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E-books and E-readers at the University:
An Analysis of the Past and Present

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Abstract

The author introduces the renewed interest in electronic books (e-books) in the context of electronic reader (e-reader) pilot programs head started by university librarians. Although the idea of electronic books has existed since the mid-20th century, the literature on e-books and e-readers is relatively young, with many articles published after 2001. Early studies of e-books in academic institutions focus on usage statistics and the subjects that seem to be checked out more as e-books than other subjects. More current e-book studies focus on students' and faculty feelings about the utility of e-books or how or why e-books are used. E-reader user and usage studies are fewer, but there is a growing body of literature as universities report first results of their e-reader pilot programs. Test runs of Amazon's Kindle, the Sony Reader, and iRex iLiad have not been overwhelmingly successful in academic settings, particularly because they are better suited for individual consumer use. Without understanding this background, it is difficult for librarians to build e-book collections and for vendors to learn how they can improve e-book technology to better meet the needs of college students and faculty. Ebooks are useful, but the technology needs improvement in order to make them more effective.

Keywords: e-books, e-readers, academic libraries, universities, colleges, higher education, usage studies, user studies

“The Horizon Report 2010” identifies electronic books (e-books) as a technology that will grow substantially on university campuses in the next two to three years (Johnson, Levine, Smith, & Stone, 2010, p. 17). Although the latest array of electronic readers (e-readers)—hand-held devices that hold e-book content—on the market for consumer use have been quite popular for leisure e-book reading, e-book usage in academic institutions has been slow (Johnson, Levine, Smith, & Stone, 2010, p. 18). Nancy Herther (2009) explains that e-readers and e-books have a surprisingly long history, dating back to the ideas of Vannevar Bush's memory extender from 1945 and Alan Kay's Dynabook from the 1960s (“The Rather Long Tail,” para. 2). Project Gutenberg also began in the 1970s (Gibbons, Peters, & Bryan, 2003, p. 3). According to Anne Behler (2009), “E-books are nothing new, and librarians and library patrons have long struggled with their lack of utility... However, in early 2008, e-books began to make waves thanks to the launch of Amazon’s Kindle” (para. 1). The buzz around e-books has resurged in recent years partly due to the growth of e-reader products (Gregory, 2008; Shelburne, 2009). Gregory (2008) indicates that in the 1990s it was predicted that e-books would take the place of printed texts, but, while e-books are used and are growing in their usage, people still rely on printed books (p. 266).

Early studies of e-books in academic environments, such as Bailey (2006), Christianson & Aucoin (2005), and two studies by Dillon (2001), focus more on usage statistics. While these studies are helpful to show that e-books have been used more over time and also reveal that e-books in certain academic subjects are more heavily accessed than other subjects (Rowlands, Nicholas, Jamali, & Huntington, 2007), they do not indicate how or why people use e-books. For vendors and libraries to better understand how users access and use e-books, user experience needs to be taken in account in order for e-books—and e-readers—to improve. At the urging of a librarian from McMaster University in Ontario during the Top Tech Trends session of the

American Library Association Midwinter meeting in January 2010, it was expressed that “attendees [should] consider the concept of ‘user experience’ (UX)” (“Top Tech Trends,” 2010, p.18). There is a growing body of American and British literature regarding user attitudes toward e-books, including how and why students and faculty use e-books, in the last decade (Gregory, 2008; Jamali, Nicholas, & Rowlands, 2009; Levine-Clark, 2006; Rowlands et al., 2007; and Shelburne, 2009). These studies offer important insights and criticisms of e-books that help support the results, both positive and negative, of e-reader programs.

Wendy Allen Shelburne's paper (2009) outlines the results of a survey conducted in May 2008 to determine student and faculty attitudes toward e-books at the University of Illinois at Urbana-Champaign. Of the 1,547 responses received, the results indicate that 55 percent were aware that the Library offered e-books, but forty-five percent were not aware (p. 61). Faculty and graduate students were less aware than were undergraduate students (p. 61). Fifty-seven percent of those surveyed had previously used e-books, but it was undergraduates who used them the least even though they knew more about their availability (p. 61). Although faculty and graduate students were least aware of e-book access at Urbana-Champaign, sixty percent of both groups used them while the undergraduates came in at 55.5 percent. Interestingly, e-books are primarily used for research and study in all demographic levels.

Approximately 59%...indicated that they use reference e-books the most, research monographs are used 43%, and textbooks are used 44%...91% of faculty use them for research; 83% of graduate student users use them for research; and 69% of undergraduates use them for research. While undergraduate use is high, the highest research use, as expected, is faculty followed by graduate students. (p. 62)

Reasons for not using e-books, in order, include unawareness, no need to use them, not liking to read from the screen, not knowing how to find e-books, a preference for printed books,

inapplicable e-book titles for research needs, and use only e-journals (p. 61).

In terms of advantages:

[t]he results showed that users considered e-books better than print books in terms of space and storage, accessibility 24/7, currency of information, ease of making copies, and availability from any location. In terms of ease of use, survey respondents gravitated toward print copies of books and stated print books were better than e-books for ease and pleasure of reading. (p. 64)

Disadvantages dealt primarily with screen and visibility issues, navigation and location of items, digital rights management, and Internet access or technical problems (p. 64). These disadvantages are not surprising, but what is interesting are the open-ended answers that address the problems with the format itself: "...the inability to 'have' an ebook the same way you can 'have' a printed book" and "One could never do *serious* study of anything just using eBook—whenever its necessary to do something in depth, even those who use eBooks end up printing off hard copies of the relevant sections for more in-depth study" (p. 64). This probably helps to explain why the majority—56 percent—of faculty and students indicate that they would be reading both print and e-books in the future (p. 65). Only 11 percent reported that they would be mostly using e-books, and 26 percent stated a preference for print (p. 65).

The Shelburne study, however, is not very clear on the viewpoints of users in terms of cost. The introduction to the paper does indicate that "There is also an increased interest in e-books and e-textbooks within academia as an answer to rising print material costs and for their convenience of use" (p 59). Only one of the included open-ended comments, written by an undergraduate student, points to perceived cost savings: "eBooks makes it a lot easier because u don't have to buy textbooks much less carry them around. It also helps the environment because less books have to be printed, saving trees in the process" (p. 63). It may just be that cost is one

of the motivating factors for the use of e-textbooks, the second-highest used type of e-book at Urbana-Champaign. To reiterate a previous statement, 44 percent of e-book usage was tied to e-textbooks, with reference books coming in first at 59 percent (p. 62). While perceived lower cost is not listed as an advantage, it does seem that cost is a factor when 86 percent of both undergraduates and graduate students who have used e-books before find them more "useful" than even faculty, 75 percent of which indicated them as "useful" (p. 62). The statement that this "indicates that students are not hesitant about using e-books and that they are early adapters" (p. 62) should not be taken at face value. Cost could very much be a reason to use e-books.

A study by Michael Levine-Clark (2005) at the University of Denver yields similar findings to Shelburne. The results of 2,067 respondents— 30.1 percent undergraduate students, 39.9 percent graduate students, 12.5 percent faculty, and 11.8 staff—indicate:

that e-books are used by about half of the campus community. Of these users, most utilize them only occasionally. These e-book users like the convenience of being able to access material from home and the ability to search within the text. Most respondents read only small portions of e-books, suggesting perhaps that print volumes are a better alternative for immersion in the text. Most respondents (over 60 percent) indicate a preference for print books over electronic, but an even larger number (over 80 percent) indicate a degree of flexibility between the two formats. (Abstract, p. 285)

Levine-Clark also indicates that undergraduates, those who "have grown up reliant on computer technology" were most aware of e-book access (p. 289). 71.1 percent of undergraduates were aware of their access to e-books, 56 percent of graduate students were aware, and 52.9 of faculty were aware. However, the included data indicates that undergraduates use e-books the least (p. 291). Using the occasional use category as an example, 68.5 percent of faculty use e-books occasionally, 63.9 percent of graduates use them occasionally, and 57.3

percent of undergraduates use them occasionally. In the Shelburne study, undergraduates also used e-books the least.

Levine-Clark's study indicates that e-books tend to be read in smaller portions, with very few respondents actually reading an entire text. Most respondents read a chapter or article within a book or a few pages (p. 292). 16.6 percent of all respondents indicated that if both a print book and electronic version were available, they would always choose the print version, and 44.1 percent would usually choose print and sometimes electronic. In contrast, 19.4 percent would normally choose electronic but sometimes print, and 2.1 reported they would always use electronic (p. 292, 294). However, 16.9 percent responded that the choice would depend in the situation (p. 292). It was also found that undergraduates are more likely to print e-book pages than are graduate students or faculty (p. 294). 36.1 percent of undergraduates reported that they printed pages, whereas only 22.1 percent of graduate students printed, and 19.6 percent of faculty printed pages (p. 295). A little more than a quarter of both faculty and graduate students indicated that the choice to read from the screen or read from a printed copy depended on the situation, but only 16.9 percent of undergraduates stated that their choice depended on the situation (p. 295). Levine-Clark assumes that this difference can partly be explained by the fact that undergraduates' research skills are not as high as these groups, particularly as these groups indicated that they print depending on the situation at a much higher rate than undergraduates (p. 294). While undergraduates are the most aware of e-book access, they may not have the skill to really know how to "use particular sources of information" (p. 294).

Levine-Clark's study makes no indication about saving money as a reason for the use of e-books. Regarding the questions as to why someone would use an e-book, respondents could choose as many responses as needed, among them being no print version of the book, difficulty getting to the library while working at home, "easier searching of the text," and other (p. 292).

"Many of the 'other ' responses mentioned ease of use or convenience, and many also rephrased the options listed above. There were very few other significant reasons given for using e-books" (p. 292). Respondents cited eye-strain for heavy reading, navigation issues, and the "inability to mark text on a screen" as problems in using e-books (p. 292, 297).

Cecilia L. Gregory's study (2008) investigates undergraduates' attitudes toward e-books after librarians at the College of Mount St. Joseph's in Cincinnati, Ohio, observed negative student reactions to e-books over a period four years. A survey was given to four randomly selected core classes in the fall of 2004. The results of the survey "ran counter to what one might expect of undergraduates belonging to the Millennial or 'net' generation" (Abstract, p. 266). Of the 105 responses, 75 percent of the students were aware of e-books, but "only 39 percent had used an e-book" (p. 269). Reasons for their use were for research, homework, or reference. The top five reasons why e-books were not used included lack of awareness, preference for print, eyestrain, no need, and difficulty to access. The top reasons why students liked e-books are convenience, low cost, and that certain pages can be printed, but the students also indicated that the top three reasons that they disliked e-books is that navigating them is difficult, produces eyestrain, and that they prefer using print. Students reported that if there were no print edition of a book, 89 percent would use the e-book equivalent, but, if there were a choice, 66 percent would choose the print version (p. 269), indicating that paper allows for better reading comprehension and concentration (p. 272).

Although there is a preference for print, many of the responses in the survey's open-ended questions indicated interest in e-textbooks due to free or lower cost (p. 270). Gregory suggests that vendors need to pay special attention to student needs in the areas of research and reference and the ability to easily print for educational purposes. "In particular, there is great student interest in e-textbook products as many student responses not surprisingly cited cost, storage, and

portability benefits of electronic or online textbooks" (p. 271). She suggests that libraries need to provide a balance of electronic and print books, investigate electronic resource sharing, and continue to market their e-book collections (p. 271). Gregory concludes that print and electronic formats are "coexisting" and that the focus should not be on which format is best but on the needs of users "and options for their access to information regardless of format" (p. 272).

Rowlands et al. (2007) conducted a user survey similar to those previously discussed at the University College London in 2006. Of the 1,818 surveys received, 35.2 percent were from undergraduate students, 32.2 percent were from graduate students, and 32.6 percent were from the staffs. The results showed that 44 percent of respondents had used e-books before (p. 493), but many—69 percent—were not aware that the University College Library provided access to e-books (p.508), which might also explain why 61 percent found e-books on their own rather than through the library catalog (p. 494, 496). At 41 percent graduate students were most aware that the library provided e-books, followed by undergraduates at 34 percent, faculty at 24 percent, and staff at 21 percent (p. 508). Interestingly, the survey found that graduate students were more likely to use e-books than staff (p. 494).

Like many studies, Rowlands et al. (2007) also found that the advantages of e-books "cluster[ed] around convenience: ease of making copies, perceived up-to-dateness, space-saving, and around the clock availability" (p. 500). One contradiction found in the study is that while most said they read from the screen, e-books were not thought to be particularly good for "ease of reading." Print was "favoured in terms of ease of reading" (p. 500). Although 48 percent of those surveyed indicated that they read from the screen, and 13 percent printed out pages to read, 39 percent said that their choice whether to read from the screen or print varied (p. 497). It seems that the choice is dependent on the purpose for reading. A statistically significant 71 percent used e-books mostly for study and work (p. 498). The survey found that "there is a strong tendency for

users to read leisure materials from a computer screen but print out the contents of work or study-based materials" (p. 498). The types of e-books used are especially informative. 59.9 percent of the responses reported that e-textbooks were the main type of resource used, 52.4 percent of usage was devoted to reference books, and 46 percent of use was tied to reference books (p. 499). While there is no mention of cost saving advantages in using e-books in this study, it may be one of the reasons for the popularity of e-textbooks on campus.

In 2008, a large survey was conducted in cooperation with over 120 universities and 20,000 students in the United Kingdom to find out the perspectives of students and staff regarding e-books. The results reported by Jamali et al. (2009) focus on the 16,000 responses, made mostly by students, to two open-ended questions: "In your opinion, what were the biggest advantages that e-books offered compared with a printed book?" and "Is there anything that you want to add regarding course texts, print or electronic, or about your university library?" (p. 36). Of the approximately 11,763 responses to the first question, the top three advantages in using e-books were in terms of convenience, as they can be accessed anytime and from anywhere (p. 36); "searchability," meaning that students could keyword search (p. 37); and lower or free cost (p. 37).

The second question elicited 5,000 responses, but, as the question did not focus solely on e-books, some comments, 931, were about library practices and provision and, 38, were about the survey itself. Responses specifically related to e-books, however, found favorable opinions. 634 (13.2 percent) of the respondents reported that they were in favor of e-books, and "632 (13.1 per cent) wanted more e-books to be available, especially in their respective subject areas" (p. 40). Distance education students and some visually impaired students were particularly "vocal in asking for more e-books" (p. 40). 70 (1.5 percent) of those surveyed felt that e-books, particularly e-textbooks, were a solution to their libraries' shortage of print textbooks, short

borrowing times, and difficulties finding books recommended by instructors. One student wrote, "Would be good to have core subject texts as e-books as there is no way libraries can supply the books in the number students would require. Also students find books too expensive" (p. 42).

This response about cost is perhaps one of the reasons why there is such a high demand for even print textbooks. Many students complained that their libraries did not have enough core texts, and that for some subjects, the texts the library did have were out of date (p. 40). These statements show that students prefer not to buy books.

While e-books were helpful to some visually impaired students, not all those with disabilities, like dyslexia, find e-books to be helpful because of the issues that come with reading from a screen (p. 41). Indeed, problems with reading from a screen were the top disadvantage of e-books. It was also found that "the problem with screen reading is also a main cause of subject-dependability" (p. 41). Students also pointed out problems of not knowing how to access or use e-books and printing problems associated with copyright (p. 42, 43). An interesting point made by a small number of respondents was that e-books are suitable in some areas, but they should not be used in a "one size fits all" fashion. 1.4 percent felt that "e-books and printed books should co-exist. Users found different and supplementary applications [for both]... students do not want to see an exclusivity of formats" (p. 44). This sentiment was also mirrored in the studies of Shelburne (2009), Levine-Clark (2005), Gregory (2008), and Rowlands et al. (2007).

Vendors and librarians can benefit from these studies by understanding user needs, which translates to how software and collections might be improved to meet academic research practices. The results from these surveys indicate that e-books are increasing in usage; e-books are used in particular ways (mostly for research and reference) and for particular subjects (those outside the humanities); e-books provide certain advantages to print resources and vice versa; and problems that academics face in using e-books are reading from the screen, navigation, and

printing problems associated with digital rights management and copyright. A point made by academics is that for certain activities, e-books are not the best solution. The studies also reveal that there is a growing market for e-textbooks as students see library provision of e-textbooks as a solution to the high cost of print textbooks. E-textbooks on e-readers seem to provide an alternative for costly textbooks, but the technology so far has not provided the answer, as evidenced from the following discussion of early e-reader experiments and the experiences of several universities using more current models.

Although e-readers began appearing for consumption in the 1990s (Herther, 2008, "Memex, Dynabook," para. 3), there is little research about e-reader usage or user attitudes in academic institutions before 2001. Only very recently have researchers begun exploring the problems and benefits of e-reader usage in colleges and universities due to a series of pilot programs head started by several university libraries (Behler, 2009; Clark, 2009; Gibbons, 2001; Johnson, Levine, Smith, & Stone, 2010; Thompson, 2009; Young, 2009). Some of the programs are still under experimentation, but first results from universities using the Amazon Kindle DX, Sony Reader, and iRex iLiad have not been overwhelmingly positive. According to Penn State University Libraries, "there is currently no single, ideal device for reading [digital publications and textbooks]" ("7 Things You Need to Know," para. 1). While the Amazon Kindle, Sony Reader, iRex iLiad, and similar devices are rising in popularity for commercial use, librarians and disgruntled users indicate that the technology still needs improvement, especially in regard to their use in academic settings.

It is important to note that e-readers are not new to the market. Herther (2009) writes that the latest e-readers are the third generation of e-readers. The first e-readers, marketed in the 1990s, were "clunky" (The First Ebook Reader Generation section, para. 1). Examples include Sony's Data Discman, Franklin Bookinan, and Nuvomedia's Rocket Ebook.

Critics of these first-generation readers noted many problems: use of batteries for power, which limited multimedia capability; small physical size of the screen; poor screen resolution; closed, proprietary architectures which limited title innovation, and user choice; search engines that offered few choices; slow response; and the lack of such key features as note fields and the ability to link to other computers. (The First Ebook Reader Generation section, para. 5)

Second generation e-readers of the late 1990s, like the Softbook Reader and Everybook Dedicated Reader, had a greater selection of titles and had better memory and screen resolution, but they also did not take off in the commercial sector (Second-Generation Readers section, para. 1). According to Herther, each generation gets "smaller in size, lighter in weight, and provid[es] better readability, navigation, and features" (Three Generations of Ebook Readers section, para. 1). Considering the Sony Reader and Amazon Kindle, which were released in the mid-2000s, "[t]here is significant technological change, but the core issues of fit and value remain" (The Third Generation—Back to the Future? section, para. 2). Herther claims that e-books on e-readers are not a transformational technology. To be transformational, "ebook readers need to offer clear technological advantages that replace existing (paper-based) books or need to offer such extremely compelling bells and whistles so that users are drawn to them despite existing adequate paper-based versions" (Change for the Better or Change for the Sake of Change? section, para. 4).

For university students, e-readers seem to offer a way to reduce the cost of expensive textbooks. C. Jeffrey Belliston's (2009) summary of the discussion of the ACRL-SPARC Forum at the ALA Midwinter Meeting in 2009 highlights that the cost of textbooks is a barrier to students. "Textbook publishers employ a variety of strategies that compound the problem of high cost by ensuring that the market for used texts is as small as possible" strategies of which

include, constant new editions, bundling unnecessary items with the text, "customizing textbooks to particular campuses or even sections of courses; and charging higher prices in the United States than abroad" (Belliston, A Significant Barrier to Students section, para. 2).

Whether the cheaper cost of e-textbooks on e-readers outweighs the problems with the technology itself or the problems users found in using e-books for in-depth studying in the user surveys discussed earlier remains to be seen. Belliston also writes, "[D]edicated e-book readers such as the Amazon Kindle and Sony's e-reader are not completely hospitable to digital textbooks...students cannot highlight or annotate a digital textbook like they can a printed textbook. Even the way to search a digital text—arguably its greatest advantage over a printed text—is not obvious to students (Three Reasons Students Prefer Print section, para. 2). As mentioned earlier, Penn State University Libraries indicates that the reviews of colleges and universities using Kindles and Sony Readers "so far have been mixed...the Sony Reader's technical model is still designed specifically for the individual home-consumer market and not the academic environment" ("7 Things You Need to Know," para. 2-3). Indeed, first results from universities using e-readers reveal issues of concern, including those outside the print versus electronic debate.

According to Jeffrey R. Young (2009), Northwest Missouri State University "nearly became the first public university to deliver all of its textbooks electronically" (para. 1). The University, trying to cut the cost of its unique print textbook rental program, wanted to implement e-books. The Sony Reader pilot project was short-lived. "Students who got their machines quickly asked for their printed books back because it was so awkward to navigate inside the e-books" (para. 2). Young writes that the University learned several lessons when it came to e-books. Most importantly, the device and software is the "key to satisfaction when it comes to electronic textbooks, since the choice of reading device determines whether students

can highlight material or easily flip the pages" (Judge e-books by their covers section, para. 1). A related issue is that "subjects are not equally e-friendly" (Subjects are not equally e-friendly section, para. 1). This assessment is in line with the aforementioned user studies of e-books in that e-books are not as useful for in-depth reading. Specific to e-readers is that e-reading devices have problems in handling color, a "major handicap for science or medical books that rely on illustrations" (Subjects are not equally e-friendly section, para. 3).

Anne Behler, the instructional librarian at Pennsylvania State University and the co-project leader for the university's Sony Reader pilot project, writes that the University's experiment in lending e-readers during the 2008-2009 year was "not a slam dunk" (2009, Not a Slam Dunk section, para. 1). Sony donated 100 Sony Readers in an effort to assess the readers' effectiveness in the academic sector. Most of the Sony Readers were used in two freshmen Honors English classes, a graduate English seminar, and a freshmen library studies class. Students pointed out common problems associated with e-readers, including "unsatisfactory battery life and difficulty recharging, slow refresh time when turning pages, glare on the page, and an expensive purchase price" (Not a Slam Dunk section, para. 2).

Although e-readers are portable, many only used the Sony Readers in their dorm rooms. Behler assumes that because many of the complaints were about the problems in navigating and making notes, students needed to "be close to their computers, notebooks, and other course materials while doing assigned readings" (E-Readers in the Classroom section, para. 2). Research from both e-book usage and user studies, however, do show that some subjects, specifically humanities, are inherently more suited to in-depth studying (Rowlands et al, 2007). Interestingly, "[m]any students in the English classes were in majors outside of the humanities, and they felt strongly that current e-reader technology is not adaptable to the hard sciences, whose texts are rich with color and diagrams, and are often not read in sequence from cover to cover" (Behler, E-

Readers in the Classroom section, para. 4). In contrast to e-book user studies in which business, computer science, and economics were more likely to be favored, e-readers were found to be more suited for humanities subjects. Indeed, the students found that they were "more immersed in the text" using e-readers, but it is noted that this could be an outcome of the difficulty in navigating to other features (E-Readers in the Classroom section, para. 4). The students reported that they would probably not buy e-readers because they were not likely to use them outside of assignments and remarked that the cost was too high. Considering university-provided e-readers, the students felt that they would probably still need to buy print books since e-readers were difficult to use for the sciences (E-Readers in the Classroom section, para. 4).

Students with visual and learning disabilities also tested the e-readers, but the program "met with absolute failure in that setting" (Behler, 2009, Institutional Issues section, para. 3). A weakness in Behler's assessment is that there is no indication as to why the readers did not work for these students, although some of the e-book user studies discussed earlier have mentioned that some visually impaired students and those with dyslexia have difficulty in reading from a screen (Jamali et al., 2009, p. 41). It should be noted that an issue that many libraries probably did not anticipate in planning for an e-reader pilot program are potential lawsuits brought by organizations for the disabled. In July 2009, a lawsuit was brought against Arizona State University, Tempe by the National Federation for the Blind (NFB) and the American Council of the Blind (ACB) "over its use of the Kindle as a means of distributing e-textbooks to its students, because the ereader's menu was inaccessible to the blind" (Blumenstein, 2010, p. 18). The organizations cited that this violates the Americans with Disabilities Act and the Rehabilitation Act of 1973 (p. 18). Arizona State, Case *Western Reserve in Cleveland*, *Pace in New York*, and *Reed College in Portland* came to "an agreement with the Department of Justice (DOJ) not to use the Amazon Kindle DX ebook reader or other ereaders until they are rendered accessible for

blind students" (p. 18). The Darden School of Business at the University of Virginia, Charlottesville and Princeton University were also involved in this pilot program, but information is not yet available about the effect of the lawsuit on their pilot programs. These challenges are rightly warranted and serve to halt other pilot programs until both visually-impaired and non-visually-impaired students can use the technology.

Behler (2009) writes that some of the e-readers at Pennsylvania State were also loaded with leisure reading, but the University found that students preferred choosing a few titles on demand rather than choosing from what was available. The large size of the Pennsylvania State system makes this unfeasible, especially since the circulation desk is manned 24 hours a day, five days a week, making for a "training nightmare" (Not a Slam Dunk section, para. 3). When one considers the finicky licensing model libraries must work around, it illuminates the problems for the library-end of the e-reader spectrum. Only one computer can hold up to five Sony Readers. Pennsylvania State could not devote 20 individual computers for the 100 devices, so it developed a complicated system using nine virtual machines on only two computers with various log-ins, passwords, and an email account with 20 aliases (Institutional Issues section, para. 1-2).

Beth Sheppard, Director of the United Library at Garrett-Evangelical and Seabury Western Theological Seminaries in Evanston, Illinois, also writes about the difficulty in acquiring e-books and setting up e-readers (in this case, Kindle 2s) with content. Sheppard (2009) writes, "Amazon must devise a payment option that is easy for library purchasing models to manage, yet impossible for general library patrons to trigger" (p. 4). The United Library discovered that while it could use its corporate account to purchase two Kindle 2s, but that a credit card was needed to purchase books. The Library used a credit card, but they quickly discovered that patrons, by pushing a few buttons on the Kindle, could also purchase items! The Library has resolved the issue by pulling "the credit card info from the *My Account* site on

Amazon.com immediately after every order is placed by Acquisitions personnel" (p. 7). The solution would be for Amazon to insert a "username/password script into the purchasing software that is resident on the Kindle...this is a clear instance where a bit of consultation with library representatives should allow Amazon to engineer the product to meet library needs" (p. 4). In an article from 2000, which summarizes the results of an e-reader program within public, academic, and school libraries in Rochester, New York, Susan Gibbons also reported that "[o]ne of the most difficult obstacles was payment method. Electronic books are steeped in the world of e-commerce, which is aimed at credit card users" (p. 73). While transferring books between library-owned Kindle 2s is relatively pain-free, Kindle books "cannot be loaned to a partner institution's Kindle via interlibrary loan" (Sheppard, 2009, p. 7). A brief article in the *Library Journal* from July 2009 reports that Brigham Young University suspended its Kindle program because "Amazon's official stance is that lending Kindles is a violation of its terms of service, but several libraries [including the Criss Library of the University of Nebraska-Omaha] have done so without penalty" (Oder, p. 12).

At Texas A&M University, the Kindle lending program has been quite popular for leisure materials. Over a one year period, 40 Kindles were tested by students, faculty, and library staff. Dennis T. Clark, the head of Public and Research Services and assistant professor at the Texas A&M University Libraries, writes that academic materials were rarely accessed, but this assessment should not come as a surprise since the Kindles were heavily marketed for popular reading. The study reveals that at the end of the first month of the program, 62 titles were added to the Kindles. "[L]ight fiction, including romance titles, was the most popular genre, accounting for almost 18 percent of the titles loaded" (Books requested section, para. 1). Children's literature and fantasy literature followed with 10 titles each (Books requested section, para. 1). This study could have been more effective had the Library done more to market

academic items in a university setting. Clark writes, "In hindsight, we should have had a 'soft opening' of the service by offering the Kindles to specific individuals who are early adopters of technology" (Conclusions and lessons learned section, para. 1). While the Kindle is a cost-efficient alternative for leisure reading, for an academic institution supporting its students' research needs, Clark reports that "[a]s more titles become available and as e-book reader technology improves, the Kindle's offering of titles will diversify. The offering of scholarly literature, which is often graphically dense, will then be possible" (Conclusions and lessons learned section, para. 3). This conclusion, however, does point to problems with e-books that have made it difficult for universities to adopt e-books. According to "The Horizon Report 2010," universities have struggled with lack of scholarly titles and poor quality of illustrations (Johnson et al., 2010, p. 18).

The Texas A&M University at Qatar experience with e-readers emphasizes one of the conclusions reached at Northwest Missouri State University, that the particular device and software is the "key to satisfaction when it comes to electronic textbooks, since the choice of reading device determines whether students can highlight material or easily flip the pages" (Young, 2009, Judge e-books by their covers section, para. 1). The "technological expertise of faculty and students at [the Texas A&M campus in Qatar] is high" (Thompson, 2009, Background section, para. 1). The campus, which opened in 2003, has 360 students specializing in chemical, electrical, mechanical, and petroleum engineering. The library is focused on meeting the research needs of the faculty, research staff, and students and has previously experimented with e-books and e-readers. In 2008, the library started a pilot program to compare the Kindle, Sony Reader, and the iRex iLiad. "Testers included library staff, faculty, and students" (Evaluation and Pilot Testing section, para. 2).

The Kindle was included in the study because the main campus in Texas was conducting

a year-long experiment with the devices. However, at the Qatar campus, the Kindle was rejected. The campus could not take part in WhisperNet because of its location outside of North America (Evaluation and Pilot Testing section, para. 4-5). Via a QWERTY keyboard on the Kindle and the WhisperNet service, users can "purchase books without needing to connect to a computer first" (Evaluation and Pilot Testing section, para. 4). Colleen Cuddy (2008) writes that WhisperNet is:

provided by Sprint and uses the same EVDO (Evolution Data Optimized) network that Treo and other mobile phone customers purchase for data plans...[The service] allows for free downloading of e-books purchased via the Amazon Web site and free browsing of the Wiki encyclopedia. (p. 391)

Thompson (2009) writes that since the campus could not use this service, the provision of the keyboard on the Kindle seemed like wasted space (Evaluation and Pilot Testing section, para. 5). The campus also did not like that in order to convert files, users needed to send content to Amazon and pay a small fee (Evaluation and Pilot Testing section, para. 4). Cuddy writes that "User converted content can also be downloaded via WhisperNet for \$.10 per document. (User content conversion is free if one bypasses WhisperNet and instead synchronizes the device to a desktop computer)" [2008, p. 391]. Thompson (2009) notes that the disinterested reaction to the device "might have resulted from [the students and faculty] being shown the three principal models simultaneously" (Evaluation and Pilot Testing section, para. 6). Essentially, the Sony Reader and iRex iLiad "look" better.

In Qatar, the Sony Reader has been popular for checking out non-academic works. In Qatar, there are not very many reading materials, and those that are available are censored (Decisions section, para. 1).

Readers have been required to purchase their reading materials outside of the county and

bring it back with them. By having the ability to purchase reading materials online and download them, an entirely new universe of availability has opened up to those whose overseas or remote location made this difficult or impossible. (Decisions section, para. 1)

The Sony Reader has been a good solution "for building a bestseller collection" (Decisions section, para. 1). "It's easy to buy, load and deliver commercially available ebooks at less than the price of comparable print and no cost for expensive shipping to a remote location" (Conclusion section, para. 1).

The Sony Reader can also store a variety of files, including Word documents, PDF files, audiobooks, and BBeB, "a proprietary book format sold at the Sony eBook store" (Evaluation and Pilot Testing section, para. 8). A newer model of the Sony Reader was added to the experiment when it was released in November 2008. This model includes a stylus and touchscreen, five font sizes, side lights for reading in dark areas, and users have the ability "to create a bookmark linked to a note that can be 'typed' using fingers or stylus on a small on-screen QWERTY keyboard" (Evaluation and Pilot Testing section, para. 9). The software for the Sony Reader is Sony's eBook Library (EBL), which can also be downloaded to a personal computer.

...[E]books are purchased through this interface. Other files, such as Word documents and PDF files are imported to the [EBL] software interface, then dragged and dropped onto the connected eReader device. It is possible to purchase, load or view content using this software for reading directly on a personal computer. (Thompson, 2009, Content section, para. 4)

Another feature is that "the storage in a digital reader is seen by the computer as another connected drive, the same as an internal drive or a flash drive or memory card" (Content section, para. 5).

Although the Sony Reader provides many features, the campus community in Qatar favors the iRex iLiad for technical documentation, although it was found to be difficult to use and more expensive (Conclusion section, para. 2; Evaluation and Pilot Testing section, para. 13). There are 15 font gradations, and the text is very clear. A unique feature of the iLiad is that it comes with a device-specific stylus that can be used "to write natural handwritten notes or draw figures into a note file which is saved to the PC and OCR'ed (optical character recognized) into digital text" (Evaluation and Pilot Testing section, para. 12). The iLiad, however, is slow, taking "55 seconds to boot to a ready state, and page turns are 4 seconds. This is too lengthy a wait by today's standards of instant gratification" (Evaluation and Pilot Testing section, para. 11).

The device also comes with a 121-page manual and a 32-page software manual. Physically connecting the iLiad to a computer requires seven different pieces of equipment (Evaluation and Pilot Testing section, para. 10).

Connecting the multiple pieces of cabling, booting the Mobipocket software, insuring that the device is at a menu rather than in the middle of a document or book can all cause a connection failure. More than one engineer required an explanation of how to accomplish this, and several calls and emails to the technical support help desk were required. (Evaluation and Pilot Testing section, para. 11)

A solution to this problem was to load books and documents on a USB drive "and [set] the device to read the USB drive on startup" (Evaluation and Pilot Testing section, para. 11).

The iLiad uses an online ebook library similar to the Sony Reader but is provided by Mobipocket and uses multiple vendors. However, users must search one vendor at a time. Users can also wirelessly download news subscriptions via the eNews (Content section, para. 6). Software can also be updated through the built-in wireless, but "there is no web browser to allow reading email or web surfing" (Evaluation and Pilot Testing section, para. 12).

In early 2009, the Lloyd Sealy Library at the John Jay College of Criminal Justice wanted to compare Amazon's Kindle with the Sony Reader to see if e-book readers would be beneficial for students and faculty (Kiriakova, Okamoto, Zubarev, & Gross, 2010, p. 21). However, to purchase a Kindle, the Library needed to use a credit card. Thus, the Library opted to test only Sony Readers, purchasing two PRS-505 models and two PRS-700 models (p. 21). The Library targeted "a group of prospective City University of New York (CUNY) freshmen taking summer classes at John Jay College" (p. 22). Most of the 163 students were between the ages of 17 and 19 and came from a variety of racial and ethnic backgrounds. The Library designed the project so that "small groups of 6-8 students" would handle the devices for 15 minutes and answer a short questionnaire (p. 22). The librarian administering the questionnaire also made observations of the students' reactions.

While the PRS-700 model has a touchscreen, several of the students assumed that the 505 models were operated by touchscreen. Although a short manual was created for the sessions, "practically no participant even glanced at them" (p. 22). Some students wondered if the devices stored music (p. 22). Some of the students also asked whether e-readers could support textbooks but were disappointed to learn that color illustrations could not be delivered (p. 22). These observations indicate that e-readers should be easy to use and operate like other well-established, multifunctional devices, such as cell phones. 99 percent of these students indicated that they owned a mobile device; 78 percent owned a cell phone. Interestingly, 62 percent of the students indicated that they read from their devices. 95.7 percent of that content is email, 29.3 percent read the newspaper, and 26 percent read books (p. 22).

When asked if they preferred reading print or reading a book on an e-reader, "84.5% of the respondents stated that they would prefer to use an e-reader!" (p. 23). Given that the students' experience in using an e-reader was only 15 minutes and that they were prospective college

students right out of high school, this does not seem like a reliable figure to use when citing college students' attitudes toward e-books and e-readers. Kiriakova et al. (2010) do remark that one of the reasons students liked the e-readers was the "'coolness factor' of reading books on an electronic device..." (p. 23).

The librarians of the Sealy Library indicate there are many limitations for libraries wanting to use e-readers, including the payment method. Since e-readers are a technology designed for individual use, credit cards are easier to use. "Sony ebooks could be purchased via a deposit account that we were able to create using Sony ebookstore gift cards bought with an institutional check" (Kiriakova et al., 2010, p. 23). Another limitation is that ebook content is still very much aimed at popular works, not academic works (p. 24). Considering the technology itself, the main difference between the PRS-505 and PRS-700 is that the 700 model has a touchscreen and stylus. While both have bookmarking, only the 700 allows users to type notes. PDF files are hard to display and read on both models; although the 700 has a zoom feature that can be accessed on a "separate menu," it is finicky to use (p. 23). The ability to increase font size also changes the pagination, making citations or references difficult to pin down (p. 23). For individuals, the lack of Internet access is a "drawback" (p. 23). Kiriakova et al. (2010) conclude:

...[T]he dedicated e-reader has not yet reached a point where the technology is worth investing in, particularly in these tough economic times. For the short term, until technology can match delivery, librarians should focus on finding ways to provide ebooks through available and existing means, including standard computers, PDAs, and other mobile devices.

The lack of access to the Internet is one reason why e-readers may not do well in the academic market. The study by Kiriakova et al. (2010) indicates that students want to be able to do more than one thing with an apparatus. As Thompson (2009) writes, "With the gaining

popularity of smart phones, the larger, more single purpose devices such as the Kindle, Sony or iLiad may not be a long term solution" (Conclusion section, para. 3). Barbara Quint (2010) writes:

If you do insist on selling e-book readers, then those readers better learn to perform all the stunts that are standard on every other piece of computer equipment. With all the computer power available in smartphones that users can hold in the palms of their hands, the idea that a device that takes two hands to use properly cannot perform all the same functions just won't fly. (p. 7)

Herther (2009), writing about the popularity of reading Internet content, points out:

Interestingly, however, the ebook reader industry generally ignores this key segment of electronic books. Why the enduring effort to replace the physical book with specialized reading devices? Why not focus on the widely available computer/laptop or PDAs or other universal, nonspecialized devices as onscreen reading environments? ("The Rather Long Tail" section, para. 4)

Ultimately, Herther sees e-books on the Web—not ereaders—as being transformational (2009, Ebook Readers as Transformational Change section, para. 2).

E-book technology offers many advantages— primarily in access to materials without having to go to the library and the ability to keyword search—to faculty and students in higher education, but many improvements are necessary to make e-books better fit into the academic sphere. Based on the implications of just a few articles, the next chapter in the evolution of e-books seems to rest in changes within the publishing industry, software improvements, and open access content. Quint (2010) writes that a perfect ebook would be interoperable: "They would have to work on all platforms, all operating systems, all computers, and all smartphones and PDAs" (p. 7). At the ALA Midwinter Meeting in January 2010, Jason Griffey of the University

of Tennessee, Chattanooga, stated that the future of e-books is not in hardware but in "software platforms; he described Blio and Copia, a software ereader to share work among various devices and a social reading platform, respectively, as two promising paths forward" ("Top Tech Trends," p. 20). Quint (2010) writes, "...when I say interoperable, I also mean proprietary software that's designed to force a user to buy all of his or her ebooks from just one seller; that's not good either" (p. 8).

Quincy also describes another facet of the digital book that emphasizes open educational resources. Macmillan's DynamicBooks subsidiary "will launch a program this August to publish etextbooks on a platform that allows professors and instructors to integrate their own materials into the text, to edit the text content with deletions and notations..." (Quincy, 2010, p. 8).

Belliston (2009) also suggests that open educational resources may be a solution for students and professors.

Because of the reuse and customization capabilities of OERs, professors can pick and choose from what is available, make needed modifications, and add content of their own to come up with something that more closely meets the need of a specific course—or even a specific section of a course. And a printed copy of the result can be produced at a reasonable price for students available. (Belliston, 2009, Three Reasons Students Prefer Print section, para. 3)

Based on these preliminary e-reader user studies, there are certain needs that students and libraries have that make e-readers an inadequate solution for expensive textbooks or reading academic content. However, more results are anticipated as many universities finish their initial pilot programs. Electronic books on computers or laptops, while with their own problems, as revealed in e-book usage and user studies, appear to be more promising. While e-books are being used more widely and offer much for students and faculty studying off-campus or away from the

university library, there are many modifications that should be made to increase their utility for those in academia. E-book and e-reader usage and user studies like these may help software programmers, vendors, and publishers identify areas to improve that would help academics meet their learning, teaching, and researching goals.

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