Chapter 2

# Electronic Book Readers

***Abstract***

*E-readers are one of the hottest gadgets on the market today. This chapter of "Gadgets and Gizmos: Personal Electronics and the Library" explores these devices and how they can work for librarians. After an exploration of how these devices work and the different types of devices, the author provides a comparison of current popular products, followed by a look at some devices that may catch on in the future.*

The year 2010 is poised to be the year that e-book devices break into the mainstream. Electronic readers have been around for some time, but since the advent of the PDA and the cell phone, people have been using them to read on the go. It was the development of a new kind of display technology (more on that below) and the participation of one of the largest media companies in the world that really created the stand-alone e-book reader. The display technology is called E Ink, and the media company was Sony.

## How E-readers Work

The current generation of e-book readers has standardized around a type of display designed and built by the E Ink Corporation, a private firm based on technology developed at the MIT Media Lab in the early to mid-2000s. What makes E Ink different from previous display technologies, and perfect for an e-book, are its incredibly low power consumption and high contrast, combined with the fact that it's a reflective, rather than transmissive, display, so it is easier on the eyes while using less power.

The easiest way to understand how E Ink works is to imagine a flat sheet covered in Ping-Pong balls. Imagine that for each ball, we've colored half of the sphere black and half of it white. Now, to display things on the sheet, we simply have to flip the balls needed to the black side and leave the remainder white. If you take that basic idea, reduce it in size by a few million times (the "balls" in an E Ink display are roughly the circumference of a human hair), and make the whole thing respond to electrical charges.

The development of E Ink led to a breakthrough in the development of new devices for reading. The new screens consumed very little power, which meant that readers could be thin and portable, without having a large battery packed into the design. It also meant that the contrast between the text and the background necessary for reading was finally good enough for nearly everyone to be able to consume text comfortably. Finally, the display draws current from the battery only when it is actively changing the screen. When you are reading a page of text on an E Ink screen, the device is, for all intents and purposes, off. It draws no power for the display until you hit the Next Page button, at which point it redraws the screen and flips all the tiny spheres into their new configuration.

That fact, however beneficial to users, also leads to one of the disadvantages of E Ink. When it redraws the screen, it refreshes every pixel, which for the end user means that screen changes have a built-in "flash," a "blanking" while everything flips around. Some users find the refresh lag distracting, but personally I got used to it very quickly, and newer versions of the technology speed the refresh to make it less of an issue. This does mean that the current crop of E Ink displays are very much static displays, unable to render movement or video in any way.

The second disadvantage of current E Ink technology is a disadvantage only when compared to a more stan-

dard type of electronic display, the LCD. Since E Ink is composed of tiny black and white spheres, it is capable of displaying text and pictures only in shades of gray. The best current screens do sixteen shades of gray, whereas any modern LCD display that you might find on a mobile phone is capable of millions of different colors. When you're reading text, this isn't a severe limitation, but for texts with detailed graphics, charts, graphs, or other visual content, it can be a significant downside.

This is, to my mind, largely an expectation issue rather than an issue with the technology. People expect, since e-book readers have some of the characteristics of a computer (some have Web browsers and other interactive content), that they will do more than they are designed to do. There is talk of color E Ink displays, and of speeding existing black-and-white displays to allow low-level video capabilities, but for the near future, there is one thing that e-readers are really good at: low-power, high-contrast displays of text.

## DRM and E-readers

In addition to the type of screen, all e-readers on the current market have a few things in common. The first is that they will all read and display multiple types of files, although each has its own "protected" file type that is delivered by a given company's bookstore. For example, all of them will allow you to place a plain text file (.txt) on them for reading, but if you shop on the Amazon.com store for a book for your Kindle, the file that it delivers to you is an Amazon formatted file (.amz) that isn't readable by any device not blessed by Amazon.

Which brings us to an important point to remember about these e-readers: digital rights management (DRM) is being used by each e-reader manufacturer to try to prevent the piracy of the books in question. This seems to be a reasonable goal, given the prolific piracy that the digital transition has caused in other media formats (music and video). On the other hand, it causes a set of problems for users of e-readers. The largest is pretty simple to see: the use of DRM on books being sold means that only approved devices can access said books.

DRM is like a lock and key for digital content. The media is locked, and you have to have the key to get at it. When Amazon sells you an e-book from its online bookstore and you load the book onto your Kindle, it works because the Kindle in question has the appropriate key to unlock the file. If you decide in a year to purchase a Barnes and Noble Nook instead of a Kindle, your old books won't transfer, since Amazon hasn't given(and for business reasons, almost certainly won't give) its keys to Barnes and Noble. Imagine purchasing a DVD that works in your current player; then your player breaks, you buy a new one, and your DVD will not play in it.

From a behavior standpoint, DRM prevents one of the most common habits of readers—that of lending the book. If you buy a book from the Amazon store for your Kindle, you can't give the file to a friend to read because the key to the file is linked to your Amazon account. This is one of the key issues that comes with moving media to a digital-only format. The advantage to a physical format, even one that contains digital information (like a DVD), is that in order to have the "decoding" happen, you have to distribute the keys so widely that anyone with the capability of accessing the content (anyone with a DVD player) can unlock it. Every DVD player has a "key" to the DRM on not only the disks you buy, but any DVD sold. Digital distribution that separates the content from the form allows producers to create different keys for each person who happens to buy a copy of the content, which limits the usage of the content in ways that should make libraries and librarians uncomfortable.

This situation and system has already been tried in the realm of digital music. DRM was a failure in actually preventing piracy, and the result, after almost a decade of a system where music was locked to specific players in the event that it was purchased for that player, was that all major music sellers online now sell DRM-free music. The largest of these retailers are iTunes and the Amazon MP3 store, but there are dozens of smaller retailers, all of which are now selling music digitally with absolutely no protection.

DRM is, in a manner of speaking, treating paying customers like criminals. It prevents legitimate customers from doing what they want with their content while doing absolutely nothing to the people who acquired the same content illegally. The music industry finally realized this, and it's my belief that book publishers will do the same. I'm hoping that it doesn't take another decade for it to happen this time around.

With all of that said, DRM is something that libraries have to pay attention to at this point. If you are hoping to acquire digital copies of bestsellers and circulate them on an electronic reader, it is very likely that if you change reader platforms in the near future, you may not be able to take your books with you. This isn't to say there aren't solutions that mitigate the difficulty, some of which I'll cover below in discussions of the specific readers. But it is very important for collection development and for responsible spending that you know exactly what you are getting when you buy an electronic copy of a work.

I happen to be one of "those librarians" who think that print as a primary method of distributing text is slowly disappearing. Whether e-readers are the next logical step, or whether they are a stopgap measure towards the stable future of content isn't clear quite yet. I suspect that when history looks back on this technology, they will turn out to have been evolutionary rather than revolutionary, but that certainly doesn't stop them from being

exciting in the moment. Even if it lasts me only a few years before the "next best thing" comes along, I love reading on my Kindle (his name is Primer, if you're curious) and find it to be a transporting experience. Just like when I'm reading a book, I completely forget that the device is even there, and the story and characters and narrative just wash over me. Isn't that, in the end, what we're after with reading?

## Sony

Sony was first to market in 2005 with its e-book reader. Named, straightforwardly enough, the Sony Librié, it was the first e-reader to use the E Ink technology for its screen.[1] Sony has continued the Reader line (see figure 1), still selling several versions of it today. The versions that are available at the time of writing are the Touch, the Daily, and the Pocket editions of the Sony Reader. Each has slightly different functionality and a price point to match.

Sony is the only e-reader company thus far that has made a content delivery deal with a library e-book vendor. In this case, OverDrive and Sony have a partnership to allow all Sony Readers to load content from libraries via the OverDrive system.[2] This process is similar to the mechanisms that have been in place for some time with OverDrive and e-books: the content is locked to your device with a time-stamped DRM. After a certain number of days, the content disappears from your device. As the only real option for the lending of e-books in a library context, Sony is way ahead of the game with its relationship with OverDrive. It's too bad that overall, the hardware Sony produces isn't on par with other e-readers available in the market.

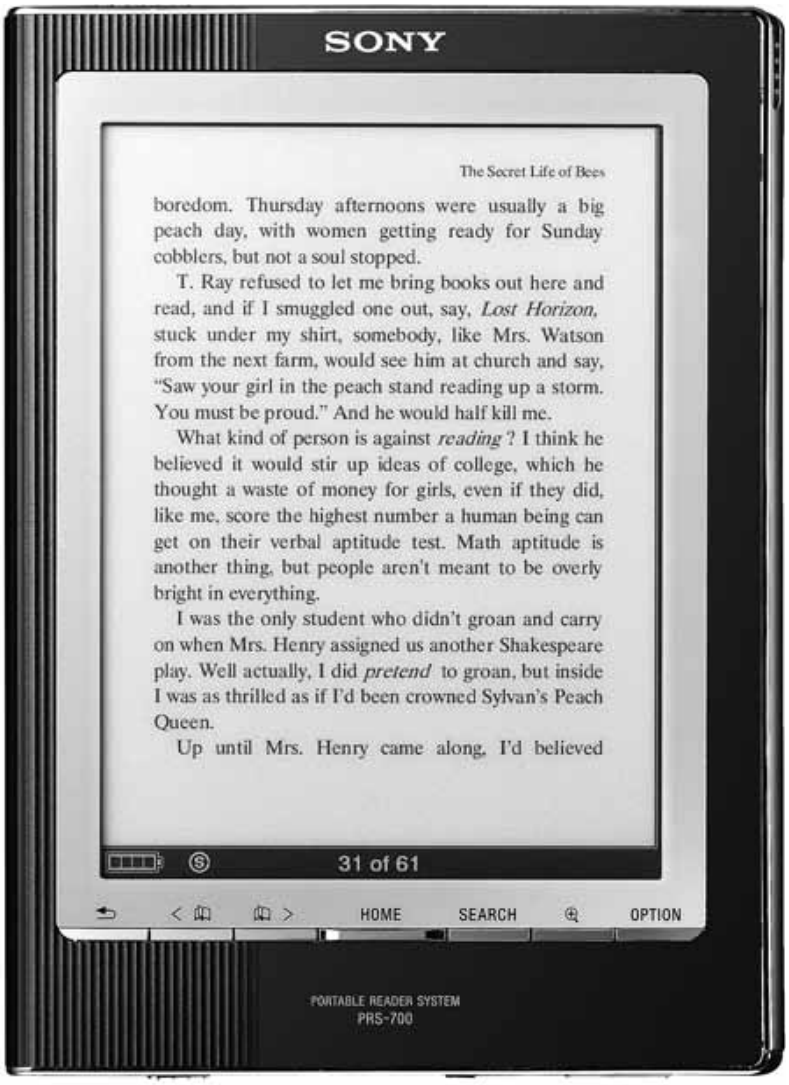


**Figure 1**
The Sony Reader, originally released in 2006.

The Pocket Reader is the least expensive of the Sony products, retailing for $199. It has a slightly smaller display than other e-readers, at only 5 inches diagonally (the average screen size is around 6 inches). Its screen is capable of eight levels of gray scale, again a bit less than most other e-readers. But its price point is the lowest for one of these gadgets, and the wide variety of formats that it is capable of handling (Sony books, PDF, EPUB, and Microsoft Word) make it a flexible e-reader for libraries.

The Sony Touch e-reader is the next step up in the current lineup for Sony. True to its name, this is the entry level for Sony's touch screen interface for an e-reader and has a more standard 6-inch screen. It also does only eight levels of gray scale and retails for $299. The Touch hasn't fared well in reviews, with most of the complaints revolving around the mechanism that Sony chose to use to enable touch. The device has a thin overlay on top of the reading surface that provides the contact sensing for the touch interface, but most reviewers have commented that the overlay subtly affects the visibility of the underlying text. This isn't something that should happen on a device solely dedicated to reading, and as such this particular model isn't one I'd recommend.

The current top-of-the-line model in Sony's lineup of e-readers is the Sony Daily edition. It rings up at $399, and the extra $100 over the Touch gets you a larger 7-inch screen and built-in 3G cellular wireless coverage provided by AT&T for purchasing books wirelessly from

the Sony bookstore. The downsides of this device include the fact that it has the same screen overlay issue as the Touch, as it relies on a touch-based interface, and the fact that the 3G connectivity can be used only to purchase books from the Sony store, since the Daily doesn't ship with any sort of Web browsing software.

Of Sony's offerings, the Pocket is probably the best bet for libraries. It avoids the issues with the touch interface and screen clarity, while still allowing for use with OverDrive e-books. But if you're willing to push beyond the traditional library models, there are better options yet to come.

## Kindle

By a large margin, the most popular e-book reader in the United States is the Amazon Kindle. Comparatively early to the party, Amazon launched the Kindle in November 2007 to a fanfare of media attention and immediately sold out its existing stock.[3] Amid early speculation that Amazon might focus on a so-called razor-blade model for selling the Kindle (taking a loss on the initial hardware so that you have a captive audience for your individually lower priced but larger volume consumables—e-books), Amazon CEO Jeff Bezos denied that Amazon would take that route to boost its market share.[4] It hasn't, and it looks like it may not need to, as the Kindle accounts for 45 percent of the e-readers sold in the United States.[5]

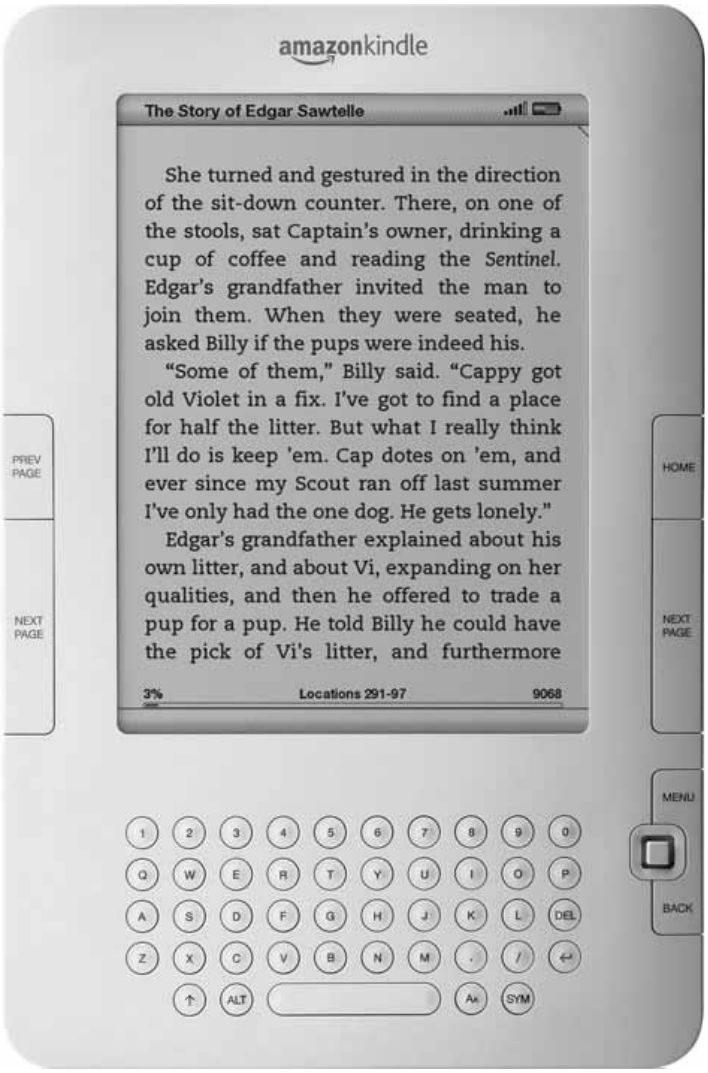


**Figure 2**
The Amazon Kindle

Amazon has thus far produced three models of Kindle. The original model, now called the Kindle 1, is no longer available, but was sold from November 2007 until February 2009.[6] It had only a four-level gray scale screen, but came with Sprint EVDO wireless access for the lifetime of the device, a service that Amazon calls Whispernet. It had a 6-inch E Ink screen, and while the industrial design of the device was criticized, it sold very well. With access that enabled users to purchase Amazon e-books anywhere they could find a cellular signal, and with no need to ever connect it to a computer, it was an ideal solution for the less technically savvy person who might be interested in an electronic reader. In February 2009, Amazon launched the Kindle 2 (see figure 2), an updated and redesigned version of the e-reader.

The Kindle 2 has the same size screen (6 inches), but with sixteen levels of gray scale, the quality is considerably higher. It was also completely redesigned into a thinner, lighter, sleeker package. The refresh on the E Ink screen was made faster, and overall the Kindle 2 is simply a more "finished" product than the Kindle 1 seemed to be. Both versions of the Kindle would allow for a limited set of files to be read: just the native Amazon purchases (.amz), along with plain text files (.txt), Mobipocket files (.mobi and .prc), and Topaz (.tpz) files. From the launch until December 2009, there was no native PDF support for the Kindle 2, and the reader will not natively allow for reading of Microsoft Word (.doc or .docx) files. A firmware update in December 2009 provided native PDF support for the Kindle 2, but the original Kindle is still unable to read PDFs natively.

In May 2009, Amazon released the third in the Kindle family, the Kindle DX (see figure 3). A monster in terms of its size, the DX has a 9.7-inch E Ink screen and was the first of the Kindle family to provide native PDF support. This was possible due to the size of the screen more than

anything else. Since PDFs are designed to be displayed on paper, the larger screen of the DX, which is capable of displaying the equivalent of a letter-size sheet with one-inch margins, is perfect for this purpose. It is also the only Kindle that has a built-in accelerometer, which flips the screen from portrait to landscape mode when you rotate the e-reader, in the manner of the iPhone screen rotation. This makes reading nearly any PDF comfortable.

The solution that Amazon provides for those file types that are not natively supported is an e-mail–based conversion system. When you purchase a Kindle, it is linked to your Amazon account by default. One of the things this gives you is an @kindle.com e-mail address that is linked directly to your specific Kindle. Amazon gives you two options for converting other types of files to a format that the Kindle understands, one free and one with a small cost. If you e-mail one of the supported file types to your @kindle.com e-mail address (list of supported file types below), Amazon will convert it and automatically send it to your Kindle via Whispernet. The document just shows up on your device as soon as Amazon finishes converting it. There is a cost associated with this (as Amazon is covering the cost of the wireless distribution) of $.15 per megabyte of files converted. If you don't want to pay for the convenience of automatic delivery, you can e-mail your documents instead to @free.kindle.com, and the documents will be converted and e-mailed back to you. You can then connect the Kindle via USB to your computer and transfer the files manually.

Amazon lists the file types that it will convert for you for your Kindle as follows:

- Microsoft Word (.DOC)
- Structured HTML (.HTML, .HTM)
- RTF (.RTF)
- JPEG (.JPEG, .JPG)
- GIF (.GIF)
- PNG (.PNG)
- BMP (.BMP)
- PDF (.PDF)
- Microsoft Word (.DOCX) is supported in our experimental category.[7]

For libraries and librarians, so many of c
provide electronic access to PDFs that I feel
provide one important warning. PDFs that h
ated by scanning a document and not fro
typeset file do not convert well to the Ki
is no textual information in the file (that is, if the pages are whole image files) then the Kindle will treat them as images and not as text, which greatly limits the legibility and flexibility of the display. As just one example, you can't change the font size of an image-based PDF, since there is no font to be changed. This surprises some people when they start e-mailing themselves JSTOR files, for example, nearly all of which are image-based PDFs.

Another problem you'll encounter in attempting to use the Kindle with image-based PDFs is that they can't take advantage of one of the Kindle's most interesting features: text to speech. The Kindle has a built-in text-to-speech program, which will "read" you the text from documents on the device. Amazon has chosen to allow publishers to determine whether or not books they choose to sell through the Amazon store will work with the text-to-speech feature. Certain publishers believe that computerized text to speech might undercut their ability to sell audiobooks, and as such have flipped a switch in their books so that users of the Kindle can't use that functionality. All other text-based files will work with this speech function. The audio produced by this is understandably

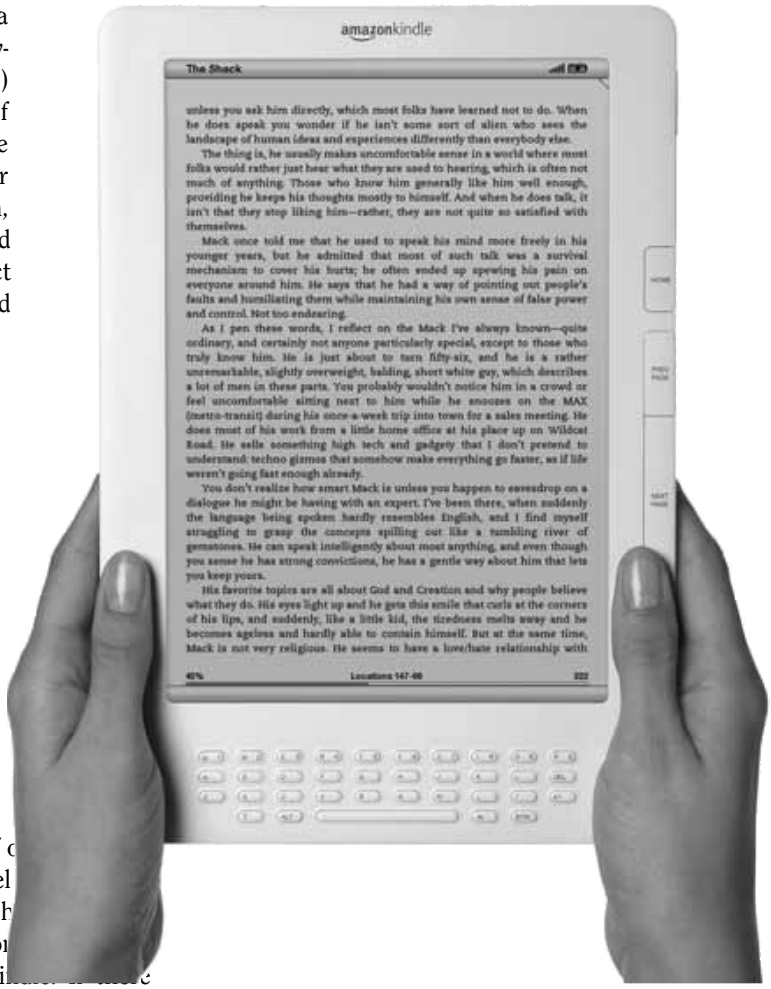


**Figure 3**
The Amazon Kindle DX

stilted and electronic. It's just not possible, yet, for a computer to be able to pronounce all words in English properly (and yes, this does work only in English). But again, this is a very interesting bit of functionality for libraries, as it potentially increases the accessibility to visually handicapped patrons.

The Kindle has one more feature that is unique to it: an experimental Web browser. Since it has an always-on connection to the Internet, it's an ideal candidate for browsing, with the exception of the limitations of the E Ink display that have already been discussed (no video, black and white only, slow refresh, etc.). While very, very limited in its abilities, the browser suffices for simple text pages and works reasonably well for tools like basic e-mail. It's a great feature to have on the device when you need it, and you can't beat "free" access to the Internet for the life of the device.

Speaking of Internet access on the Kindle, there are two different versions of the Kindle 2 out there. Version 1 was the original CDMA version that used the Sprint cellular network for its access to data. In late fall of 2009, Amazon announced the international version of the Kindle 2, which switched from the Sprint to the AT&T network for its access to data.[8] This switch allowed Amazon to change the radio type from the aforementioned CDMA to the AT&T standard GSM radio, which is the standard cellular protocol for most of the rest of the world. This meant that the Kindle 2 would work in a much broader set of countries and allowed Amazon to launch it successfully internationally. Just after this launch, Amazon made the international version the standard Kindle 2, dropping the CDMA completely. This is an important note for rural areas in the United States, which sometimes have only one choice for cellular coverage. You should know that if you buy a Kindle now, you need to have AT&T coverage for the data network to work, while older versions of the hardware will work on the Sprint network.

## Nook

In October 2009, Barnes and Noble entered the e-book race with its e-reader, called the Nook (see figure 4. Using the same 6-inch screen as the Kindle, the Nook has one huge hardware difference: a secondary full-color touch screen LCD embedded below the E Ink screen. This screen fills the space where, on the Kindle, Amazon chose to put a keyboard. The advantage of the touch interface with a color screen is that it can change into any user interface that Barnes and Noble can think of, and it can be contextual. When you need a keyboard, the screen becomes one, but if you just want to see what books you have on the device, it can show you the covers in full color, in a display reminiscent of the Apple "Cover Flow" model.

Unsurprisingly, Barnes and Noble is launching the Nook in support of its own e-book store, which you can access via the built-in cellular connection, supplied by AT&T for the lifetime of the device. One-upping the Kindle, the Nook also has standard 802.11 WiFi built in, which will work in Barnes and Noble retail stores to give you the ability to browse and read e-books on your Nook while you are in the store. You can also connect the Nook to your home WiFi or any WiFi that doesn't require browser-based interaction, including those at some hotels and airports. The Nook ships without a built-in browser, which limits both the WiFi you can connect with and the purposes for which you can use the WiFi.

One other positive for the Nook in comparison to the Kindle (in the United States at least, they are one another's main competition) is that Barnes and Noble made a deal with Google Books to allow the Nook access to Google's catalog of out-of-copyright works, which allows the Nook to claim that it has, at launch, an e-book catalog of over a million titles. In addition, Barnes and Noble has agreements with other e-book stores like Fictionwise and eReader.com that specify that their products will be compatible with the Nook. Barnes and Noble has also standardized around the emerging e-book standard called EPUB, an XHTML/XML-based electronic book format that seems to be the future of electronic publishing for books. The Nook will read PDFs natively, as well as Palm DataBase (PDB) ebook files. It won't at the present time read Microsoft Word files, nor does Barnes and Noble currently have a solution for converting Word to a format viewable on the Nook.

One piece of the reading experience that is often missing with e-books is the ability to lend a book to a friend. Barnes and Noble is attempting to tackle that downside with a service that it calls LendMe. The service allows you to lend a book that you bought to a friend, who can read it on his Nook or on any one of a myriad of devices using the Barnes and Noble Nook software. Devices that will be able to do this include Windows-based computes, Mac OS X computers, BlackBerry smartphones, the iPhone, and potentially many more. In theory, you could lend an e-book you bought through the Barnes and Noble e-book store to a friend, who could then read it on his iPhone. In reality, this process is less than seamless, and the actual implementation is badly damaged. If you lend a book to a friend, you can't access it during the loan period. This makes some sense intuitively, except that it overlays physical limitations on digital files, something that has never worked well with media. In addition, the LendMe function works once per book. If you loan your copy of *The Road* to your friend, that's it for that book, you can't lend it to anyone else, even after the first friend's time is up.

The last big difference between the Nook and the Kindle is that the Nook has two things that the Kindle doesn't: a user-replaceable battery and a memory expansion slot. The Kindle battery is built in and is not a user-


**Figure 4**
The Nook

serviceable part, although Amazon will replace it when that becomes necessary, for a price. The Nook's battery is accessible to the end user and is no more difficult to change than purchasing a replacement and popping it in. There are two good arguments for this being a feature that you may need. The first is the situation that all rechargeable batteries find themselves in eventually: the inability to hold a charge. After a certain number of recharge cycles, all rechargable batteries start to lose their pep, and in a library situation, where the device is being used, recharged, used, recharged and used again at a rate higher than the typical single user, it may become a financial benefit to be able to just replace the batteries locally.

The last difference is the memory expansion slot. Both the Kindle 2 and the Nook have 2 gigabytes of internal storage, enough for many, many hundreds of e-books. Both claim to hold over a thousand titles on internal memory alone, but the Nook one-ups the Kindle by including a micro-SD card slot for expandable storage options. This would allow a user to insert a memory card that would double or triple the Nook's built-in memory easily. The benefit of this for libraries is that having removable storage would allow you to swap the contents of the Nook out as easily as removing and inserting a memory card. You could have entirely different "libraries" of content on several micro-SD cards and choose the one to insert into the Nook at the time of checkout. Or, conversely, if you happened to have a patron base where the Nook was a hugely popular device, I suppose you could even just circulate the micro-SD cards with content directly.

At the time that this is being written, the Nook has just started shipping. It is unknown right now how it's going to affect the overall e-book market and how it will compete in the long term with the Kindle. But right now, based on its initial reception, it's the only serious competition that the Kindle seems to have in the e-reader market.

## Upcoming Devices

All this talk about the Kindle and the Nook isn't meant to imply that it isn't possible that another competitor in the e-reader space will emerge and give both the Nook and Kindle a serious run for their money in the next year or so. There are a huge number of companies that are developing e-readers, although we'll probably be halfway through 2010 before we have any idea if any of them will actually see the light of day. Here's a short list of a few companies and products to keep an eye out for, just in case they are a break-out success when they launch.

### The Que

Plastic Logic has announced its Que e-reader (see figure 5), which was launched officially at CES 2010 (the 2010 Consumer Electronics Show). The same size as an 8½-by-11-inch sheet of paper, it will be using the traditional E Ink display, but with the advantage of being able to display a piece of letter-size paper with no resizing necessary. This is a huge advantage for people who deal with lots of PDFs. The Que is also a touch screen, but early reviews indicate that it doesn't have the ghosting and smudging effects that the Sony technology seems to be saddled with. It comes bundled with AT&T 3G access as well as standard 802.11 WiFi and allows for annotation of documents directly on the screen through using the touch interface (see the video listed in the gray box for an example).[9]

While Plastic Logic seems to be focusing on the busi-

ness world with its advertising and public relations campaigns, the Que has the potential to be useful in the library realm. Plastic Logic has a retail deal of some type with Barnes and Noble and announced in October 2009 that the Que would be sold in Barnes and Noble retail outlets.[10] Coming just a week after the announcement of the Nook, the Que is a different sort of e-reader, aimed squarely at the business executive who wants to carry something lighter than a laptop with him. The Que's home screen is a good indicator of the sorts of uses that Plastic Logic sees for the device; it has, for example, Microsoft Outlook integration that provides a heads-up display of your e-mail and daily calendar at the same time that it shows you the magazines and books that you are reading.

*Video of Que e-reader*
http://vimeo.com/4875333

*Barnes and Noble Que Catalog*
http://que.barnesandnoble.com/catalog


**Figure 5**
The Que e-reader by Plastic Logic

The Que is perhaps the sleekest of the e-readers that I demoed, with an industrial design and general look and feel that puts it in the same league as an Apple device. While plastic, the device felt solid and yet light, easy to handle, and the touch response of the screen was the best I've seen on an E Ink device, with none of the blur in evidence that the Sony Touch e-reader is burdened with.

## The Alex

My favorite of the upcoming e-readers may be the Alex, from Spring Design. It's similar in appearance to the Nook, with a dual-screen design that puts a 6-inch E Ink screen above a 3-inch touch screen LCD. Also like the Nook, it's Android-based, but that's where things diverge. The user experience and flexibility of the Alex are very different from the Nook. Where the Nook feels like a very prescribed interface, bending only so far to the whims of the user, the Alex provides a flexibility that is refreshing. One example of this flexibility, and the feature that was my favorite in the Alex, was the ability to "push" content from one screen to the other. Why is this useful? The color LCD has the ability to run a full Web browser, and when you find something you want to read, one click syncs that page up to the E Ink, where you can read the article using the much more comfortable display. Conversely, if you're reading something on the E Ink, you can highlight a term and push the lookup down to the LCD screen, which can pull up Wikipedia or any other Web-based resource to help you understand the word or idea, all the while keeping the context of the actual page intact.

*Spring Design*
www.springdesign.com

The color screen also gives you the opportunity to "enhance" the E Ink text with multimedia content. For example, you could link a section of *Hamlet* to a video of a performance, reading the text while viewing the play on the LCD screen. You could do the same for color photos,

charts and graphs, or music, playing specific songs during specified parts of a text.

The Alex has some growing pains to overcome, however. The demo unit that I had a chance to see at CES 2010 had issues with linking the two screens properly and with recalling embedded media as well. It didn't appear that this was a hardware issue, but instead a software one, which gives hope that the firmware that ships with the device will provide a smoother experience.

## IREX

One of the longer-term players in the e-reader space is the company Irex. Best known for its iLiad e-readers, it has branched out and now has three different models of e-reader listed for sale on its website. Two fall under its iLiad line (the Irex iLiad 2nd Edition and the Irex iLiad Book Edition), and the third is its high-end device, the Irex Digital Reader. The various devices range from 8.1 inches diagonally for the iLiad readers all the way up to 10.2 inches for the Digital Reader, which again gets you to full letter-size paper rendering. The main distinguishing characteristics of the various versions are in the connectivity and size. The two iLiads differ significantly only in the presence or absence of 802.11 WiFi. The 2nd Edition has it, the Book Edition doesn't. The Digital Reader does all the things that the iLiad models do, but with the larger screen. All of Irex's devices cover the same basic ground as far as file types that are compatible; PDF, HTML, TXT, and Mobipocket are all supported, and they all use a touch-based interface as well.

The biggest things holding these back from any sort of mass-market appeal are their lack of connectivity to a retail store and their price. For whatever reason, these start at $499, and work their way up to $859 for the Irex Digital Reader 1000, an enormous sum in today's computing market. The Amazon Kindle DX sells for half of that amount and is equivalent in other regards (with the exception of the touch interface). Very few libraries would, I think, choose the more expensive option for seemingly little advantage in functionality.

## The eDGe

Another attempt at a dual-screen solution is coming from a company called enTtourage, in the form of its eDGe (see figure 6). The enTourage eDGe is a dual-screen e-reader that marries an E Ink screen with a tablet-style netbook. Imagine a netbook where one half is E Ink and instead of a keyboard you have a touch-sensitive LCD. Then stand

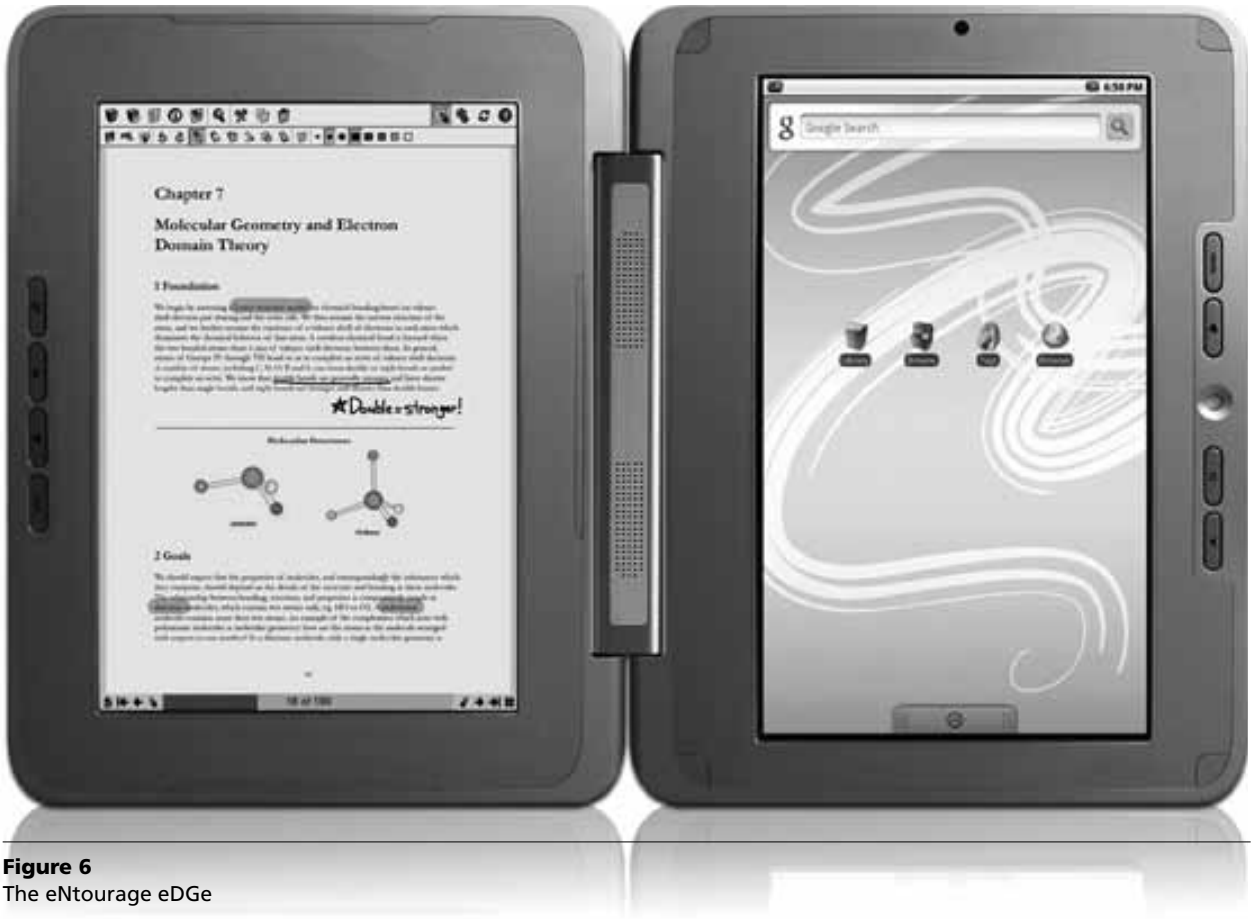


**Figure 6**
The eNtourage eDGe

the thing on its edge like a hardback book. The eDGe has a very useful dual-hinge design that allows it to fold completely back on itself, so that closed it can present just the e-reader screen to you, or conversely, just the tablet-style netbook.

In demoing the eDGe, I found that it works reasonably well, but the overall weight of the device is cumbersome. It's several times heavier than a dedicated e-reader like the Kindle or Nook, as the LCD screen takes a considerable amount of battery power. On the other hand, it has the potential to narrow the range of devices that you carry, as its jack-of-all-trades design seems to lead you towards not carrying a notebook. Unfortunately, as the saying goes, it's jack of all trades, master of none, as the dual-screen design outweighs the advantages of combining the functionality to the point where it isn't something that I would really recommend at this point in time.

### Qualcomm's Mirasol Displays

The truth is that there are dozens of new e-readers hitting the market in 2010, from worldwide electronics powerhouses like Samsung and Sony all the way to manufacturers that you've never heard of like Astri and enTourage. The price of E Ink screens has come down to the point where manufacturing a dedicated reader isn't the big deal it once was, and nearly every new reader is compatible with the Adobe DRM that is used in library-centered products like OverDrive. The biggest differentiator over the next twelve months is likely to be the content deals that the individual companies strike with publishers, and not necessarily the technology involved.

There is, of course, one large exception. One of the things that seems to be holding back a lot of e-book development is the limitations of E Ink. I saw a demonstration of one technology that is nearly guaranteed to be on a few librarians' wish lists for the holiday season of 2010: Mirasol.

What's Mirasol? It is a brand-new display technology developed by Qualcomm that is the equivalent of color E Ink. Using micromechanical switches, Mirasol is phase-stable, not drawing power while it's a static image, and is reflective in the same ways as E Ink. However, Mirasol can do full color at 30 frames per second, which means that not only does it have the ability to render full-color pages that look as good as a printed magazine, but it can do so at full video. That means that the user interface can be more attractive and faster and that the content no longer has to rely on sixteen shades of gray in order to be used in an e-reader. At the current time, there hasn't been any formal announcement of a specific e-reader that is going to use this technology, but Qualcomm representatives told me that they will have Mirasol in an e-reader by fourth quarter of 2010.

## Platforms

With all of that said on e-readers, I don't believe that they are the most exciting thing that will happen to text in 2010. There were two technologies shown to me at CES 2010 that excited me about the potential for books moving forward, and both are things that libraries should seriously pay attention to. They also have strange names. Get ready to hear a lot this year about Copia and Blio.

Both of these technologies are platforms, not e-readers per se, although Copia is producing a line of physical devices to go with its service. They are very different and focus on different aspects of the reading experience. Copia is attempting to make reading social, while Blio is—not to be too terribly hyperbolic—trying to reinvent the book.

### Copia

Copia (see figure 7) was one of the coolest things that I had a chance to see at CES 2010. It's a service that is accessed via the Web, via client software, through one of Copia's devices or a licensed device, on your iPhone, BlackBerry, or Android device, and anywhere else Copia can get it working. So what does it do? It makes the reading experience social, giving you the ability to share notes, highlights, annotations, questions, or just about anything else relating to a text seamlessly across all your devices and with all of your friends. It also reduces the book to small pieces and allows you to clip and share parts of the work in ways that you currently share media online.

*Copia*
www.thecopia.com

While Copia is going to license and sell e-reader devices based around the E Ink display, it really is more of a platform for making the reading process a social one. The ability to collaborate and share notes and annotations could make it the killer app for students, and Copia hinted that it would consider allowing users to monetize their notes as well. Imagine buying a copy of a Jane Austen novel, and then being able to selectively load purchased notes from a variety of Austen scholars. Or, speaking directly to the library world, think about the power of using a collaborative platform to do library instruction literally inside the book that the class is using and then being able to reuse those notes with the next class.

In addition to this sort of collaboration, Copia has also loaded up the service with things that you might come to expect with a virtual bookshelf. You can compare your shelf to others, see readers who share your interests, tag your books to aid in organization, and suggest books for other users. These sorts of services are available


**Figure 7**
Copia.com's web page

already on websites like LibraryThing and Shelfari, but Copia adds the integral missing piece: the book is actually there, electronically, when you talk about it. There are a lot of opportunities with a service like this, and I'm sure we'll hear a lot about Copia in 2010.

## Blio

The other major demonstration was from Blio, a company founded by futurist and technologist Ray Kurzweil. Hosted by Microsoft at CES 2010, Blio was shown off behind closed doors, but promoters claimed that it would be available in February 2010. Blio is difficult to describe, but put simply, it's a comprehensive new display technology for e-books that combines the text, any media, audiobook, and more all in one package that can be displayed as you wish.

The key to the Blio platform is twofold: the first factor is the technology, the second is the content partner. The content for the platform is being provided by Baker and Taylor, a name that should be very familiar to the library world. The technology is the star, providing a multilayered approach to displaying a book to the reader. If you wish to see the book exactly as printed, you can do that, a boon for textbooks, children's books, cookbooks, and the like, where the display of the printed page is itself meaningful. Or, if you are on a device that doesn't handle the full printed page properly, you can choose to reflow the text and display it on a smaller screen like the iPhone. You can even choose how to reflow the text, changing the margins, number of columns, and more.

One of the best tricks that Blio has up its sleeve is the deep integration with audio, something you would expect from a technology developed by Kurzweil. It keys audio to the text at the individual word level, highlighting the text as the audio is read to you by either a text-to-speech voice or a voice actor. In addition, it will sync your progress up to the cloud, allowing you to do things like read for a bit on your computer, then pick up your iPhone to continue reading, decide to listen for a while on your drive home, and then pop the book open on your laptop and have it know at every step in this process where you are in the book.

For the student, Blio not only provides textbooks with the full-color images, charts, and graphs, but also allows the publisher to embed rich media objects into the text. These objects can be a part of the Blio file or can be embedded Web objects, and the reader can interact with them in real time from within the book interface. The example that I was shown was an anatomy book where the images of the bone structure of the face could actually be a quiz, and identifying them could be part of the reading process. If the objects are pulled from the Web, the publisher would then be able to change the content as needed, from swapping in randomized questions at the end of chapters to updating maps and more.

But with all this flexibility come a few limitations. Because Blio has such a complex set of modes, these books won't be delivered as one of the existing standardized file types. This isn't another variation on EPUB that we're talking about. It will be a proprietary file type that will very likely be readable only with Blio software.

The other limitation is that because of the file type and rich experience, you won't be able to consume Blio books on anything that we currently think of as an e-reader. It will work on computers and rich devices such as the iPhone and Android phone platforms, but you won't be reading this on your Kindle or Nook. It remains to be seen if people will be happy consuming their texts on computer screen instead of a dedicated reader, although with a number of rumored tablet devices just on the horizon, Blio could be the perfect solution for reading on them.

## Tips and Tricks for E-readers

The largest misunderstanding that I run across every time I talk to librarians about e-readers is the belief that an e-reader can be used only to read files purchased from the store attached to the device. When I tell people that my Kindle 2 has two hundred books on it, invariably someone in the audience says "You bought two hundred e-books from Amazon?" No, of course I haven't (although I'm certain there are people who have). The very first thing that I did when I got my Kindle was load it up with every piece of free content that I could find that I could possibly ever want to read. And when my place of work decided that it wanted to experiment with e-readers but was still a little wary of Amazon and lending out Amazon-purchased e-books, we bought Kindles and put public domain works on them.

There are a variety of ways of collecting and converting content for loading onto e-readers. There are lots of Creative Commons–licensed works and open access scholarly work that could be located and downloaded. The existing public domain works that are available in the United States are an amazing collection of literary works: Jane Austen, Shakespeare, H.G. Wells, Arthur Conan Doyle, and hundreds more classics of literature are available at no cost.

My recommendation for locating books to download are to start with just three websites. The first is Project Gutenberg, the longest running and most thorough source for electronic books on the Web. Project Gutenberg provides e-books in both HTML and plain text formats, although more file types are available under its "experimental" heading. Books that are digitized by Project Gutenberg are proofread by teams of volunteers, and the quality of the texts is very high. It's the first place I go for classic works of literature.

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The last bit of discussion of e-readers that I'd like to cover revolves around software that you can use to convert documents into e-reader–friendly versions and generally manage an e-book library. My favorite piece of software for converting HTML, PDF, or DOC files to MOBI files is a free download that is unfortunately Windows-only.

Mobipocket Creator 4.2 is a free piece of software that allows you to import PDF, DOC, or HTML files and create a fully formatted e-book file. Creator is an incredibly powerful tool that allows for deep formatting, metadata editing, and even the embedding of covers and other images into the file. It's a great, great option for creating your own files for reading on the Kindle or other MOBI-friendly e-reader.

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## Notes

1. "Comparison of E-book Readers," Wikipedia, http://en.wikipedia.org/wiki/List_of_e-book_readers (accessed Dec. 2, 2009).
2. *Publishers Weekly,* "Sony, OverDrive in Deal," Aug. 12, 2009, www.publishersweekly.com/article/CA6676216.html (accessed Dec. 2, 2009).
3. "Amazon Kindle," Wikipedia, http://en.wikipedia.org/wiki/Amazon_Kindle (accessed Dec. 3, 2009).
4. Saul Hansel, "Jeff Bezos: Kindle Books and Readers Are Separate Businesses," Bits Blog, NYTimes.com, June 15, 2009, http://bits.blogs.nytimes.com/2009/06/15/jeff-bezos-kindle-books-and-readers-are-separate-businesses (accessed Dec. 3, 2009)
5. Eric Jhonsa, "Amazon Has an Early Lead, but the Game's Not Over," The Motley Fool website, Aug. 31, 2009, www.fool.com/investing/general/2009/08/31/amazons-got-an-early-lead-but-the-games-not-over.aspx (accessed Dec. 3, 2009).
6. "Amazon Kindle," Wikipedia.
7. Amazon.com, "Files Kindle Recognizes," on the Help page for Transferring, Downloading, and Sending Files to Kindle, www.amazon.com/gp/help/customer/display.html?nodeId=200375630&#recognize (accessed Feb. 4, 2010).
8. "Amazon Kindle," Wikipedia.
9. This information was obtained by the author in person at the 2010 Consumer Electronics Show in Las Vegas, NV, Jan. 7–9, 2010
10. David Carnoy, "B&N to Sell Plastic Logic Que along with Nook," CNET News, Oct. 27, 2009, http://news.cnet.com/8301-17938_105-10383981-1.html (accessed Feb. 8, 2010).