get online. The Fire is also a window into the Amazon storefront, allowing you to shop and purchase smoothly from the





**Figure 3.3**  
Nook Color and original Nook

device, and has a web browser and access to the Amazon App Store, a curated subset of Android apps that run on the Fire.

The Nook Color and Nook Tablet are both LCD-based e-readers, based on Android, with yet another App Store experience and curated apps to choose from. The Nook Color has been around for over a year at this point, and the Nook Tablet could have easily been called the Nook Color II. It's very, very close to the same device with enhanced specs: a faster processor and more memory, mainly. The Nook Tablet was released as a sort of replacement for the Nook Color, but Barnes and Noble is continuing to sell both for the time being, giving them two different price points: the Nook Color at \$199 and the Nook Tablet for \$249.<sup>5</sup>

However, none of these devices should be mistaken for tablets, at least not out of the box. While they do all run some version of Android, all of them (Amazon Fire, Nook Color, and Nook Tablet) are skinned with customized user interfaces that obscure the fact that Android is running the show. Each company has, by default, some limitations on the apps that you can download

and install onto the device in question. In the case of the Fire, Amazon restricts the loading of apps to its own App Store, going so far as to redirect Web queries to the Google Android Market back to the Amazon App Store automatically. This means that you can't, by default, get a lot of the value-loaded apps that come on a certified Android device, mostly those provided by Google directly: Google Maps, Gmail, Google+, and so on. Without these baseline apps, these tablets feel far less like something I'd want to work on and far more like the glorified e-reader that I think you should understand them as.

As readers, these all work very, very well. The benefits of the LCD screens are readily apparent in their responsiveness, ease of typing, and color display. Books that rely heavily on photographs or illustrations (cookbooks, children's books, etc.) and magazines look phenomenal on them. These also open the door to video as a media consumable, with the Fire and the Tablet both able to play back HD videos without any problems. Earlier E Ink devices from both Amazon and Barnes and Noble would play audio



**Figure 3.4**  
Kindle Fire

files, although these devices certainly make it a lot easier and more attractive.

Amazon is doing some very interesting cross-promotional access to media that might sway the individual who is trying to make a purchasing decision among these e-reader tablets. The first is that while the Fire draws its video access from the Amazon video store (where you can digitally purchase a large number of videos for sale), Amazon offers free streaming from its Instant Video collection (a subset of its larger video collection) to members of Amazon Prime. Amazon Prime is a \$79-per-year sort of Amazon fan club,<sup>6</sup> where the original perk was that, as a Prime member, you received free two-day shipping with any order from Amazon—any order at all, so that meant that if you were a Prime member, ordering anything from Amazon just became a default position. You paid \$79, but you can order a can of tuna and have it delivered for free. Or, as in my case, a television set or a mattress.

The reason I mention Amazon Prime in this context is that Amazon is sweetening the Prime membership with bonus access to its Instant Video collection for members. Prime members with a Kindle Fire get free streaming access to over 100,000 televisions and movies.<sup>7</sup> What should directly concern libraries is that Amazon recently added access to what they are calling the Kindle Owners' Lending Library, which is just exactly what it sounds like: access to lendable books, for free, from Amazon.<sup>8</sup> Amazon has about 50,000 titles in the Lending Library so far and is adding more and more over time. These titles are also available to Prime members at no additional cost. It seems clear that Amazon is happy to incentivize the purchase of Prime by subsidizing via content deals for media to be delivered to the Kindle Fire (and, one assumes, any future tablet they may release).

These perks of Amazon Prime membership aren't available to, and don't really matter for, libraries that wish to deal with the Kindle Fire. But for individual librarians and patrons, these may be huge drivers for making a purchasing decision. And it's the area of significant difference between the Kindle Fire and the Barnes and Noble Nook. The Nook Color and Tablet are solid color LCD-screen based e-readers and even work reasonably as an Android tablet. But they do not have the weighty infrastructure behind them that the Fire does. On the other hand, the Nook Color and Nook Tablet have one advantage that separates them from any of Amazon's Kindles. They read EPUB files. The next section will talk about some of the technical details that connect e-books, file type, and digital rights management.

## File Types and DRM

There are two different things going on when someone tries to open an e-book file on an e-reader. One is file type: how the file itself is organized internally, how the information contained within is encoded. This is analogous to the difference between a Word file saved as a .doc file, a Word file saved as a .docx file, and a PowerPoint file (.ppt). All are different file types—the program involved in the creation, editing, and display of those files describes the information contained inside. Right now, there are two main file types being used to describe e-book files: the Amazon e-book standard, or AZW file, and the EPUB file (.epub) that is used by just about every other e-book vendor.

Amazon purchased Mobipocket (an early e-book vendor and distributor) way back in 2005<sup>9</sup> and used Mobipocket's format as the basis for its own current proprietary .azw file type. EPUB, on the other hand, is an open, XML-based e-book standard and is used by a huge number of e-book vendors; indeed, it's easily the standard for current e-book publishing.

But file type is only half the battle. In addition to the way the file is organized and structured internally, there is also digital rights management (DRM) to deal with. Think of DRM on an e-book as a lock, with your e-reader having the key to open the lock and display the file. Without the key, the e-reader can't open the file at all—can't even see what it is. And if it has the key but can't read the file type, that's no good either; in that case, the e-reader can view the contents of the file but will have no idea how to render it on the screen properly.

Amazon, in addition to using a proprietary file type, also uses a proprietary DRM mechanism. This means in order to read an Amazon-purchased e-book, you have to have an e-reader with the right key as well as the right interpreter for the file. So far, that means that you have to be using a Kindle, or alternatively, using the Kindle software provided for any number of other devices (Windows, Mac, iOS, Android). This doesn't mean that's the way it has to be. Amazon could choose, tomorrow, to remove all DRM from its files. This would mean that you'd still need a program to interpret the AZW, but you wouldn't need the key anymore. Conversely, Amazon could license its DRM to other e-readers, in effect handing them the key—but it would still be up to the e-reader itself to be able to display the AZW file.

Vendors that use the EPUB format have chosen different sorts of DRM to lock up their content. Apple and its iBook app use the EPUB format but wrap it up with the Apple-specific FairPlay DRM. This means that while the file itself would be readable by any device that can interpret an EPUB file, without that particular key on its key ring, the e-reader can't do anything. Sony, Barnes and Noble, OverDrive, and other e-book vendors have chosen a shared DRM solution. They license their DRM from Adobe and run Adobe Content Servers that provide the keys to EPUB files that they sell. This means that if an e-reader has the key to one of those stores, it has the key to all of them; think of it as a shared master key for any Adobe DRM'd file.

This illustrates why, although both Apple and Barnes and Noble use EPUB as their file type, you can't buy a book from the Barnes and Noble store and then move it over to your iBook app on your iPad. Conversely, you can't buy something on the iBook store and then move it to your Nook: same file type, different lock.

OverDrive, in supporting Adobe DRM'd EPUB files, works with Sony eReaders as well as the Barnes and Noble Nook: same file type, same DRM key to unlock them. OverDrive has made a deal with Amazon to provide pass-through authentication to allow OverDrive customers to access Kindle-format files via the OverDrive interface. This doesn't mean that OverDrive is converting EPUBs or somehow magically making Adobe DRM work with the Kindle. The way that OverDrive provides Kindle files is a complete end run. OverDrive isn't in reality providing the files at all. It

is providing the authentication, and then Amazon is providing the files for the Kindle in question.

With all that said, any e-reader that will read a given file type will read said file type if the file doesn't have any DRM. So if you convert an existing document to an EPUB using software like Calibre, Sigil, or InDesign, that file will be readable on a Nook, Sony eReader, *and* the Apple iPad/iPhone/iPod Touch. If you have some text and you convert it to, say, a Mobipocket file (.mobi or .pdb), then it would be readable on the Kindle *and* the Apple iBooks app—but not on the Nook. For a complete list of e-readers and their corresponding file types, there is no better place than Wikipedia's article "Comparison of E-book Formats."

#### *Calibre*

<http://calibre-ebook.com>

#### *Sigil*

<http://code.google.com/p/sigil>

#### *InDesign*

[www.adobe.com/products/indesign.html](http://www.adobe.com/products/indesign.html)

#### *Wikipedia: Comparison of E-book Formats*

[http://en.wikipedia.org/wiki/Comparison\\_of\\_e-book\\_formats](http://en.wikipedia.org/wiki/Comparison_of_e-book_formats)

While a DRM-free e-book ecosystem would clearly be the best for the consumer (choice of device, free movement of files from device to device, etc.), the second-best option is an ecosystem where the DRM is ubiquitous and the patron doesn't even realize it's there. This was the case with Apple and the early battles for music sales on the 'net—it had the store and the distribution network (iTunes) as well as the device used to access the content (iPod). All of the content was originally DRM'd, but largely no one noticed since it was completely invisible for the average user.

The biggest issue with e-readers and library patrons is that this process isn't seamless. The content providers and their DRM servers are huge headaches for the average e-reader user. My hope is that publishing goes the same way that music did and we both find a common file type and lose the DRM. But it took digital music years and years to get there, so I'm not holding my breath.

## **Bonus Tip for Physical Management of Devices**

There are a handful of companies that provide custom-printed, fitted-to-the-device skins, a form of mildly protective sticker that wraps the devices in a layer of

printed plastic. The one I recommend for quality and service is GelaSkins, as I've used it for years and never been disappointed in its product.

*GelaSkins*

www.gelaskins.com

The idea here is that you can create a custom image with your library in mind: logo, address, contact info, website, whatever you'd like. You can then apply the skin to your devices to help with identification as a library device and add a bit of protection to the device as well.

## Notes

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4. "Using Send to Kindle for PC," Amazon.com, accessed February 17, 2012, [www.amazon.com/gp/help/customer/display.html/ref=hp\\_s2kpcland\\_file?nodeId=200768460](http://www.amazon.com/gp/help/customer/display.html/ref=hp_s2kpcland_file?nodeId=200768460).
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6. "Amazon Prime," Amazon.com, accessed February 17, 2012, [www.amazon.com/gp/prime](http://www.amazon.com/gp/prime).
7. Ibid.
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9. "Franklin Sells Interest in Company, Retires Shares," Philadelphia Business Journal, March 31, 2005, <http://philadelphia.bizjournals.com/philadelphia/stories/2005/03/28/daily32.html>.

# Absolutely Fab-ulous

## Abstract

*Our current levels of technology are enabling many things that were complete science fiction only a decade or so ago, but no modern technology is more capable of inciting futuristic predictions than 3D printing. The very idea that you can download a digital file and transform it into a physical, functional thing is science fiction turned technological fact. This chapter is a roundup of 3D printing options as they stand in 2012 and how said options might fit into libraries.*

There are interesting and exciting new opportunities for libraries coming in the form of a technology called 3D printing or, more colloquially, “fabbing.” This technology is just becoming affordable at the consumer level, although it’s been used for decades by corporations. As some have described it, 3D printing is at the stage that personal computers were in the 1970s. Kits for home computers existed, and you could buy different models, but they were largely toys for geeks who were trying to learn about their capabilities. However, we all know the history of where that “toy for geeks” went, and fabbing has the potential to redefine how we make and consume goods of all sorts.

The technology is conceptually simple, although in practice the theory gets played out in a number of different forms. The current high end in the fabbing world is a technology called *laser sintering*, and the low end is a much simpler method called *deposition printing*. Both rely on taking a raw, unformed material, designing a three-dimensional object, expressing it as a digital file, and converting the material to a real object that you can hold, use, mold, or otherwise interact with.

In the laser sintering process, the substrate to be “printed” is usually a fine powder that can be made

of a large number of materials—plastic, ceramic, even some metals. Multiple lasers are passed through the material in three dimensions, fusing the material together particle by particle until an entire structure is formed. The device is then turned off, and the object is removed from the residual powder as a single, complete structure. This process gives the best resolution of prints, as the degree of detail available for the structure is limited only by the fineness of the powder and the precision of the laser. Which is to say, you can produce remarkably delicate structures using this process.

The other major 3D printing process is deposition printing. This is far simpler in both concept and practice and is the least expensive way to print in 3D at the current time. With this sort of fabber, you have a print head that is composed of a heating element that liquefies a form of plastic wire that is fed into it and deposits very fine amounts of said plastic onto a printing platform. The print head typically moves in two dimensions across the platform, and then either the platform or the print mechanism moves in a third dimension, creating an object with depth. Something printed with a deposition printer is printed in very thin layers of liquid plastic and then built up slowly.

With particularly high-end sintering printers, you can even introduce multiple colors into the substrate with dyes, allowing for full-color objects to be printed.

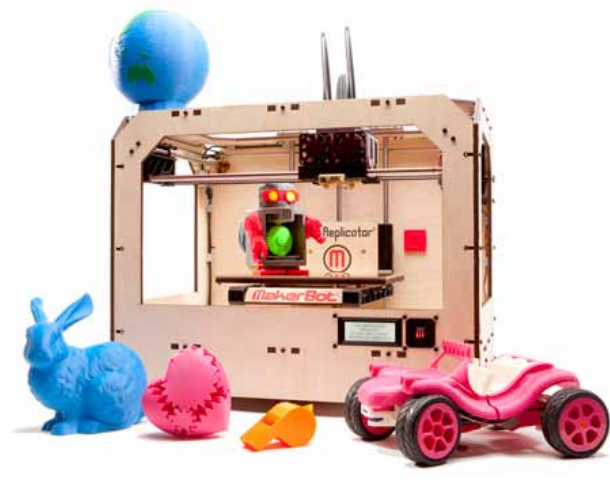
Even just a few years ago, any 3D printer was extremely expensive, and the software and hardware required to operate one was difficult to use and required a high degree of effort and skill. Now, you can purchase a kit to build your own deposition printer for just a bit over \$500, and the software is largely straightforward (if needing a bit of trial and error to learn) and most important, free. You can design an object using the free version of Google Sketchup,



export it, and print it to a printer that costs less than a high-end laptop, and be holding a physical expression of your model in minutes or hours.

*Google Sketchup*  
<http://sketchup.google.com>

There are numerous 3D printers available for purchase in kit form, but the industry leader for individuals doing this is MakerBot Industries. MakerBot is a company that manufactures a printer called the Replicator (figure 4.1), which comes pre-assembled and ready to print in two varieties. The first is a “single extruder” model, which means that it can print in a single color at a time from a single spool of plastic and has one print head for deposition. The second is a dual extruder, which (as the name implies) has two print



**Figure 4.1**  
 MakerBot Replicator

heads that are capable of printing in two different colors simultaneously. Both are the same size and have the same-size printing platform, capable of printing an object that is up to 300 cubic inches in size, or about the size of a loaf of bread.

The MakerBot Replicator is available in single-extruder for \$1,750, and dual-extruder for \$2,000.<sup>1</sup>

MakerBot also runs a website called Thingiverse, which is maybe the world’s largest collection of 3D object models for printing. Need a new chess piece? Someone has already uploaded it for you, ready for you to download and print. Want to alter the piece to be a different size, or you want your knight to have a unicorn horn? Easy enough—you can alter the files in a free program after they are downloaded. Want to print bookmarks with your library logo embedded in them? No problem—and if you edit the file and upload it with your logo, anyone in the world can re-use your work and print your bookmark for themselves.

*Thingiverse*  
[www.thingiverse.com](http://www.thingiverse.com)

One easy way of thinking about the power of 3D printing is to imagine that, in the same way that books democratized information and the Internet has democratized communication, 3D printing is going to democratize production of goods.

There are other companies making printers of varying degrees of complexity and completeness. One company, RepRap, is dedicated to working to design a printer that is capable of printing itself—or rather, printing the parts that you need in order to print another, effectively making the printer self-replicating. Table 4.1 shows a list of current companies and models of 3D printers available now.

Company	Product	Website	Price
BotMill	Glider 3D Printer (fully assembled)	<a href="http://botmill.com/index.php/3d-printers/glider-105.html">http://botmill.com/index.php/3d-printers/glider-105.html</a>	\$1,395
Ultimaker	Complete Ultimaker Kit	<a href="http://blog.ultimaker.com/">http://blog.ultimaker.com/</a>	\$1,500
Bits from Bytes	RapMan 3.2 3D Printer Kit	<a href="http://www.bitsfrombytes.com">http://www.bitsfrombytes.com</a>	\$1,390–\$2,170
RepRap	Mendel (RepRap II) Prusa (Mendel variant) Huxley (RepRap III)	<a href="http://reprap.org/">http://reprap.org/</a>	varies
Printrbot	Printrbot	<a href="http://printrbot.com">http://printrbot.com</a>	not currently for sale
Solidoodle	Solidoodle 3D Printer (fully assembled)	<a href="http://www.solidoodle.com/">http://www.solidoodle.com/</a>	\$700
Shapercube	Shapercube 3D Printer Kit	<a href="http://www.shapercube.com/">http://www.shapercube.com/</a>	\$1,400

**Table 4.1**  
 3D printers other than MakerBot Replicator

All 3D printers have their pros and cons, but if your library is interested in playing with 3D printing, I would recommend going with MakerBot printers. They have the largest community around them and solid support for the product. MakerBot was one of the first to commercialize 3D printing and is a very safe choice for libraries.

The software needed for 3D printing can range from the very simple (Google Sketchup) to incredibly complicated and expensive (Autodesk Maya). Many, many models, especially those with simple geometries (boxes, triangles, etc.) can easily be created in Google Sketchup, while more complicated organic shapes can be done in the equally free Blender. Sites such as the MakerBot-run Thingiverse are becoming storehouses for models that others have created, a sort of catalog of things that you can download and print or alter to your own whims.

*Google Sketchup for MakerBot*  
<http://wiki.makerbot.com/google-sketchup>

*Autodesk Maya*  
<http://usa.autodesk.com/maya>

*Blender*  
[www.blender.org](http://www.blender.org)

Things that you can print from Thingiverse range from a replica dinosaur skull to custom Lego bricks to a two-color globe. There are a plethora of gears, slides, and other functional pieces that you can use to repair things. You can even print your own functional geared clock and build it. It's amazing how many objects there are that you can download and be holding in your hand via a 3D printer.

### *Thingiverse Models*

*Dinosaur skull*  
[www.thingiverse.com/thing:14248](http://www.thingiverse.com/thing:14248)

*Custom Lego brick*  
[www.thingiverse.com/thing:13531](http://www.thingiverse.com/thing:13531)

*Two-color globe*  
[www.thingiverse.com/thing:15658](http://www.thingiverse.com/thing:15658)

*Clock kit*  
[www.thingiverse.com/thing:7976](http://www.thingiverse.com/thing:7976)

There are members of the maker community that are pushing the limits of these printers even now. There are groups working to make it possible to print

using recycled plastics, such as that from two-liter soda bottles or plastic milk containers. There was even a Kickstarter project for a recycling mill that would take old plastic and extrude it into the correct diameter plastic to feed directly into a deposition printer.<sup>2</sup>

## Why Should Libraries Care?

There has been a rise over the last year or so in the idea of the library as a creative space for making things,<sup>3</sup> and the 3D printer is a natural match for this effort. In my opinion, however, the better argument for acquiring a 3D printer is that libraries have adopted the role of providing universal access to technology over the last couple of decades. There are plenty of communities where the public library is the best place to go for Internet access and to use a computer to type your resume or to print out your taxes. These are all technologies that we've come to expect to see in libraries, and they are there because they were all extremely expensive at one time and the library acted as a collective buyer, spreading the cost of access to these expensive technologies over the entire community. This allowed people who could not otherwise have afforded to use a computer to have access to one. 3D printers are at exactly this point in their development. They are just a bit too expensive for the average person to own, but they are a potentially transformative technology that the public needs to be aware of. Moving towards providing access to hardware such as a MakerBot Replicator is simply fulfilling the role that libraries took up long ago.

My very favorite answer to the question "Why should libraries care?" comes from a wonderful blog post by Andromeda Yelton, entitled "Libraries / Makerbots / Augmented Reality / Wonder," where she discusses having ordered a 3D printed art piece:

Isn't that what libraries were always for? Secrets in the world, hiding in plain sight, waiting for you to stumble upon them and have your world opened with one heartstopping lightning bolt, look around in new ways? . . .

So this is how I'd answer that question, the question of why. Because discovery is wonder. Because possibility is love. Because, amid the stacks and silent places, the forests and convention centers, there are secrets whispering to us, licking at the edges of our minds and asking to transform us. Because information and imagination were ever thus, and associating that with books was a wonderful historical coincidence: not a shackle.<sup>4</sup>

Libraries need to not only educate and inform, but inspire and transform. And this technology has the ability to do all of these things.

## Where Does This Take Us?

The ultimate goal of this fabrication technology is very much like the Replicator on Star Trek: The Next Generation: the ability to construct items at an atomic or molecular level so that you can create any object or substance at will. Such creation will be fed by the equivalent opposite: a machine that can recycle objects into their component molecular or atomic parts. Such a device is sometimes called a universal or molecular assembler, and these first crude steps are paving the way to make this science fiction a reality.

## Notes

1. "MakerBot Replicator," MakerBot Store, accessed February 17, 2012, <http://store.makerbot.com/replicator-404.html>.
2. Tyler McNaney, "Filabot: Plastic Filament Maker," Kickstarter, posted December 19, 2011, last updated February 13, 2012, [www.kickstarter.com/projects/rocknail/filabot-plastic-filament-maker](http://www.kickstarter.com/projects/rocknail/filabot-plastic-filament-maker).
3. See, for example, John Kalish, "Libraries Make Room for High-Tech 'Hackerspaces,'" NPR, December 10, 2011, [www.npr.org/2011/12/10/143401182/libraries-make-room-for-high-tech-hackerspaces](http://www.npr.org/2011/12/10/143401182/libraries-make-room-for-high-tech-hackerspaces).
4. Andromeda Yelton, "Libraries / Makerbots / Augmented Reality / Wonder," Andromeda Yelton: Across Divided Networks (blog), January 30, 2012, <http://andromedayelton.com/blog/2012/01/30/libraries-makerbots-augmented-reality-wonder>.



# It Just Gets Weirder

## Abstract

*Chapter 5 is dedicated to general trends that I see coming in technology and computing over the next three to five years, including a ubiquity of cameras, insanely high-density displays, autonomous flying robots, and more. Each trend is driven by a drop in manufacturing cost of specific components, which enables experimental and commoditized production of devices that were priced well out of the range of the average consumer. Once these costs drop just a bit more (as they are destined to), the library world will see the results, including finding ways to deal with massive data sets produced by our communities.*

There are a number of really interesting technologies coming in the next couple of years that may not impact libraries directly, but will impact individuals in society—which means that we need to, if nothing else, be aware of them. All of these are trends that I noticed at the 2012 International Consumer Electronics Show, the largest such show in the world. It's where the personal electronics manufacturers come to show off what they are producing for the following year, as well as try to one-up one another with a variety of crazy future tech that may or may not ever see the light of day.

Among the crazy things you see at CES every year are the insane demo televisions that aren't for sale, but just show off the possibilities of the manufacturer. This year, the companies that wowed were LG and Sharp, in two different ways. LG showed off an Organic LED (OLED) television that was 55 inches diagonally, but only 4 millimeters thick—just barely outside the thickness of a pane of glass. To see it in person was like seeing a magic trick. There were moving pictures on the screen, and when you stepped to the side the object

appeared to disappear. It looked like an absolutely impossible object, and in ten years it's likely to be the dominant type of display for sale.

Sharp debuted something that wasn't amazing for its physical characteristics, but for its imagery. The company was showing off an 85-inch display that it called the Super Hi-Vision TV due to its packing 33 million pixels into its 8K display. Everyone is probably familiar with HD television, which comes to us in two standard resolutions, 720 and 1080. Both of those numbers count the vertical lines of resolution, so that a standard 720 HD picture has a resolution of  $1280 \times 720$ , while a 1080 HD picture has  $1920 \times 1080$ . A 4K video, the next step up, measures instead horizontal lines of display density, varying in specific resolution by the aspect ratio, but for general use, a resolution of  $4096 \times 3072$  is a good starting point. YouTube currently allows 4K uploads, and there are a number of commercially available cameras that can take stills and video at that resolution. In very simplified terms, 4K is roughly four times the resolution of what is now the highest end HD format commonly used.

As you can imagine, an 8K display is a different sort of beast. The Sharp Super Hi-Vision has a  $7,680 \times 4,320$  resolution, or roughly sixteen times that of a 1080p Blu-Ray disc. It's hyperreal, unbelievably clear—it's as if you have an 85-inch window into another world. Seeing it felt like a scene out of Harry Potter, where the pictures were alive and might respond if you questioned them. The picture has no discernable pixels at all, no matter how close you might look, and seemingly infinite amounts of detail no matter how closely you might stare at the screen. It was incredible, and Sharp has said it thinks the technology is probably five years or so from being commercially available. Video will be available even before that, as the BBC plans

to shoot some of the 2012 London Olympics in super hi-vision.<sup>1</sup>

So, with that brief journey into televisions of the future, here's a quick look at some trends that I see in personal electronics this year.

## Cameras Everywhere

There is an effect in consumer electronics where, as Moore's Law drives the costs of individual components steadily downward,<sup>2</sup> the cost per unit for said component is suddenly so cheap that device manufacturers can just put them in everything. It's no secret that gadget manufacturers look for low-cost options for their devices, but I'm talking about how, once a given chip or interface hits a certain price point, it becomes negligible for the manufacturer to just include it. There was a brief point in the 90s where IR emitters hit this point: every PDA, every phone, every piece of electronics you picked up had an IR port on it and could do stuff with it, from communicating with other devices to controlling your television. It wasn't that the IR was the best interface (it was horrible) but that the component was so cheap that it didn't really cost the manufacturer anything to just throw it in.

I believe we've hit that point with camera sensors.

When you can buy a Barbie doll that doubles as a video camera, I think that it's official that anything can be a camera. There are cameras that are designed to be worn during extreme sports (the GoPro) and my personal favorite, the Looxcie, which is effectively a Bluetooth headset, but complete with an HD video camera that can capture everything you do, all the time.

*Barbie Video Girl*

[www.barbie.com/videogirl](http://www.barbie.com/videogirl)

*GoPro*

<http://gopro.com>

*Looxcie*

<http://looxcie.com>

Even more transformative are the cameras that are connected to the computers in our pockets. The cameras in most smartphones are better than the dedicated point-and-shoot cameras that you could buy just a few years ago, and they have the advantage of being connected to a computer with network access, which means that not only can you upload pictures to the Internet, but in many cases you can also live stream video.

This level of ubiquitous video capture has a lot of interesting potential for libraries, especially as we think about the role of the public library as community

memory. Is your library ready to start collecting all of the video being created in your communities? Very shortly we won't be talking about a box of VHS tapes from the 1980s; we'll be talking about local historians bringing you a box full of multi-gigabyte SD cards and more hours of video to deal with than you have hours in a day. How can we handle that sort of content explosion? If you think it's unlikely to happen, consider: at the time I'm writing this, YouTube has 60 hours of video uploaded to it every minute of every day. If we end up being the recipients of even a tiny percentage of that fire hose, it may drown us.

## Autonomous Drones

When President Obama signed the FAA Modernization and Reform Act in February, that stroke of a pen opened up the skies of the United States to autonomous drones.<sup>3</sup> There had been limits on uses of drones in US airspace, but the new law first opens the skies to law enforcement drones, and then rolls out other allowable uses (including commercial) over the next several years.

What's a drone, you may ask? Drone is just another term for a form of unmanned aircraft, normally much smaller than anything that could reasonably be manned. We've probably all heard of military drones being used, but the rise of the quadcopter and hexacopter chassis are bringing stable and easily controlled flight to the masses. These devices can be either manually flown or, in some cases, programmed via GPS coordinates, and their price points are coming down to the degree that anyone with \$300 in their pocket can pick up a flyable aircraft capable of HD video capture, such as the Parrot AR.Drone (figure 5.1). Kits are available, and an entire open source software project, ArduCopter, is dedicated to these types of aircraft. These devices are on the cusp of complete ubiquity, simply by virtue of affordability and usefulness. For one take on how they may be used, watch the TED video from Vijay Kumar, the researcher from the University of Pennsylvania who is leading one team that is experimenting with small agile drones for a variety of tasks.

*Parrot AR.Drone*

<http://ardrone.parrot.com/parrot-ar-drone/usa>

*ArduCopter*

<http://code.google.com/p/arducopter>

*TED: Vijay Kumar: Robots that fly . . . and cooperate*

[www.ted.com/talks/vijay\\_kumar\\_robots\\_that\\_fly\\_and\\_cooperate.html](http://www.ted.com/talks/vijay_kumar_robots_that_fly_and_cooperate.html)

So why should libraries care? Partially because

these devices are going to be an increasingly important technological tool in the next five to ten years, involved in everything from mapping to search and rescue, and there may be library applications that emerge simply from the ubiquity. The second is that these are a subclass of the “cameras everywhere” phenomenon described above, and one of their first uses is in photography and videography. Helping a community capture and archive its memories may come to involve circulating an autonomous photography drone to the public.

The other aspect of this technology that I think is going to be very interesting is the copyright and other intellectual property challenges that arise from their use. Who owns the copyright on a photograph that a robot takes? What sort of privacy issues arise from the ability to have nearly silent autonomous robots flying around with cameras?

## Alternative Control Schemas

Many technology vendors at CES were showing off variations on user interfaces for controlling their gadgets, and one of the hot areas this year was the use of motion and voice to control everything from computers to televisions. Everyone is slowly getting used to touch as a user interface for interacting with information, but motion and voice control are still growing as ways to communicate with your devices.



**Figure 5.1**  
The Parrot AR.Drone

Voice control has been improving quickly over the last three years, with Google’s Android operating system having speech-to-text ability built in at the operating system level and very good voice recognition as an offshoot. Apple’s recently released Siri is yet another example, giving your device the ability to “understand” what do when you talk in natural language to it. With Siri, you can simply speak commands like “Remind me to take out the garbage when I get home,” and the system can parse the sentence, create a Reminder with the correct text (Take out the garbage), and then use geolocation to pop up said Reminder when you are physically close to your house.

The other emerging control schema is gesture, driven largely by people’s experiences with the Microsoft Kinect platform on the Xbox 360. The Kinect is a sensor/control unit that has multiple cameras, infrared sensors, and a microphone, and it is capable of distinguishing your body from its surroundings to a degree of specificity that allows for controls based on gestures and overall body position. The Kinect has enough resolution that it can resolve individual fingers, easily allowing for control of playback of media in addition to its primary use as a game controller.

Microsoft has released an official software development kit for the Kinect to allow it to control standard Windows workstations and to let people hack control systems for their software.

Gesture, voice, and touch are all powerful new ways to interact with systems. It is no coincidence that they also tend to be the ways that we communicate with other humans. They are powerful precisely because they are natural in a way that tool use isn’t, and that power is why touchscreens have taken over where styli, keyboards, mice once dominated. With cheap cameras and fast processors, gesture control becomes far easier to implement, and I think we’ll be seeing it in a huge variety of places over the next few years.

## Health Monitoring

The last set of upcoming technologies that I think are interesting are what I’m calling personal monitoring devices. These are almost always currently being sold as health assistants, used to track your steps, exercise, and sleep patterns. These are yet another emergent technology based on the plummeting price of the components used to measure these things. There are several of these devices either currently on sale or about to hit the market, and all have similar features, if unique ways of dealing with them.

Each of these devices does one basic task: they contain an accelerometer that measures



**Figure 5.2**  
The Fitbit Ultra wireless tracker on its charger/base station



**Figure 5.3**  
The Fitbit Ultra wireless tracker worn in a pocket

steps or movement (think high-tech pedometer). They store the data and then transfer it to an online tool that tracks your progress over time, compares it to the progress of others, allows you to set and measure goals, and generally lets you game-ify your way into a healthier lifestyle.

The longest standing of these devices is the Fitbit Ultra wireless tracker (figures 5.2 and 5.3), a small device that resembles a digital money clip. The Fitbit tracker measures your steps, elevation, and if you wear it at night, sleeping patterns. It then reports all this information wirelessly to your local computer and then uploads it to the Fitbit servers, giving you the ability to share your activity with friends and compare and compete among a closed set of acquaintances. It's got a robust user community and is by far the most popular of these networked ambient data devices in use.

*Fitbit*  
[www.fitbit.com](http://www.fitbit.com)

The most high-tech of these devices, at least in appearance, is the Nike+ FuelBand (figure 5.4), a bracelet with the same sorts of sensors as the Fitbit Ultra. It measures your steps with its accelerometer and gives you feedback as to goals with its embedded LEDs, doubling as a watch. It syncs to your computer using the built-in USB connector or will pair with a mobile phone via Bluetooth and sync with the Nike+ FuelBand app. It is designed for athletes and is water-resistant and purports to last four days on a single charge.

*Nike+ FuelBand*  
[www.nike.com/fuelband](http://www.nike.com/fuelband)

The last of these devices that I'd like to talk about is the Goldilocks choice: not too hot and not too cold. It's the Jawbone UP (figure 5.5), another bracelet that measures your steps like the FuelBand, but also measures your sleep patterns like the Fitbit Ultra. It also adds a feedback mechanism for certain activities in the form of a small vibration motor, which can be programmed to do a couple of interesting things. First, it can be set to remind you not to be too sessile, buzzing to alert you that you need to get up, move around, and get away from your desk for a few minutes. The second is potentially more troublesome, in that you can tell the UP to wake you at the "best" time in the morning: that is, when your sleep cycle is at its lightest within thirty minutes of the time you have to be up. In monitoring how you toss and turn, the software can evidently determine the most opportune time to softly buzz you awake. I've not had the opportunity yet to test this, but it's an interesting concept that could be really helpful in practice.

*Jawbone UP*  
<http://jawbone.com/up>

So why am I pointing these personal health devices in a library-related technology report? Because they are indicative of the sorts of devices that we can expect to see blossom over the next two to three years, and if we aren't paying attention to what our patrons are doing, then we aren't paying attention at all. One of the hallmarks of the next stage in personal electronics is going to be this type of ambient, everywhere data collection as a part of what some call the Internet of Things. These devices are a first step towards massive data collection that we need to be aware of and be considering for future data conservation and collection needs.



**Figure 5.4**  
Nike+ FuelBand

## Conclusion

In the conclusion of my previous “Gadgets and Gizmos” tech report, I said:

When I first conceived this issue of Library Technology Reports, my goal was to highlight certain types of personal electronics that I felt were either generally useful for libraries or interesting for libraries to think about.<sup>4</sup>

This is also true for the treatise you are currently reading, but with a twist. This time around I wanted to paint with a broader brush and try to indicate the overall direction that personal electronics are taking. We are seeing a focusing of the market on just a few e-readers, and the tablet market is almost entirely composed of the iPad at this point. The real creativity is coming at the lower level, the \$100 devices that do one very specific thing, but do it well. It’s not clear to me how these work with libraries or if they are something that will be quickly iterated and overwhelmed by other competitors in the marketplace. But their very existence is proof that we are on the way to using connected objects to understand our world in new ways.

One of my favorite new technology websites is The Wirecutter, which is unlike any other tech coverage site because it tells you explicitly, “You Should Buy This Thing.” Looking for a tablet? Buy this one. So in that spirit, here are my explicit recommendations for libraries, ignoring all of the “may be different for your use case” waffling that is true, but sometimes unhelpful. Here’s simple list of what device I would buy personally if I were in the market:

- Tablet: the new iPad, 32 GB, Wi-Fi + LTE (AT&T or Verizon, pick for your area)



**Figure 5.5**  
The Jawbone UP

- E-reader: the bog-standard Amazon Kindle with special offers for \$79
- 3D printer: the Makerbot Replicator with dual extruders

*The Wirecutter*  
<http://thewirecutter.com>

The march of Moore’s Law is unavoidable, and these devices will only get cheaper and faster over time. Personal electronics are the only consumer product that I am aware of that gets both less expensive and better over time. Everything else either gets cheaper and worse, or more expensive and better (or, occasionally, more expensive and worse). But the march of faster, better, cheaper is a drumbeat that is regular and predictable. It’s up to us to pay attention: we can’t afford to be surprised anymore by these things.

Now get out there and play with stuff!

## Notes

1. Mark Sweney, “BBC Plans to Use 3D and ‘Super Hi-Vision’ for London Olympics,” *The Guardian*, August 23, 2011, [www.guardian.co.uk/media/2011/aug/28/bbc-3d-vision-london-olympics](http://www.guardian.co.uk/media/2011/aug/28/bbc-3d-vision-london-olympics).
2. “Moore’s Law,” Wikipedia, last modified March 14, 2012, [http://en.wikipedia.org/wiki/Moore's\\_law](http://en.wikipedia.org/wiki/Moore's_law).
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# The New iPad



**Figure E.1**  
The New iPad

Just as I was about to wrap this LTR up, Apple decided it was time to release the latest version of its iPad (figure E.1), rendering a lot of what I had written somewhat dated. So here's an attempt to at least point out the differences between the iPad 2 and the new iPad and suggest why you'd prefer one over the other. The new iPad is available for pre-order as I write this, and will be available in the United States on March 16, 2012.

The key difference between the previous generations of the iPad and the new iPad is the new display.<sup>1</sup>

The new iPad uses what Apple calls a Retina display, which is defined as a display that, at a typical viewing distance, has pixels packed tightly enough that they are indistinguishable from each other. First used on the iPhone 4, the Retina display provides a picture that is smooth and even, with no visual artifacts of pixelization at all. Having a screen resolution of  $2048 \times 1536$  pixels means that the pixels-per-inch measurement is 264 ppi, higher density than much printed material. The screen is the highest density LCD on any consumer device and looks incredible, truly something

unlike anything else on the market.

The other major change between the iPad 2 and the next generation iPad is that the new iPad includes the option of an LTE radio in addition to the previously available 3G cellular connectivity.<sup>2</sup> LTE is short for Long Term Evolution<sup>3</sup> and is the fourth generation (4G) cellular network technology being used in the United States. It is an incredibly fast connection, upwards of 80 Mbps at its best, and will approach standard Wi-Fi speeds. If you live in an area that is lucky enough to be covered by LTE signal, this will be a huge change in the speeds you can expect while out and about in the world.

There are other changes (faster, more RAM, slightly heavier and thicker), but these are the two that will make the most significant difference to users. If you are planning a personal purchase or a purchase for your library, the new iPad screen alone is a reason to choose it. However, Apple did leave the previous generation iPad on sale with the traditional screen, for \$100 less than the lowest priced new iPad, lowering the entry-level for iPad ownership down to \$399.

As with every iPad introduction, there will be lots of reviews and recommendations online, and I'm certain that there will be massive outcries that the new iPad isn't revolutionary enough and that it's sure to disappoint. And like every other iPad introduction, Apple is almost certainly going to sell millions and millions of them, orders of magnitude more than any other tablet on the market. My prediction is that the new iPad will, over the course of 2012, continue Apple's dominance of the tablet market.

## Apple Configurator

For the purpose of libraries, a completely different announcement made the same day will likely make a huge difference in how we deal with Apple devices. The Apple Configurator for OS X Lion is a brand-new piece of software designed specifically for the non-enterprise rollout of iOS devices that is much easier to use than the previously available enterprise tools.<sup>4</sup> You have the opportunity to configure and deploy iOS devices in three distinct ways.

First, you can prepare new devices by creating a standard installation for your devices, including the version of iOS to install, the apps that you want installed, and the data you want synced. Second, you can supervise existing devices that you need to "clean" after each use by reinstalling to a known state every time they are plugged in; this is the option that seems perfect for libraries that wish to circulate iOS devices. Last, you can assign devices to specific users and manage that user's interactions with the device, which is also applicable to staff-side uses of iOS devices.

One note on limitations of the program. The documentation says that the Configurator can handle up to 30 devices simultaneously, but that's not a hard limit as to the total devices it can manage, just a limit on managing all at once. If you have 60 iPads, you could manage them in batches of 30 with no issues, just no more than 30 at once. The URL in the gray box is for the Configurator documentation, and I highly suggest that if you are managing iOS devices, you check it out. It's going to be incredibly useful in dealing with iPads, iPhones, and iPod Touches in the library and education fields.

*Configurator documentation*

<http://help.apple.com/configurator/mac/1.0>

There was more news on the same day from Apple, including iPhoto for iOS, a new Apple TV that supports 1080 HD AirPlay, and more. But the new iPad and the Configurator are the two that will be huge in the next twelve months.

## Notes

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