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eReaders in Higher Education

The use of eReaders has proliferated across the world in recent years, so it is no surprise that it has reached the Higher Education realm. This whitepaper analyzes the uses of eReaders in Higher Education while investigating the background, design and possible solutions that eReaders provide.



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Introduction

It seems as if everywhere one turns today, people are talking about eReaders and eBooks. In fact it is possible that you are reading this very document on an eReader device. As the popularity of these devices grows, so do the issues associated with them; in particular, how eReaders deliver content in higher education. This whitepaper explores the use of eReaders in order to guide decisions regarding the use of these devices in one or more programs in the College of Human Environmental Sciences (CHES) at the University of Alabama.

Due to the popularity of these devices, many institutions and publishers have turned their publications towards the eReader market, and in some cases the notoriety of these devices brings into question the likelihood of the continuation of paper formats. Many schools are now treading into the area of provisioning these devices as part of an ongoing curriculum, as well as providing students with an immersive interactive environment utilized throughout their education.

Questions now arise as to the validity of peoples' works published through the use of simple applications such as Portable Document Format (PDF). This lessens the need for full publication, as documents become easier to publish through one's own adaptations, not just as digital documents, but also through social media.

The College of Human Environmental Sciences is already making use of digitized reading materials; classes in the Consumer Sciences and Clothing, Textiles, and Interior Design departments have access to PDFs that are available via the University Libraries' electronic course reserves. With new federal textbook laws, coupled with recent laws in the state of Alabama,

faculty members are now required to follow stringent guidelines pertaining to the usage of textbooks within the curriculum due to the costs associated with each textbook. As a result, greater emphasis has been placed on textbook selection which, in turn, has resulted in discussions of the use of eReaders as an additional standard. It is no surprise to find these discussions at work within the various faculty communities at the University of Alabama, including the College of Human Environmental Sciences, where interactive technology is a one of its focused elements. As an early adopter of various online teaching curricula, CHES has created a learning environment well-suited to the use of eReaders. Questions, however, have arisen regarding their suitability for students and faculty alike.

While one of the largest concerns with students is money, the resulting successful educational opportunities are overshadowed by the benefits that eReaders provide. Therefore, the decision should not be solely made on the economic impact, but also on the resulting marketability of students once they set foot into the community upon graduation. Faculty members recognize that they must provide students with the best possible options regardless of the format presented.

The 2011 Horizon Report predicts that the adoption period for electronic books is one year or less. Electronic books are a real alternative to the printed book and can make reading material far more interactive. Departments and divisions at institutions of higher education need to know how to respond and adapt to this trend.



Approach / Process

EReaders Defined

EReaders are typically defined as "portable, low-power high-resolution devices specifically designed to display digital versions of written material from books magazines, newspapers and other printed sources" (Educause, 2010, p. 1). There is some debate about what constitutes an eReader since some of these devices include web browsers which also provide access to blogs, websites, and other interactive content. Other devices whose primary function is not necessarily to display electronic text, such as cell phones or Netbooks, are sometimes called eReaders. In addition, there are portable self-contained "tablet" computers that have been grouped into the eReader classification.

For purposes of this discussion, devices whose intent and design is to display or present text are eReaders. These include Amazon's Kindle, Sony's Reader™, and Barnes & Noble's Nook. Also included in this discussion are devices designed with an eye on the eReader market, including eDGe from enTourage, QUE proReader from Plastic Logic, and iPad from Apple. Finally, the tablet PC itself (available in many brands including HP & Motion Computing) will be considered.



Issues Identified and Investigated

A number of issues relating to eReader usage have been identified and investigated. These include:

1. Practical issues (text revisions, economy, memory, battery life)
2. Platforms/compatibility
3. ADA compliance issues
4. Copyright and intellectual property concerns
5. Best practices, Interactivity, design, and usability (annotation, highlighting, navigation)
6. Theft



Discussion of Findings

A number of practical issues must be considered in evaluating eReaders for use by students. Price is certainly a factor, along with the cost of materials available on the device (via download). Since materials such as textbooks are downloaded for viewing, the amount of available memory and the availability of memory expansion are critical concerns. Battery life is also an issue. In the average classroom setting, not every student will be able to "plug in" for the duration of the class.

Over the last few years, the price of textbooks has become an increasing concern among students, parents, and state lawmakers. The issue of rising textbooks costs is specifically mentioned in the Higher Education Opportunity Act, signed into law by President George Bush in August 2008. Due to costs, many students decide not to purchase textbooks at all. A solution could be electronic textbooks, which can be the digital version of a printed textbook but also enhanced with online quizzes, interactive material, and video to improve student learning.

The economic ramifications speak for themselves. The typical cost of an electronic book is half that of its paper counterpart. With this in mind, the eReader pays for itself within the first semester of school. While there is a reduction in paper, paper waste, writing utensils, and erasers, those items are typically offset by the cost to power the unit.

The digital versions of books provide educational institutions the ability to easily keep a copy of text up-to-date in a more timely fashion. Students need not wait on the next textbook revision before they can see an important update to the information within its pages. A familiar example



of this concerns the heavenly body, Pluto, which is no longer considered a planet. If one has a pre 2006 textbook, Pluto is still listed as a planet. With the use of digital textbooks, information can be updated on the fly, in the middle of the semester along with a notation for the student within the media to let them know of the update.

Acquisition of the digital publications themselves can be less stressful for students than standing in line to purchase textbooks. Purchasing the book online allows the book to be available typically within minutes of the purchase. The burden of carrying textbooks is reduced by the less cumbersome nature of an eReader, which typically weighs less than a single textbook.

Regarding the possibility of theft, Tony Cole (2010) states it best in his blog, eBookAnoid, when describing a situation in Beijing, “This is a tricky one. In a school I worked in Beijing, all the teachers, administration staff and kids were issued with Mac laptops, which they signed for and were responsible for (you lose it, you pay for it!) and to the best of my knowledge, theft or loss were almost zero. I think it is a case of using intelligence and only going this route in schools that don’t have a culture of stealing school equipment.” While it would be indeed wonderful to exist in a culture of this nature, it is, unfortunately, unlikely. However, relatively inexpensive insurance will cover losses due to theft or accidental damage to an eReader. Additionally, there are some units that now provide a “lowjack” type device built into the system to locate it via Global Positioning System (GPS) should it be stolen or lost. In any case, students should be advised to back up all data in a separate location (in the cloud or on a physical drive).



While the loss of a device can be detrimental to a student, so can the compatibility of the device between classrooms. While many eReaders do not support each other's formats, due to proprietary file formats, a standard for Electronic Publishing (EPUB) does exist. This standard allows publishers to "produce and send a single digital production file through distribution and offers consumers interoperability between software/hardware "(Dougherty, 2010, p. 254). As more and more people use electronic books, the need for eReaders will increase. Much like the "lowjack" implementation within eReader devices, every eBook maker uses Digital Rights Management (DRM) to hinder piracy of the eBooks; this is based on the experiences of other digital media (music and videos). While understandable, DRM can cause problems for users of eReaders: only approved devices can access books being sold.

In plain English, DRM can be compared to a "lock and key for digital content" (Griffey, 2010, p.8). If one buys a book from Amazon and loads the book onto a Kindle, he or she can read the book because the Kindle is approved to read the device; the Kindle can unlock the file. However, if one buys a Nook from Barnes and Nobles and tried to read the same file, this will not work, since, for business reasons, Amazon is not interested in a Barnes and Noble product being unable to unlock the file. In addition, DRM generally prevents eBook lending and borrowing. The key to using the file is linked to one's account. Institutions that are considering buying eBooks (for example, an academic library that hopes to lend eBooks and eReaders as it would a print copy of a book) must pay attention to DRM. A change in eReaders may mean that institutions lose access to the eBooks. Any institution considering buying



electronic books must know exactly what it is acquiring and what the rights to those acquisitions are.

EReaders are not just limited to reading titles of eBooks. There are also documents that can be read on eReaders, and there exists software that lets one convert various files (PDF, word documents, or Hypertext Markup Language (HTML)) into an eBook file. For those who want to use scanned electronic copies of documents or articles for a class or in a classroom setting, there are copyright issues to be considered. It is permissible to post materials to an online class, distribute the readings, and create electronic reserves of an individual's own works (where he or she kept copyright or reserved use rights) and public domain works (generally defined as works published by the United States government and works not under copyright, which expires 70 years after the author's death). For electronic works licensed by the institution (i.e. articles in an online database licensed by an institution's library), linking is permitted. Before creating any type of electronic library for an eReader, it is best to consult with a library's electronic reserves department to find out what acceptable options exist.

How do eReaders handle electronic copies of articles and documents, materials which were traditionally assembled in a print course packet and may now be put on electronic reserve? It depends on whether the eReader can handle the file format. In most cases the best design is to put it in PDF format, a format that most major devices are compatible with today.

The Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973 (Section 504) dictate and define accessibility in the education realm. It is vital to note that



many popular eReaders fail to meet basic ADA compliance requirements, and thus must be disqualified from serious consideration in the higher education setting.

On June 29, 2010, the Civil Rights Division of the U.S. Department of Justice and the U.S. Department of Education Office of Civil Rights issued a “Joint ‘Dear Colleague’ Letter” regarding eReader use in Higher Education. The Departments of Justice and Education jointly protect the rights of college and university students with disabilities by implementing and enforcing titles II and III of the ADA and Section 504. Title II and Section 504 both apply to the University of Alabama because it is a public university which receives federal funding. Specifically, the ADA and Section 504 prohibit discrimination against individuals with disabilities.

The statement issued by these agencies expressed concern over the use of eReaders which are not compliant with federal law. The Joint Letter was issued close on the heels of settlements made between the Departments of Justice and Education and colleges and universities which had required use of the Kindle, a non-accessible eReader. Requiring use of an eReader in a higher education setting is only appropriate and legal if the eReader offers the visually impaired student the opportunity to participate equally in the opportunity provided other students. Alternatively, the same benefits and opportunities must be provided to visually impaired students through other means.

Fortunately, the text-to-speech conversion feature available on many eReaders satisfies this accessibility requirement. Apple’s iPad is a notable example, offering VoiceOver, a gesture-

based screen reader, as a standard feature. The iPad user touches the screen to hear an item's description, and then gestures (double-taps, drags, or flicks) to control the device.

Other eReaders, such as the Pandigital Novel and Amazon's Kindle, offer more limited text-to-speech conversion. Kindle, for example, now offers a text-to-speech feature which must be enabled by accessing menus visually. Thus, a visually impaired individual would require assistance in the basic setup of the device. The feature is designed primarily as a tool to read text aloud as a matter of the user's convenience or preference, rather than as a tool for true accessibility for the visually impaired. Text-to-speech on Kindle is still labeled by Amazon as "experimental."

EReader quality has grown though. Improvements are attributed to E-ink and Electronic Paper Displays (EPDs), coupled with no backlighting. An EPD is a display that has a high contrast appearance, similar to paper, very low power consumption, and a thin, light form. The reader's experience is similar to that of reading on paper but with the option of information that can be updated. Electronic ink adds to the experience because it is a reflective technology, needing no front or backlight and can be viewed under a wide range of lighting conditions, including direct sunlight. In addition, eReader technology has evolved to the stage where graphs, illustrations, video, and interactive elements can be included. Many eReaders make bookmarking, annotations, and dictionary lookup available.



Not excluding the University of Alabama, several other institutions of higher education (IHEs) have also run pilot programs using eReaders including Princeton University, Northwest Missouri State University and Case Western.

Princeton University had a pilot program using Kindle eReaders in the classrooms. The hopes were to reduce the amount of printing and photocopying, discover whether eReader technology would be equal or better to using traditional reading materials, and to explore the strengths and weaknesses of the available eReader technology and provide suggestions for the future. The eReaders did reduce the amount of printing, sometimes as much as 85%. With regards to how well the devices worked in the classroom, many students found the experience to be the same. Most students expressed desire that more course readings be available for the Kindle, but were unsure or disagreed, when asked if more courses should use the Kindle in the classroom. Many students were dissatisfied with using the Kindles in the classroom, reporting difficulty in comparing documents, flipping through the documents, or skimming the documents later. However, students particularly liked the Kindle's battery life, wireless capability, and portability that all course readings were housed on a single device, and provided them with the ability to search content, as well as the ease of reading the screen, including in full sunlight. Students felt areas of improvement could be highlighting, annotation, and navigation. Princeton University concluded that for eReaders to be successful in higher education, outstanding annotation tools were a must. The reader should also be able to quickly skim or flip through the document to view highlights and notes. The reading functionality was quite satisfactory but the tools that enabled studying, reflection and writing needed to be improved.



Northwest Missouri State University (NMSU) ran a pilot where 240 students received Sony Reader devices loaded with McGraw-Hill textbooks. This was in the interest of reducing the cost of the university's textbook rental program, since, at the time of the pilot, eBooks were half the cost of printed books. Response to the pilot was mixed. Many students found it awkward to navigate the eBooks. Many faculty members were eager participants. Administrators predicted that, as eBooks and eReaders improved, user satisfaction would also rise. NMSU recommended that any IHE considering adopting eReaders and electronic textbooks consider the following:

- Look closely at the device and the software used to run that device. Students want to highlight and flip through pages.
- Plan for a learning curve and allow students time to adjust to the device. As students learned device capabilities and how to use them, they preferred the electronic version
- Pay attention to the battery life
- Remember that not all subjects are “e-friendly”. Will the eBook support numbers and equations as well as text?

In 2009, Case Western provided Amazon Kindles to about 40 students in three courses. The intent was to compare their reading performance, note taking skills, and retention of information with a control group of peers in the same courses who read printed materials. The response of the students at Case Western was similar to that at other institutions. These students also found fault with the underlining, annotation, and bookmarking tools. They also found it confusing that the Kindle did not mark texts by page numbers in the same way as printed equivalent. This made it



challenging for the students to follow their professor when instructed to go to a particular page. In fact, the most common complaint was the inability to go to a particular page.

There have been some pilot programs at the University of Alabama with eReaders, specifically iPads. Students in Dr. Harold Elder's economics class were given an iPad to use for a whole semester, by Inkling, the creator of an iPad textbook app. The students' end of the bargain was to use the electronic version of the textbook and share their experiences with Inkling. Student response was positive. Students liked the ability to follow the professor, making notes in the book, highlight, and take notes themselves. The light weight was also a positive. Students did know that the eBook could not be resold. Dr. Elder is familiar with electronic textbooks, having used them for years, and hopes their development will include more interactivity.

The University of Alabama's College of Arts and Sciences hopes to have faculty members using tablet computers in teaching and research in the near future. A pilot program in the fall 2010 awarded iPads to faculty in various departments, including history, mathematics, psychology and political science. The Department of English received 80 iPads for the Spring Semester 2011. The belief that tablet computers will be part of academia is a driving force behind the pilot, with some faculty predicting their use will encourage more student collaboration. At present, the iPads have not been distributed to students.



Executive Summary

While the rest of the world has been evolving towards the use of these digital devices and their various platforms, many higher educational institutions have maintained the status quo with paper versions of textbooks. For the institution of higher education now considering the move to eReaders, there are several key points to consider. Functionality and ease of use are particularly important to students. The newest eReaders allow highlighting, annotations, and bookmarking within digital documents and textbooks. Many also permit sharing these markups between devices. Also important to students, the battery life of the eReader must be sufficient to accommodate a potentially long academic day. Additionally, both the cost of the device, and of downloads available for the device, are worth noting.

Ideally, an eReader purchased for the academic setting will provide sufficient internal memory to retain a large number of textbooks, articles, and other documents, as well as possibly image or video files, to support all phases of students' education. For the institution building a digital library, copyright considerations are a priority. Faculty must abide by fair use principles in the compilation of course reserve materials, while also taking advantage of the publishing and distribution opportunities made possible to them through the use of simple conversion software and eReaders.

Format compatibility must be considered in relation to the curriculum the eReader will support. Certain formats, such as PDF, are so common in digital documents that compatibility with them may be considered essential. On the other hand, eBooks published in a proprietary format will not be readable on all devices. DRM (Digital Rights Management) technology



deliberately prevents cross-compatibility for many types of files. Thus, an institution choosing a particular eReader is making a commitment to a certain range of compatibility and accepting certain limitations on eBook availability. Finally, the institution's decision-makers must be aware that, by law, only ADA-compliant devices may be required or recommended in the classroom setting, unless the instructor is prepared to make other, equally beneficial provisions for students with disabilities.

Colleges and universities should carefully consider the switch to eReaders. With the potential to address many issues with textbooks today, including currency of information, economy, and accessibility, these devices are clearly here to stay.



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