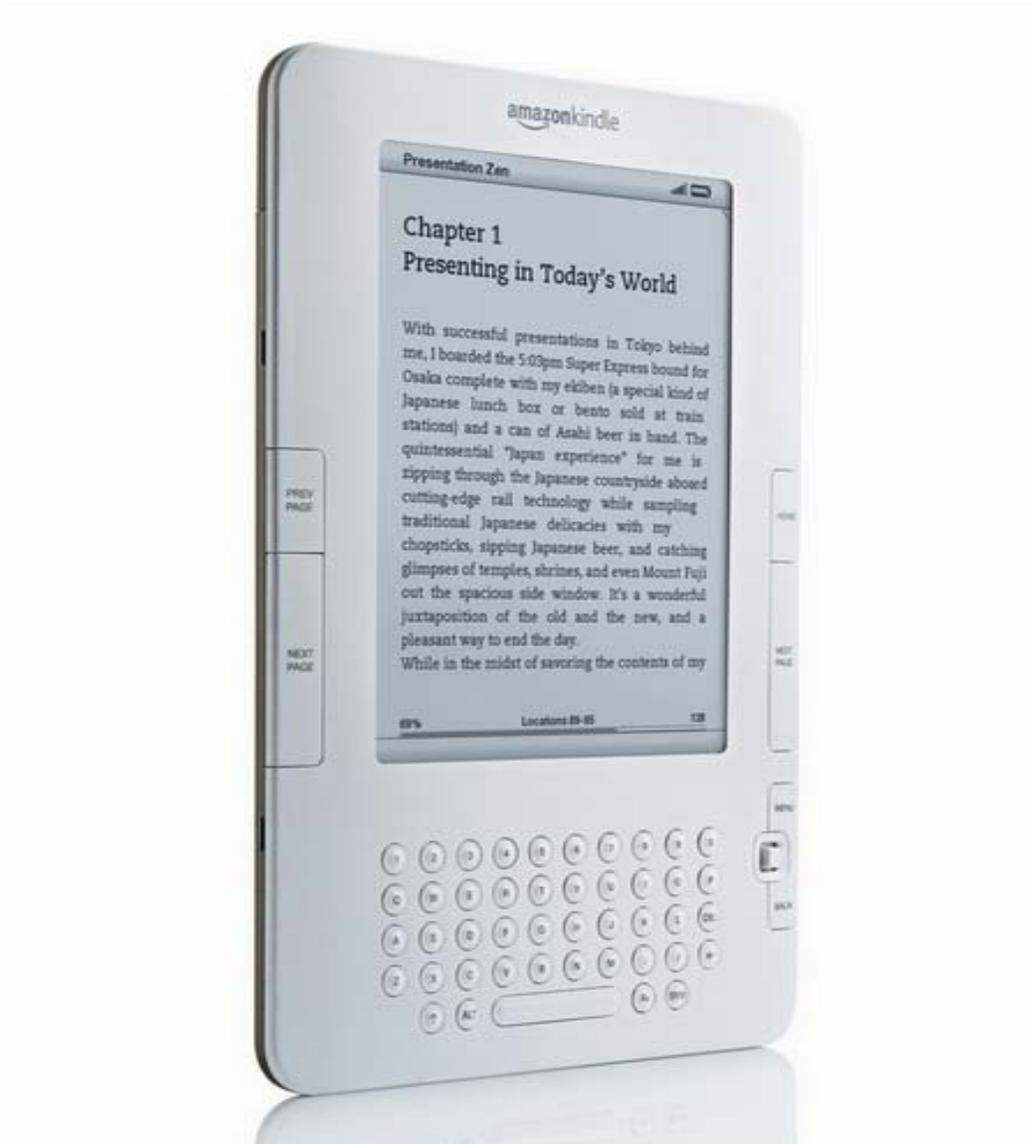


The Kindle: A Background for the Novice



A4/6I Educational Technologies Research Services, Air University

1 March 2010

Abstract

EReaders are growing in popularity as more and more digital text is made available to the public. Although this technology has been around for years, it seems to have finally come into its own. With companies like Amazon[®], Barnes and Noble[®], Sony[®], and now Apple[®] leading the way, the eReader is poised to have a lasting effect on publishing and education. The eReader is quickly becoming a part of the digital phenomenon. It has been integrated with mobile technology, the iPhone Apps™, and applications available for personal computers. This offers the versatility of being highly portable. While reading this synopsis, keep in mind there is no perfect eReader. Continuing advances in technology frequently impact the capabilities of eReader devices. The purpose of this report is to provide information to those who are considering the application of eReader's to enhance learning, but who know very little about them.

Introduction

What is a Kindle?

Have you ever seen a book bag that could carry 1,500 books? The Kindle can. What about a textbook that compiles your notes or provides easy access to the Internet? Again, the Kindle is up to the challenge. The Kindle is an electronic reading device, or eReader, created by Amazon. Users of the device can download books, magazines, newspapers, and blogs straight to the Kindle by wirelessly accessing its "Shop" menu. Amazon also converts other document formats to be sent to a Kindle email address in Microsoft Word, HTML, .prc, .mobi, .pdf, or numerous image formats; or, in just plain text. The Kindle allows you to download free material as well, such as books from the public domain. It can easily connect with Wikipedia, Google, and other sites.

How It Works

The Kindle utilizes an Intel™ processor originally designed for smart phones. The display is a technology called electronic paper display (EPD), a proprietary imaging film manufactured by the E Ink Corporation. Their EPD technology uses a super-thin display and charged microcapsules to simulate the appearance of an actual printed-paper page. The EPD technology is used today in many eReaders, mobile phones, and other portable devices. Through its EPD, the Kindle can display graphics in 16 shades of gray. Barnes & Noble's eReader, the nook*, utilizes the combination of a full-color touchscreen/virtual keyboard for book search and selection, and the same EPD as the Kindle for the actual books' text. (*nook is not capitalized by Barnes & Noble.)

In conjunction with Sprint, Amazon utilizes Whispernet™ technology, allowing the user to download books, check email, search the Internet, and more. There was a time when Amazon considered charging 10 cents per download, but up to this point, no such charge has surfaced. Unlike Apple's iPad™, Amazon does not currently charge Kindle users any monthly fees—they are considered a part of everything included with the device. Also different is that the Kindle user does not need to seek out a Wi-Fi connection to access the Internet. One drawback to Sprint's Whispernet is that international coverage is limited. The basic web-browsing functionality for both the Kindle and Kindle DX supports JavaScript,

SSL, and cookies. The device does not, however, support Java applets or media plug-ins. Several features make the Kindle user friendly. An accelerometer allows the screen display to rotate to and from portrait or landscape orientation, depending on how the device is being held. The storage capacity of the Kindle DX is 4 GB compared to the 2 GB of the Kindle 2. This equates to about 3,500 books on the Kindle DX and 1,500 on the Kindle 2. The Kindle 2's memory can be expanded by adding an SD card. One of the features that best demonstrates the versatility of Kindle is the built-in dictionary. When a word's meaning is not recognized, the user can move the cursor next to the word and the definition(s) will appear at the bottom of the screen. This feature is extremely helpful. No longer does the user have to have a dictionary and thumb through the pages to find the meaning(s) of a word. The Kindle makes it easily accessible. Another great feature of the Kindle is the text-to-speech function. This is beneficial to those with vision problems, language barriers, or lack of reading frequency. Research has shown that adding the audio element could be invaluable for those users who learn better by hearing than by seeing. Another feature is the ability to adjust the text size. This is important for those who are challenged by smaller fonts. The Kindle's highlighting feature is sufficient for the casual reader. For the student, however, it can be frustrating due to limitations on the amount of highlighted text stored in the My Clipping folder.

Kindle's Uses in Education

According to Charles Crowell (June 2009), the Kindle aligns with two pedagogies: traditional and contemporary. His thoughts on the effects of the Kindle from traditional pedagogy mainly focus on the budgetary savings available from using the device. The contemporary approach has far-reaching pedagogical effects. With free high-speed wireless access, the student has the ability to receive and read documents at their leisure. With the availability of professional and scholarly journal collections, e.g., EBSCOhost and ProQuest, the user can download the research documents directly to the Kindle. Another benefit is the ability for academic faculty to stay current on changes in the field and tailor readings to be downloaded to enhance the learning experience in their courses. This functionality is aided by its wireless capability.

A concept paper published in July 2009 by the Democratic Leadership Council, titled "A Kindle in Every Backpack," proposed conducting a national trial, placing 400,000 eReaders in classrooms across America. In the fall of 2009, Amazon, in collaboration with other major universities, launched a series of projects to test the Kindle in a classroom environment.

In today's mobile environment, the Kindle's functionality has expanded to the more popular devices, such as the iPhone[®] and the Blackberry[®]. Amazon has provided applications to ensure that Kindle users are able to continue reading while on the go, even without their Kindles. There is also an application for those who rely more on their computers than their mobile devices. As the user reads ahead on either device, each will synchronize, bookmarking where the person last left off. This feature is also makes this technology extremely user friendly.

A pilot program was conducted at several major universities to determine: (1) if the use of eReaders could significantly reduce printing costs, and (2) the effect of eReaders on the quality of education. This study was also used to provide feedback to makers of future eReader devices. The results of the study were mixed: Some doubted the positive overall impact of the Kindle in education, while others had an opposite opinion due to a more positive experience. The most interesting facts are:

1. The cost of printing at Princeton University was decreased an average of 54 percent.
2. Having all the required readings consolidated in one place was an advantage.
3. Students were unable to identify page numbers to quickly reference a given topic.
4. Students had difficulty highlighting and annotating PDF files.

The consensus was that students are more apt to use the Kindle for recreational reading, although they do understand its benefits to education. The hope is that future eReader devices will incorporate the features necessary to be truly beneficial to higher education.

Comparison

With the popularity of the eReader, several companies have developed their own devices to compete with the Kindle. No eReader has everything users are looking for. The best eReader is the one that suits the individual user's needs. Below is a matrix listing the attributes of the most popular eReaders on the market today.

Make/Model	Kindle 2	Kindle DX	Sony PRS 505/700	B&N nook	Apple iPad		
Screen Size	6.0"	9.7"	6"/6"	6" screen/ 3" LCD touchscreen	9.7"		
Wireless/Wi-Fi	3G Wireless	3G Wireless	No (USB 2.0)	3G Wireless	3G Wireless/Wi-Fi No plan for Wi-Fi \$14.99 per month 250 MB data \$29.99 unlimited data		
Memory	2 GB	4 GB	256/512 MB	2 GB	16 GB	32 GB	64 GB
Expandable Storage	Yes	No	Yes	Yes	No		
Battery Life	Up to 1 week		2 Weeks	10 Days	Up to 10 hours		
Screen Type	16-level grayscale		8-level grayscale/monochrome LED backlit	16-level grayscale screen/LCD color touchscreen	LED backlit color		
Text-to-Speech	No	Yes	No	No	No		
Formats Supported	PDF, eReader, PDB, MP3, JPG, GIF, PNG, BMP, DOC, DOCX, TXT, RTF, MOBI, PRC, AZW		PDF, eReader, PDB, MP3, JPG, GIF, PNG, BMP, DOC, DOCX, TXT, RTF	PDF, eReader, PDB, MP3, JPG, GIF, PNG, BMP	MP3, MOV, AAC, AIFF, WAV, M4V, MPEG4, JPG, GIF, PNG, BMP, PNG, TIFF		
Price	\$259	\$489	\$279/\$349	\$259	\$499	\$599	\$699

Conclusion

When considering an eReader for pleasure or education, consider your requirements. As seen in the matrix listing, each eReader varies in its functionality and versatility. EReaders provide the kind of flexibility critical to a mobile society, and a subset of that society is involved in education in one capacity or another. EReaders can replace large publications or textbooks, reducing printing and publishing costs—and that doesn't even factor in the ecological/environmental aspects. They can also reduce the fatigue or back pain from carrying heavy books. Furthermore, the educational experience can be enhanced, offering more flexibility for the instructor or institution to tailor the content taught in the classroom.

Disclaimer

The opinions and viewpoints expressed in this paper are solely those of the authors and do not reflect official policy or position of the US Government or the Department of Defense (DoD), the United States Air Force, or Air University. The information in this article should be considered time sensitive and is subject to change due to technological advances after 26 February 2010.

References

Chamber Four: *eReader Comparison*. Retrieved January 29, 2010, from Chamber Four, for readers of books and ebooks, <http://chamberfour.com/ereader-comparison/>.

Crowell, C. (June 15, 2009). *The Kindle Factor*. Retrieved February 11, 2010, from Inside Higher Ed, <http://www.insidehighered.com/views/2009/06/15/crowell>.

Freedman, T.Z. (2009). "A Kindle in Every Backpack." *A Proposal for eTextbooks in American Schools*, The New Democratic Leadership Council, p. 3. http://dlc.org/documents/DLC_Freedman_Kindle_0709.pdf.

Scholastic Administrator: *Will the Kindle Change Education? (October 2009)* Retrieved January 29, 2010, from Scholastic.com, <http://www2.scholastic.com/browse/article.jsp?id=3752572>.