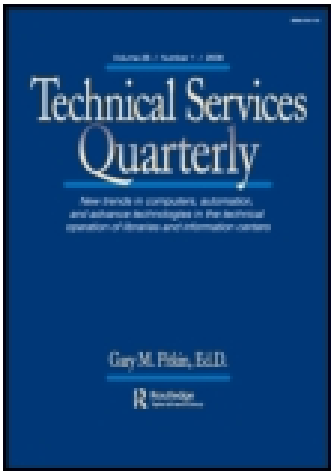

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History of the Ebook: The Changing Face of Books

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History of the Ebook: The Changing Face of Books

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The history of the ebook and e-readers began before World War II with Vannevar Bush, who conceived the memex as a way for individuals to store and read increasing amounts of available information. Project Gutenberg started digitizing texts in 1971. In this article the authors trace the history of ebooks and e-readers from these early beginnings to the current explosion of ebook use. While libraries started to experiment with ebooks relatively late, they have jumped upon the ebook bandwagon within the last few years. Problems have arisen with proprietary formats, licensing rather than ownership, and the mechanics of ebook circulation.

KEYWORDS ebooks, e-readers, Kindle, Nook

HISTORY OF THE EBOOK: THE CHANGING FACE OF BOOKS

> Consider a future device for individual use, which is a sort of mechanized private file and library. It needs a name, and, to coin one at random, "memex" will do. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.
>
> "As We May Think" (Vannevar Bush, 1945)

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The history of the ebook started much earlier than most people think. Much like the printing press, the ebook has the potential to change how the world reads. While the idea of Guttenberg's printing press spread rapidly across Europe in just 30 years, the concept of the ebook is taking somewhat longer to catch on. Although the ebook trade has exploded during the past five years in what some call the ebook revolution, ebooks have been around much longer. The ebook's roots can be traced back to early computers. Technology has developed by increased miniaturization over the years. To get an idea of how this has happened with ebooks, consider the telephone. As much of a visionary as Alexander Graham Bell was, he would be in awe at the evolution that the telephone has undergone over the past 140 years. The development of the ebook is similar. When the ebook was conceived, "the typical computer of this era was the size of two or three refrigerators back to back" (Hiltzik, 1999, p. xxi). In this article the authors will explore the origins of the ebook and follow its development until 2012. While this study is not exhaustive, we will narrate the history of the ebook from its humble beginnings to its current popularity.

DEFINITION

Before going any further, it is essential to define the term "ebook." Like many technologies, the definition of and vision for ebooks has changed over time. The word "ebook" is an ambiguous umbrella term that encompasses several concepts. A review of the literature further confirms that the word carries multiple meanings that depend upon context. Morgan (1999) defines ebooks as being the hardware/software combination specifically designed for reading, in contrast with e-texts written in hyper-text markup language and viewable on a computer. Balas (2000) also cautions readers not to confuse e-texts with ebooks and stresses that ebooks must be read on an ebook reader or with special software. Hawkins (2000) expands the definition of ebook to include the contents of any book made available in electronic form through four different methods: a downloadable, dedicated ebook; a dedicated ebook reader; a web accessible ebook; or a print-on-demand book. The changing definition of the ebook throughout the years can be attributed to market trends. While the first ebook readers were multifunctional, they developed into single function devices as they became more popular. The latest trend, reported by Liliputing (2010), is for the devices to once again become multifunctional as seen in the Nook, which can be used as a primitive Web browser and can run some Android apps ("Firmware Update," par. 1). For the purpose of this article, we will use Hawkins' definition but exclude any substantive discussion of print-on-demand.

VANNEVAR BUSH AND THE MEMEX

The idea for an electronic book was first presented to the scientific community in Vannevar Bush's essay "As We May Think" (1945). Bush speaks of the difficulty researchers faced even then from the vast amount of information available. Bush (1945) states: "The investigator is staggered by the findings and conclusions of thousands of other workers—conclusions he cannot find time to grasp, much less to remember, as they appear" (p. 89). Bush felt that information left trails and that one document would lead to information in another. He thought that a personal device, where that the researcher could store information, would make the job of the researcher considerably easier. Bush was addressing what Colin Burke (1994) refers to as the "library problem" (p. 99). After World War II, both librarians and patrons were encountering difficulties in finding what they wanted in the mass of available information, the phenomenon now known as information overload (Burke, 1994).

Although Bush did not publish his essay "As We May Think" until 1945, he actually wrote the article in the late 1930s. Originally titled the "Mechanization and the Record," Bush sent a rough draft to Eric Hodges, publisher of *Fortune Magazine*, on December 7, 1939 (Nyce & Kahn, 1991). Bush later declined *Fortune*'s offer to publish the manuscript due to concern over whether or not it would reach the right readers. Bush was looking for backers to fund the development of "memex." Burke (1991) explains that Bush "saw little chance that someone would provide funds for such a speculative device" (p. 146). As it turns out, the article would not be published until 1945 in *The Atlantic*, nearly six years after it was written.

The device described in Bush's "As We May Think" was never built. Bush did manage to secure funding for a memex-like device, but his career headed in other directions. Bush left Cambridge to head the Carnegie Foundation in Washington. Three graduate students worked on the memex project (Burke, 1991). Despite the fact that Bush outlined their tasks and held them to a schedule, the end product was not the personal machine envisioned by Bush. Instead, the "Rapid Selector," the name for the finished product, ran the entire length of a large room (Burke, 1991). Bush's efforts did inspire the work of Alan Kay, who would create the world's first portable computer, as well as the work of Douglas Englebart and Ted Nelson, who developed Bush's notion of information trails into what we know today as hypertext.

ALAN KAY AND THE PORTABLE LIBRARY

It was not until nearly 30 years later that Bush's idea of a portable, personal library began to take form. In Alan Kay's 1969 doctoral thesis, he described an early prototype of a small personal computer. Unfortunately, technology

at that time was not advanced enough for Kay to turn his prototype into a reality. Kay went to work at the Xerox Palo Alto Research Center (Xerox PARC), which focused on basic research and whose goal was to invent the "office of the future" (Barnes, 2003, par. 8). During his career at the Xerox PARC, Kay encouraged co-workers to design small notebook computers. Leading the Learning Research Group at Xerox PARC, Kay hired people with like interests who believed in interactive computers and the possibility of notebook-sized computers (Kay, 2000). Unfortunately, technology had still not been invented that could make the portable computer a reality.

Kay worked on children's learning software until technology caught up with his ideas. He saw the potential for the computer to become a communication medium. Susan Barnes (Kay, 2000) explains that Kay envisioned a medium that could represent, communicate, and animate words, images, and sounds. He referred to the images presented on a computer screen as dynamic simulations and thought that they would have the potential to surpass the book as a form of communication (Kay, 2000). Kay's unofficial motto was "The best way to predict the future is to invent it" (Barnes qtd. Kay, 2007, p. 19).

THE ALTO

While Kay was working on the programming language that would one day be known as SmallTalk, Chuck Thacker developed the circuitry that would make possible Kay's dream of a computer the size of a notebook. The prototype for the first notebook-sized computer was called the "Alto." In a 1971 PARC memo, Kay writes: "In the 1990s there will be millions of personal computers. They will be the size of notebooks of today, have high-resolution flat-screen reflective displays, weigh less than 10 pounds, and have 10 to 20 times the computing storage capacity of the Alto. Let's call them *Dynabooks*" (Barnes, 2007, p. 23).

The only problem was that the Alto cost nearly $10,000 to build. On the upside, the folks at Xerox PARC were nearly 10 years ahead of their competitors Apple and IBM (Hiltzik, 1999). In April 1973, the first Alto became operational and displayed an animated image of the Cookie Monster, a Sesame Street character (Hiltzik, 1999). Vannevar Bush and Alan Kay's dream of a portable electronic book was starting to become a reality.

Even though Alto was the prototype for the laptop computer, it was in actuality more the size of an early desktop computer. An interim Dynabook, the Alto was shaped like a small box into which you could put a disk. Each disk could store approximately 1,500 pages. The Alto was controlled by a mouse and had a desktop with graphical icons. The pages looked professionally typeset and displayed graphic images. Having a screen with the dimensions 8.5″ × 11″, it looked somewhat like a small television set.

In 1988, when most users had shared access to a mainframe computer, Chuck Thacker reflected that it was hard for people to believe that an entire computer was required to meet the needs of one person (Barnes, 2007).

THE GRID COMPASS COMPUTER

Although the Alto had a running start, Kay's Dynabook design was not the first portable compact computer. In 1979, William Morridge developed the first actual laptop computer for Grid Computer Systems Corporation. Known as the Grid Compass Computer, it weighed less than 20% of any other computer that had similar computing capabilities (Ghaoui, 2006). As things turned out, it was Toshiba that manufactured the Dynabook in 1986, although it was known by that name only overseas where it was first marketed (Toshiba Corporation, 2009, par. 1). Considered a notebook, the Dynabook had a backlit-liquid-crystal display monitor, a word processor, and a spreadsheet as well as other applications.

MICHAEL HART AND PROJECT GUTENBERG

While Alan Kay's idea of ebook hardware was still in its infancy, Michael Hart had the idea to create the world's first ebook library. In 1971, what became known as the Project Gutenberg began at the University of Illinois Materials Research Lab on the Xerox Sigma V mainframe. Having been given $100,000,000 worth of computer time, Michael Hart quickly judged that computer time would best be used for storage and retrieval purposes. Using the American Standard Code for Information Interchange (ASCII), he found that he could duplicate a file an infinite number of times and send it to multiple computers via ASCII text with its alphanumerical characters translated for computers into binary bits (Hart, 1992, par. 7). Hart dubbed this process of duplicating files "Replicator Technology." "The concept of Replicator Technology is simple; once a book or any other item (including pictures, sounds, and even 3-D items) can be stored in a computer, then any number of copies can and will be available" (Hart, 1992, par. 6). By using the ASCII file format, 99% of all the computers around the world could read and access the files.

The first text made available was the Declaration of Independence, followed by the Bill of Rights. Hart's project had two goals, to be low in cost and easy to use. The original goal of Project Gutenberg was to have 10,000 books available in electronic format by the year 2001. A blog posting by Michael Hart (2010) states that on August 31, 2010, Project Gutenberg had surpassed 37,500 titles and planned on having made available 40,000 ebooks by its 40th year celebration (par. 1).

SUPERBOOK SOFTWARE

Throughout the history of ebook development, new technology continued to enhance ebook usability. One such technology, developed at Bell Communication and known as SuperBook, revolutionized ebook navigation. Remde, Gomez, and Landauer (1987) explain that SuperBook software preprocesses text and turns it into a formatted, searchable book. SuperBook software formats text to a standardized title format, table of contents, and page/word look up. SuperBook can build an index to find all occurrences of a word as well as use Boolean combinations to improve searching. SuperBook also allowed the user to add annotations. When asked if SuperBook was hypertext, Remde et al. (1987) cite Bush (1945) and explains that, in spirit, SuperBook accomplishes what hypertext sets out to do. In actuality, SuperBook is not a hypertext system, but rather a different solution to the limitations of the previous linear construction of ebooks.

CD-ROM COMPANIONS

In 1989, Martin (n.d.) explains that Bob Stein and his company Voyager released Beethoven's Symphony No. 9, the first title in their line of CD-ROM Companions. The package included a copy of the original score, music by the Philharmonic Orchestra, and a commentary. The format was so popular that the company used it for 13 years. Lambert, Ropiequet and Gates (1986) explain that an optical data disc-storage technology, such as CD-ROM, allows for "enormous volumes of textual, visual, and/or audio data to be stored in a very small, highly-resistant-to-damage piece of hardware" (p. 252). Voyager's CD-ROM Accompaniments were the precursor to the company's Expanded Book Toolkit software. The Expanded Book Toolkit retailed for just under $300 and allowed consumers to create their own electronic books. Consumers were now able to make CD ROM's similar to what Voyager had on the market. By 1996, the market for CD ROM had waned; and the company had financial difficulties. Vickers (1997) in part credits failing CD ROM sales in part to the lure of the Internet.

BOOKMANAGER

In 1989, IBM introduced BookManager software products that used General Markup Language, allowing files to be viewed on many platforms. Among the products under the BookManager name were BookManager BUILD and Book Manager READ. BookManager BUILD created the online books to be used by BookManager READ. BookManager READ displayed, searched, and managed the online books and bookshelves. In a study done on the

usability of a manual created with BookManager products, Hendry et al. (1991) found that inexperienced users underutilized the index, relied heavily upon navigating by paging, and seldom used the search features or the table of contents to find information. This would suggest that users were not entirely comfortable using books accessed electronically. BookManager products, however, are still available for download today; and the IBM website offers technical support (Reitz, 2004, p. 213).

SONY

Koppel (1991) explains that the idea for the Sony Data Discman occurred in 1988 when Sony engineers noticed how popular pocket-sized electronic notebooks were with younger employees. The Sony Data Discman is a modified version of Sony's portable compact disc player. The Data Discman can store up to 200,000 pages of text on the same discs that once played only music. "The Data Discman Electronic Book Player plays both audio CD singles and 8 cm CD-ROMs. It weighs 1.5 pounds (with battery), measures 4.25 × 2 × 5.25," and includes a small QWERTY keyboard with a cursor pad. The 3.4″ diagonal LCD screen can display 30 characters by 10 lines. Each character is a sharp 8 × 16 pixels. It is battery operated and provided three hours of use" (Keep, McLaughlin, & Parmar, 1993, par. 2). The Discman sold for about $450 in Japan. The disks were pricey and ranged from $125 to $145 a piece. The Discman was introduced to the American market in November, 1991, at a price of $550 but had little success outside of Japan.

Rogers (1992) reports that in the fall of 1992 Sony launched the CD-ROM XA player, also known as the Sony Bookman. The Bookman retailed for $995 and played full sized CD-ROM Discs on a MS DOS platform, unlike the Discman which played smaller discs. Keep et al. (1993) report that the "Sony Bookman was larger, weighing 2 pounds and measuring 7 × 2 × 6.″ It had two notable differences from the Data Discman: it played full-length audio CDs and CD-ROMs and was a DOS-compatible 80286 computer with 640 KB of RAM. The monochrome display was 4.5″ diagonally and supported 300 × 200 resolution (Keep et al., 1993, par. 9). Even pricier than the Discman, the Bookman hit the American market at $900. Sony also partnered with Microsoft to develop additional software for the Bookman. Although initial sales were promising, Sony failed to create a sustainable market for its ebook reader.

SOFTBOOK READER

In 1998, Soft Book Press came out with the SoftBook Reader. Kay (2000) describes the SoftBook reader as being 9″ × 12″ inches and weighing about

three pounds. Kay's critique of the SoftBook reader included several faults: poor contrast, text that was too large and too bold, and the ability to display only 300–320 words per page. It came with a stylus to make notes and a backlit screen. While an unremarkable device, its importance will be illustrated shortly.

ROCKET EBOOK READER

Also in 1998, NuvoMedia entered the market with the production of the Rocket eBook Reader. Schilit et al. (1999) state that the Rocket eBook Reader was designed to be the size of a paperback, weighed 1.4 lbs., and had a monochrome screen that was 4.5″ × 3″. The Rocket eBook Reader had about 17 hours of reading time and could be recharged by using a cradle attached to a PC. Books were downloaded from online book sellers such as Barnes and Noble. One drawback to the device was that it could hold a maximum of 10 books, about the equivalent to 4,000 pages. Kay (2000) points out that although it was a much better product than the SoftBook and about the size of a paperback, it weighed considerably more and caused wrist fatigue when used for long periods of time. Bryan (2001) reports that, when the Public Library of Charlotte and Mecklenbuerg County in North Carolina circulated the Rocket eBook Reader, user experiences were mixed. Some patrons tried ebooks and discovered that they liked paper books better. Others were fascinated by the ability to read in the dark and look up definitions while reading. Patrons really liked the backlighting feature on the readers. Numerous patrons noted that this feature was great for reading in bed or traveling. Suggestions for changes to library procedures included: increasing check-out time, allowing renewals, and providing an annotated title guide (Bryan, 2001).

In a similar study, conducted at Loughborough University and Market Harborough Public Library in Leicestershire, United Kingdom, users evaluated the Rocket eBook Reader and the Glassbook, a software program that allowed users to view ebooks on a computer. Users found that, while using the Rocket eBook Reader, it was "easy to find the actions required to read and annotate the material" (Dearnely & McKnight, 2001, p. 68). Although the "illumination was adequate, and the typeface was easy to read," little information was displayed upon the screen. One user noted that, although there were difficulties to reading of the screen, the Rocket eBook Reader was easier to read than the usual desktop computer screen. Users reported that the Rocket eBook Reader had typical computer-like navigation tools and a stylus that was easy to use. Although it was easy to recognize what function most symbols controlled, users where unsure what the "rocket" key did but, with a trial and error approach, determined that it was used to switch text sizes (Dearnely & McKnight, 2001). When compared to the Glassbook

reader, the Rocket eBook Reader was preferred by the majority. Users felt that it had a "booky" feel and liked that it was both portable and durable (Dearnely & McKnight, 2001).

DIGITAL MILLENIUM COPYRIGHT ACT

A significant development for ebook sellers occurred when the U.S. Congress passed the Digital Millennium Copyright Act (DMCA) of 1998. Freeman (2002) explains that the DMCA made major changes to the copyright law in order to address new issues brought about by the Internet. The DMCA inserted new laws into previously existing copyright laws that discouraged copying copyrighted materials and included new anti-circumvention provisions. "These provisions prohibited gaining unauthorized access to a work by circumventing a technological protection measure' put in place by the copyright owner where such protection measure otherwise effectively controls access to a copyrighted work" (Freeman, 2002, p. 5). In response to the DMCA came digital rights management, better known as DRM. DRM includes any mechanism, either hardware or software, that attempts to control the use and distribution of intellectual property in digital form. Types of DRM systems include data encryption, digital watermarks, and user plug-ins.

The strengthening of copyright protection through the DMCA was especially important for ebooks and ebook readers because most DRM controls either prohibit or limit copying and often do not allow the ebook to be transferred to a new device when coupled with a restrictive licensing agreement. These controls encouraged companies like Amazon.com and Apple to develop proprietary formats that limited users to their ebook inventory and readers and made it impossible to sell ebooks through the doctrine of first sale because the ebooks are licensed rather than purchased.

While these controls are set in place to prevent unlawful distribution, they also prohibit consumers who have purchased the electronic version of the book to fully utilize it. DRM is particularly challenging to libraries who purchase materials intended for multiple users. As an aside, detailed instructions on how to bypass protection for the Amazon Kindle have been and may still be available on YouTube, but providing a reference to these videos is most likely illegal.

EVERYBOOK

At about the same time that the SoftBook and Rocket eBook Reader came out, World Electronics introduced the EveryBook. Reid (1999) states the EveryBook advertised that, unlike both the SoftBook and the Rocket eBook Reader, it had two full-color, 450-dpi hinged screens that resembled a traditional book and used original PDF files created by publishers. This en-

hancement allowed it to display illustrated textbooks. "The first EB Dedicated Reader on the market will be the professional version, aimed at doctors, pharmacists, lawyers, architects, engineers, the military and sales professionals" (Martin, 1998, par. 3). Martin (1998) quotes Karolyn Kelly–O'Keefe, EveryBook's vice president of marketing, as explaining that these professionals will use the device "for storing and instantly updating their professional libraries and for internal document management" (Martin, 1998, par. 3).

Schilit et al. (1999) report that the EveryBook was scheduled to come out in three different versions. The Professional version was made available in 1999 at a cost of $1,500. It measured 8.5″ × 11″ inches and included a leather binding to look like a real book when closed. Future plans included college and personal versions to appear in 2000. Unfortunately, the EveryBook was never available widely and remained a market prototype (Crawford, 2001, p. 50).

MICROSOFT READER

Microsoft attempted to solve the problem of poor readability of e-readers by using new ClearType technology in the Microsoft Reader. Microsoft Reader allowed users to read ebooks on PCs. This reader worked best with liquid crystal diode (LCD) screens, explains Hilts (1999), by improving font resolution and the appearance of the printed page. When Bill Gates presented the ClearType technology at the Comdex Computer Trade Show in Las Vegas in 1998, he admitted the reason ebooks had not taken off in the past was the hard-to-read type (Hilts, 1998). In 1999, Microsoft partnered with R. R. Donnelley & Sons, the largest publisher in the United States, to create a repository that held tens of thousands of titles (Hilts, 1999). Donnelley & Sons had some experience in this area because the company had been publishing ebooks for more than a year. Crawford (2001) found that ClearType made type harder to read by adding color fringes and asserted that, even with ClearType technology, high quality ebook screens did not yet exist.

NETLIBRARY

Hane (1999) states that in March 1999 NetLibrary launched an electronic library that had already sold subscriptions to more than 40 libraries and five major library consortia with 24/7 access to electronic books. With over 2,000 titles available, Hodges, Preston, and Hamilton (2010) explain that libraries were offered three acquisition packages that would allow them to order titles individually, as a package, or as a patron-driven acquisition. Patron-driven acquisition was a major change in the way that libraries could purchase books because it allowed titles to be purchased with immediate access

according to patron requests. With patron-driven acquisitions, the paradigm shifted from the just-in-case stockpiling of materials to a just-in-time purchase as needed. The library could add records for the ebooks to the online catalog with automatic purchase with a certain number of uses or a certain amount of time spent reading the ebook, both as specified by the contract. Electronic books could be viewed by patrons, with checkout periods set by institutions. At the end of the checkout period, the ebook automatically disappeared from the user's ebook reading device. In most instances, there was a limit on how many physical pages patrons were allowed to copy in an attempt to avoid any violation of copyright law. Unfortunately, many agreements treated ebooks as physical books and did not allow more than one copy to be checked out simultaneously.[1]

GLASSBOOK

An important tool for the diffusion of ebooks was Glassbook EBX software. This multi-platform software allowed users to read ebooks on whatever form of reader was available. Hilts (1999) explains that the Glassbook software could be used with Rocket eBook Reader, SoftBook, or on PC's and Macintosh computers. Similar to EveryBook, Glassbook used PDF files and provided an exact copy of the printed book. The one advantage Glassbook had was that its titles could be loaned to a friend, something that was not possible with other ebook formats. Reid (2000) states that Glassbook Inc. and Adobe Systems integrated the technology of the Glassbook reader into the Adobe Acrobat Reader. The Adobe Acrobat Reader is still in use and remains very popular a decade later, though faulted for its lack of security. Dearnely and McKnight (2001) share results from a pilot study which evaluated the Rocket eBook Reader and the Glassbook software at Loughborough University and Market Harborough Public Library in Leicestershire, United Kingdom. Overall, users found that Glassbook software features were difficult to find, the print was difficult to read, and that the icons were difficult to interpret. (Dearnely & McKnight, 2001). On a more favorable note, one user did enjoy the familiar on-screen environment while another commented that once you figured it out, it had a "reasonably simple format" (Dearnely & McKnight, 2001, p. 68).

GEMSTAR INTERNATIONAL GROUP

In 2000, Gemstar International Group acquired both the SoftBook and the NuvoMedia Rocket eBook Reader. Milliot (2000) states that they intended to capture the reference market of the SoftBook and the general trade sales of the NuvoMedia. Gemstar dropped both the RocketBook and SoftBook

names, which indicates the lack of importance of these brands in marketing the products (Crawford, 2001). As reported by Guthrie (2003) in April 2003, under threat of jail by the Securities and Exchange Commission, the founder of Gemstar, Henry Yuen, was fired. In July of that year, Gemstar discontinued its ebook business and stopped production of ebook readers. On May 6, 2006, the U.S. Securities and Exchange Commission announced that Henry C. Yuen had been ordered to pay $22 million for defrauding investors by inflating Gemstar licensing and advertising revenues (U.S. Securities and Exchange Commission, 2006).

EBOOK READERS IN THE 2000S

Hane (2006) looks back at the influx of ebook readers to hit the market in the early 2000s and notes that, although expectations were high, the market was not very successful. Of the 24 ebook readers that Crawford reviewed in 2000, only eight are still around (Hane, 2006). Hane interjects that, in order for ebooks to become widely used, vendors must address the following issues: improvements in e-book selections and hardware, cost, lack of interactivity and connectivity, and the inability to share e-books with other users (Hane, 2006).

SONY PORTABLE READER

In answer to the many problems with ebook readers, Sony launched the Portable Reader System PRS-500 in September, 2006, along with the Connect eBook store that offered over 10,000 titles (Hanes, 2006). Centered on improving the user experience, the Sony Portable Reader System uses E Ink technology. This ebook reader, according to Hane (2006) enhances the reading experience with the following positives: it has a bright, paper-like display; it is readable in bright sunlight; and battery life is longer than previous e-readers with up to 7,500 page turns. In addition, the device connects to PCs by using a USB port, enabling users to purchase over 10,000 titles from the Sony Connect eBook store. It has the ability to magnify up to 200%; can read Word, TXT, JPEG, TRT formats; plays MP3 files; and uses a SD/MMC memory stick. As a bonus, the owner can download purchased books onto as many as six devices (Hane, 2006).

BOOKEEN CYBOOK

The Bookeen Cybook, whose first model appeared in 2003, came out with an improved model and began to become a formidable contender (“About

Bookeen," 2011). The new model was considerably lighter and had longer battery life than its predecessor (Sontag, 2008). The current model, the Orizon Cybook, introduced in 2010, provides "up to 10.000 consecutive pages and approximately 3 weeks" battery life ("Cybook Orizon," 2011, par. 2).

The Cybook is the only reader on the market that accepts all nonproprietary copyrighted material (Sontag, 2008). The cost was $350 for the basic version. Despite the improvements, the user experience was often unsatisfactory because it had uncomfortable page turn buttons (Sontag, 2008).

AMAZON KINDLE

Although the Amazon Kindle cost more at $399, it connected by wireless to the Amazon book store and the Internet (Sontag, 2008). Unfortunately, the only place one could buy copyrighted material for the Amazon Kindle is the Amazon bookstore. It was also not possible to resell used ebooks. It was possible, however, to put books purchased from Amazon on as many as six Kindle accounts (Sontag, 2008).

Similarly, the only place you can buy copyrighted material for the Sony PRS-505 is at the Sony bookstore (Sontag, 2008). Unlike the Kindle, books must be downloaded from a computer using a USB device. All three devices use E Ink technology and have glare free-screens. While testing all three devices, Sontag (2008) noted that although the Sony and Cybook were lighter than the Kindle, it was the Kindle that she kept using. She attributed this to the way the Kindle fit in her hands, and she described it as a feeling of "melting away" when reading (Sontag, 2008, p. 39). As of November, 2007, Prime View International reports that Amazon had sold 216,000 Kindles and had a backorder waiting list of 6 weeks (Sontag, 2008). Similarly, the Cybook was also frequently out of stock. Although Sony, Bookeen, and Amazon did not release sales figures, ebook readers, as of 2008, were not threatening to take over (Sontag, 2008). In 2009, Amazon released the international Kindle, costing $279, in over 100 countries (Zee, 2009, par. 3).

EBOOKWISE

Also in 2008, the eBookwise 1150 hit the market at $109.95 (Trippe, 2008). The standard eBookwise has only 8mb internal memory and can hold only about 10 books. The eBookwise's best feature, its dictionary look-up, takes up over half the memory (Trippe, 2008); more memory is available at a cost. An eBookwise that comes with a 64MB memory card costs $139.95. Another option is an 128MB memory card for $179.95 (Trippe, 2008). Content cannot be purchased from the device itself; one must purchase the book from an online bookstore. Further cause for concern is that the online store does

not offer a full range of books. To the product's credit, both personal and commercial content can be read on it. Reading is comfortable, settings are easy to navigate, and the device can be read day or night with a battery life of up to 15 hours. In addition, it has useful tools for searching, drawing, and highlighting (Trippe, 2008).

EBOOK COMPARISONS AT THE END OF THE FIRST DECADE

Reid (2009) compares the newest ereaders in 2009, including the Kindle 2, Kindle DX, Cool-ER, Ditto Book, Sony Reader Daily Edition, Sony Reader Touch, Sony Reader Pocket, Irex DRS, Irex Iliad, iPad Touch, iPhone, and the Acer Netbook. Ebook readers are now available in a multitude of devices varying in size from the 3.5″ iPhone to the 10.2 inch IREX DS. While all of these readers display ebook content, the Kindle 2, Kindle DX, Sony Reader Daily Edition, IREX iLia, iPod Touch, the iPhone and the Acer Notebook are wireless. Title availability ranges from 100,000 titles with the Sony Reader Daily Edition, Sony Reader Touch, and the Sony Pocket Reader to the millions of titles available through pay and public domain for the iPad Touch, the iPhone and the Acer Notebook (Reid, 2009).

In 2009, according to Levack (2009), the Kindle was the best known device on the market. Competitors include Sony Reader Digital Books, STAReBOOK, Bookeen Cybook Gen 3, Fujitsu, FLEPia, Readius, and Onyx Book. In January 2010, Plastic Logic LTD launched a new ereader that was somewhat larger at 8.5″ × 11″ and designed for magazine and newspaper reading. The Plastic Logic device supports a variety of document formats, including Microsoft Word, Excel, PowerPoint, and Adobe PDF's (Levack, 2009). It uses E Ink technology, displays in black and white, and weighs less than a pound.

BARNES AND NOBLE NOOK

Barnes and Noble began shipping their own ebook reader, the Nook, in late November of 2009 (Milliot, 2009). Priced at $259, the Nook has some features that allow it to compete with both the Amazon Kindle and Sony Reader, such as Wi-Fi capability that allows the user to browse the Barnes and Noble book store from the device. At the time of the Nook release, a Bowker PubTrack Consumer Report found reader market-share percentages to be distributed as follows: desktop PCs at 42%; Sony e-reader 1.0%; Kindle 25%; PDA (Blackberry, etc.) 5.0%; iPhone 6.0%; regular mobile phone 1.0%; and iPod or other MP3 devices 16.0% (Milliot, 2009). With plenty of room left in the market for newcomers, the Nook had the opportunity to become a formidable contender.

Upton (2008) points out that ebooks have many advantages over traditional paper books. Not only can a single e-reader replace many books, but ebook online distribution has a lessened environmental impact over the distribution system for paper books (Upton, 2008). Over a lifetime, users could greatly reduce their carbon footprint by reading electronic books instead of paper. Another advantage of ebooks is that they have the ability to reach the market much more quickly than print books.

EREADERS AND LIBRARIES

Ereaders have great potential for libraries. As early as 2009, Sony collaborated with Penn State libraries by donating 100 PRS-505 eBook readers in order to test the usability of ereaders in libraries. While the responses were varied, it became apparent that ereading is an individual experience. Although each person had a different perspective as to whether they liked using the ereaders, almost all commented on known issues with the devices, such as low battery life, difficulty recharging, slow refresh time when turning pages, glare on the page, and an expensive purchase price (Behler, 2009). At the time of the study, ereaders cost between $300 and $400 (Behler, 2009).

During 2010 and 2011, many libraries across the country continued to adopt ereader checkouts. Palm Harbor Public Library in St. Petersburg, Florida, introduced Amazon Kindles for check out (Dougherty, 2010). Cushing Academy in Ashburnham, Massachusetts went virtual by replacing its paper collection with 200,000 electronic books that can be accessed in the library or by laptop (Dougherty, 2010). Amazon announced in an April, 2011, press release that Kindle customers will be able to borrow from over 11,000 libraries in the United States ("Amazon to launch . . ." 2010). Previously, libraries who boasted about ebook checkouts had only the option of checking out the physical ereader loaded with titles. The new practice will allow patrons to download books to privately owned readers. As reported by Haq (2011): "Here's how it works. Libraries must first purchase digital copies of books. The e-books are then loaned out as if they were physical books. Patrons don't need to make a physical trip to the library to borrow an e-book. Instead, they can download books from library websites. Most, but not all, major public libraries offer free digital-ebook lending. Though each library sets its own e-lending policy, only one person can check out a book at a time and typical lending periods are 14 or 21 days" (Haq, 2011, p. 1).

As this article goes to press, one problem for libraries is that some publishers are hesitant to license their ebook content. They are concerned about the longevity of ebooks in contrast with print copies and also with the current distribution system that they fear will reduce their revenues (Kelley, 2012).

RECENT DEVELOPMENTS

As ebooks become a growing alternative to print books, problems still lie in the ereaders ability to display illustrations, graphs, diagrams, and charts (Dougherty, 2010). Despite this fact, optimism toward ebooks continues to rise. In 2010 alone, 15 new ereaders came on the market (Herther, 2011). A report from ABI Research predicts that over 11 million ereaders will ship in 2010, with the majority being shipped to the United States. (http://www.abiresearch.com/nalyst_blog.jspl). Numbers are up considerably since 2009, when only 4 million of the devices shipped (http://www.abiresearch.com/nalyst_blog.jspl). A 2010 In Stat Research report forecasted that shipments from key suppliers, such as, Barnes and Noble, Amazon, and Sony, would rise from 12 million units in 2010 to 35 million units in 2014 (Herther, 2011). A GfK Group analyst report published in 2010 reported that ereader ownership tripled in just 18 months (Herther, 2011).

Meanwhile, the price of the Amazon Kindle continues to drop. The Barnes and Noble Nook is now available in color. Millions of other devices, such as PCs, laptops, smart phones, and so on, can be used to access econtent. Also flooding the market are free ereading software programs, such as Bilo (http://www.bilo.com), Copia (http://www.thecopia.com), Calibre (http://calibre-ebook.com), and Stanza (http://www.lexcycle.com).

Despite their rocky start, it looks as though ebooks are here to stay. Amazon recently announced that ebook sales exceeded the sale of hardcovers (Miller & Bosman, 2011, par. 1). Sales reports from the International Digital Publishing Forum show that in the third quarter of 2010, sales of ebooks skyrocketed to $119.7 million up from $88.7 from the previous quarter (Industry Statistics, n.d., par. 4). Latest figures report that the number of owners of ebook reader and tablets doubled after the 2011 Christmas season (Enright, 2012, par. 1). Since electronic resources are breaking new ground, some trial and error is inevitable in the attempts to develop seamless implementation of resources; but the basis for success is firmly established. Like most major changes in technology, solutions to the issues with producing, distributing, and using ebooks will not come overnight but will require further experimentations and hard work, with some major and minor mistakes made along the way.

CONCLUSIONS

The future is somewhat cloudier for ebooks and libraries, in part because of the need for dedicated readers for the proprietary systems. Although there is some resistance by both publishers and libraries alike, ebook library lending is a natural progression of the ebook technology evolution. Traditionally, libraries have been at the forefront both in introducing new technologies

and teaching library patrons how to use them. It is only natural for patrons to expect ebooks to be available at their public library. According to Taylor (2011) the benefits of ebook library lending are multiple. Libraries benefit because it is more cost effective: one book can be downloaded to six ereaders, allowing for multiple people to check out the same book. The library can attract new patrons who want to try out a new ereader before they commit to purchasing one.

In addition, most ebook devices can read PDF files, which offers the possibility of lending original content. Creating a library lending infrastructure to support ereaders will be challenging. Harris and Goldberg (2011) caution that lending Kindle titles brings up privacy concerns for libraries. While library systems usually purge any record of patrons check-out once they return the item, Amazon will know the identity of library patrons who already own a Kindle. Even with its risks and potential snags, libraries cannot afford not to lend ebooks and ereaders. Library patrons have always counted on libraries getting the right book to the right reader. Ebook and ereader lending can allow libraries to do this in half the time and for a lot less money. What remains is for publishers, distributors, and aggregators to find a solution that meets the core needs of each group.

NOTE

1. "The developing model ebook publishers are creating for libraries is that each individual copy of an ebook bought can only be issued to one reader at any one time. One purchase, one loan. The ebook can be reissued many times but only one reader can borrow it at any one time. If a library wishes to issue two copies in parallel, then they must pay for two copies of the same book. This service model is still in development" (Ormes, nd. par. 32).

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