BARRIERS TO ADOPTION OF ELECTRONIC TEXTBOOKS

Written by Document Management Intern Jonathan Moberly with guidance from mentors Kim Milford and Vic Borden

2012-2013 AYIP
# Table of Contents

Executive Summary .................................................................................................................. 2  
eTextbook Market .................................................................................................................... 3  
eTexts at IU ............................................................................................................................. 3  
Environmental Impact of eTexts ............................................................................................. 4  
Courseload Software .............................................................................................................. 7  
Impact on Cost ......................................................................................................................... 9  
Effects on Education .............................................................................................................. 11  
Primary Research Methodology ............................................................................................. 13  
Interview Findings .................................................................................................................. 13  
Recommendations .................................................................................................................. 15  
Appendix A ............................................................................................................................. 18  
Appendix B ............................................................................................................................. 19  
Works Cited ............................................................................................................................ 21
Executive Summary

Universities are often at the cutting edge of technological and cultural trends. With regards to promoting a sustainable growth model, American universities have experimented with a number of initiatives to reduce their environmental footprint. One area of focus has been the reduction of paper used in academic, administrative, and learning pursuits. According to research by previous Document Management Intern Karin Dunne, all departments at IU are currently working towards reducing the amount of paper they use. Furthermore, the Office of the Registrar has streamlined many administrative practices and now offers many forms electronically. An example this is the switch to electronic course evaluation forms, which are beginning to replace physical scantron sheets this year. While IU has reduced its paper usage for administrative purposes there haven’t been many direct university-wide advances toward reducing paper usage in the classroom.

The most significant barriers to reducing paper usage are both interrelated and fairly obvious: the traditional preference that individuals have for paper and the lack of trusted alternatives. Both students and faculty have spent their entire lives working with paper, which from a technological standpoint can be easily proofread and is comfortable to use. To reduce paper usage, the university must offer digital technologies that can provide a greater value than the incumbent technology. With this in mind, I decided to look for a specific learning technology that potentially fulfills two criteria: a reduction in the University’s environmental footprint and providing software features that would offer benefits which paper cannot. For my project I explored barriers to adoption of this technology with the goal of providing recommendations to facilitate its adoption.

Against this backdrop, I decided to focus my project on electronic textbooks, or eTexts. Electronic textbooks have existed for over a decade but until recently were merely digital copies of the printed text. With recent technological advances, however, eTexts now offer features that physical textbooks cannot. Additionally, IU has led the way in higher education in terms of encouraging adoption of eTexts (Malek). Although they have been offered in some form through the University for nearly three years, eTexts are still used in only a small amount of classes. At the current pace of adoption, it will be years before the majority of courses are using eTexts.

For my project I examined eTexts from a holistic viewpoint, looking at their potential impact on the marketplace, educational outcomes, and the environment. Additionally, I compiled a questionnaire and interviewed faculty across a range of disciplines to identify barriers to adoption among faculty relevant to Indiana University. Ultimately, I have provided recommendations/suggestions for ways to encourage increased adoption of eTexts.
eTextbook Market

Electronic textbooks have existed for a number of years, being offered directly by publishers and college bookstores. Historically, the product has been a digital version of the physical textbook, with few differentiating features. Although the publisher saves nearly the entire cost of printing the textbook, eTexts have never been priced competitively with physical textbooks. For example, one of the instructors I interviewed teaches a class where the physical text costs $142.00 compared to $97.00 for an eText purchased through the publisher; overall, electronic books offered through the publisher are still relatively expensive compared to the textbook.

Furthermore, major publishers have embraced strict Digital Rights Management (DRM) enforcement. Generally speaking, when a student purchases an electronic textbook through the publisher, they are purchasing access to the book for a set amount of time; ultimately the book belongs to the publisher. Due to strict copyright enforcement, students who purchase an electronic textbook through the publisher can only access the text on the publisher’s terms and may face restrictions when trying to print sections of the book. Because of a range of factors such as uncompetitive pricing, strict copyright restrictions, and ingrained preference for physical textbooks the adoption rate for electronic textbooks has consistently stayed in the low single digits.

eTexts at IU

IU’s eText initiative first began with a pilot program in 2009 that lasted two years before being rolled out to the University at large. Twenty two courses and 1700 students were enrolled in the pilot program, which took place at the IUB and IUPUI campuses (Denis). IU contracted with Courserload, an Indianapolis based startup, to provide the software for reading eTexts. According to a student survey completed at the end of the program, a majority of students preferred eTexts, although this was largely contingent upon the instructor using the text and software features. Following the four semester pilot program, the eText initiative was formally launched for all campuses in the IU system as well at IUPUI in Spring 2012. Since the initiative began, IU has signed agreements with 4.5 of the Big 5 publishers (Elsevier has two separate higher education units), which control roughly 72% of the textbooks in higher education (Osborne).

Instructors who decide to use an eText through the IU model apply to the initiative the semester prior to allow for Courserload to import the text into their system. In classes where the instructor has opted to use eTexts, students are billed a materials fee for the book when they sign up for the class. Therefore, under the IU model, every student is purchasing the book and has access to it through the Courserload software, which is integrated into Oncourse learning management software. Students have access to the text throughout their enrollment at IU and have the option of buying a print on demand (loose-leaf) copy through Courserload for a small fee. While the model forces some students to pay more
than they would otherwise, overall costs decrease while ensuring that every student has access to the book at the outset of the semester.

The eText program intends to disrupt the textbook marketplace. By requiring students to purchase the digital version of the textbook, the university is able to ensure that publishers capture a greater market than if students purchased used texts, pirated the text, or went without it. Additionally, because publishers don’t have to physically produce and distribute the book, they save on materials, manufacturing, and distribution costs; in essence they are selling the right to their copyrighted material. In return for offering publishers this new revenue stream, the university is able to negotiate decreases in the price of the textbook. Furthermore, because IU negotiates directly with publishers it is effectively cutting out the bookstores from the process. While part of the cost of the eText is a fee payable to Courseload, the fee is much smaller than the markup charged by college bookstores. The IU model looks to create significant savings by moving course material online, negotiating directly with publishers, and spreading the cost for the copyrighted material among all students.

Now in its third semester, the eText initiative is growing. As of Spring 2013, almost 10,000 students are using an eText in at least one course and there are 250 course sections enrolled in the initiative; this is an increase over the roughly 8,000 students who used an eText during the Fall 2012 semester (Fater). The initiative is in full swing at all campuses in the IU system as well as IUPUI with the regional campuses boasting proportionally higher adoption rates of eTexts compared to the Bloomington campus. Many other universities are running pilot programs that attempt to reduce the cost of learning materials through digitization and bulk purchasing (Malek). While the eText initiative at IU has established itself as a presence, growth is slow and the program may have to evolve to provide a credible alternative to traditional but costly paper textbooks.

**Environmental Impacts of eTexts**

Examining the environmental impact of eTexts vs. traditional books requires looking at a number of different variables and leads to a complicated conclusion. Although I wasn’t able to analyze the carbon footprint of either technology firsthand, I have been able to research the subject and gain a sense of the environmental impact of the technologies. Although a switch to eTexts wouldn’t directly affect the University’s carbon footprint, it would have an impact on the footprint of students and has the potential to indirectly lower the University’s.

Evaluating the environmental footprint of a paper textbook requires looking at the complete lifecycle of the textbook. There are a number of studies looking at the carbon footprints of books. The most applicable study I was able to find was written by Greg Kozak of the University of Michigan and looks directly at the lifecycle of a college textbook; he found that a 1kg textbook produces 3.89kg of air emissions (Kozak, 83). Kozak’s analysis of a textbook’s lifecycle begins at the papermaking process. He looked at the papermaking process as being comprised of 7 distinct steps: timber preparation, pulping, bleaching, refining, sheet forming, coating/drying/calendaring, and cutting and packaging.
The other main stages in the lifecycle of a textbook are the printing, distribution, and disposal processes. While the printing process is energy intensive it has less of an impact than the paper production process. When evaluating the life cycle of a textbook, Kozak looked solely at the printing process of offset lithography, the predominant printing process for scholarly books. He found that such a process only contributed 28% of the book’s total emissions (Kozak, 83). Because of the large volume of books that is transported, Kozak found that distribution of the book had a footprint of less than 4% of emissions. An important caveat to this is the potential for a student having to make a car trip to purchase a single book; this concern does not apply to IU, however, where the majority of students live close to campus and use other methods of transportation.

Looking across other studies, the main source of a book’s environmental impact comes from this 7 step process with pulp production being particularly influential. Many variables are involved in calculating the impact of each of these stages and differences in estimated environmental impacts between studies can be explained by their inclusion and measurement of these factors. For example, the emissions that result from transporting raw timber to the paper production facility are influenced by distance between the two locations as well as the mode of transportation. Because of the differences in assumptions, there is no consistent estimate for the footprint of a textbook.

While Kozak provides a comprehensive look at the life cycle of a textbook, there are a number of assumptions that may not match up with today’s textbook market. The first and perhaps biggest assumption is that the textbook is only being used once and will be kept by its owner for the entirety of its lifetime. While some students do hold on to their textbooks, this is largely confined to a few specific areas of study. The majority of students who purchase a textbook elect to resell it at the conclusion of the course. Taking into account students who choose to rent their textbook as well, the amount of people who use a book across its lifetime is certain to be greater than one. Spreading out a textbook’s usage across multiple individuals can drastically reduce its footprint. On the other hand, books resold over the internet have to travel over distribution networks that Kozak’s model did not take into account. Ultimately, the figure presented by Kozak may not paint an accurate picture of the lifecycle of a textbook in today’s marketplace.

When looking at recycled content used in the bookmaking process, it does appear that there are efforts underway to make textbooks more sustainable. In particular, the percentage of post-consumer waste recycled paper has steadily increased in the bookmaking industry. However, while recycled content decreases the need for raw timber, there is a question of whether this actually affects the total emissions in the papermaking process. A recent study published in the Journal of Industrial Ecology found that using a mix of recycled pulp and virgin pulp resulted in significantly higher emissions than strictly virgin pulp (Wells). The process to recycle paper and convert it to pulp requires large amounts of energy intensive industrial equipment. As such, using recycled paper can have a huge impact on a book’s CO2 emissions and is heavily dependent on the location of the pulp mill and the mix of electricity from the local grid. Although using recycled pulp has the potential to lower emissions, this is heavily dependent on designing the supply chain around minimizing travel distances and choosing producers with access to efficient grids.
There are a number of estimates as to the environmental footprint of books. The fluctuation in estimates, however, can be ascribed to a number of factors such as the sustainability of the supply chain, location of the pulp and book manufacturing centers, and the number of people who use a specific text. These factors will vary, making it difficult to come up with a concrete number that is accurate to the marketplace. There are a number of takeaways that are consistent across the various estimates. The most important of these is that a large amount of emissions come from the pulp production process. Because of the significant amount of emissions early in the bookmaking process, efforts to curb a book’s environmental impact are most effective when focused upstream in the process. Furthermore, because distribution is a relatively small part of a text’s life cycle, supply chain efficiency adjustments are limited in their scope to reduce emissions. For the purposes of this paper I will use an estimate of 4 kg of CO2 per 1 kg of hardcover book.

While there is very little relevant literature for defining the footprint of an eText under the IU system, the components involved are more straightforward. Because the Courseload application is based in HTML5, it is accessible from almost any digital device; as such, students do not require a dedicated electronic reader. There have been a number of studies into the footprint of electronic readers, primarily focused on determining the break-even point in terms of books, where the E-reader would have a lower footprint than its physical counterparts. These studies have shown that a vast majority of the E-Reader’s footprint comes from the device itself and all conclude that the electricity required to power the device and the servers on which the books are stored is less than the impact of an individual book. An e-reader’s screen uses less power than almost any other computing device so it remains to be seen if this holds up across the board.

While the software doesn’t require a dedicated device, students will still need to use some computing device to access the text. Every IU student has access to desktops at a number of on campus computing labs. Furthermore, the vast majority of students have access to a PC (laptop or desktop) or tablet at home. Over the lifecycle of a tablet/PC, accessing and reading eTexts will represent a negligible percentage of the device’s total use. For the purpose of establishing an estimate of the carbon footprint of an eText, I will ignore the emissions required to produce the viewing device. The only components necessary to determine the environmental impact of an eTexts lifecycle in the IU system are the electricity used and the number of pages printed off.

Although IU students use a wide range of computing devices, the most common is a laptop. I chose to use the Dell Latitude XT2 XFR as a benchmark because of its standing as a mid-range laptop in terms of screen size, RAM, processing power, and other relevant specifications. All of the following calculations can be found in Appendix A.

Using 2010 testing data, the laptop consumed between 28-32 watts of electricity an hour during moderate usage. The local electricity grid for IU - Bloomington emits approximately 0.689 kg of CO2 for each kilowatt hour; put another way, roughly 1450 watts of electricity must be used to generate a single kg of CO2 emissions. Using the upper estimate of 32 watts for power consumption, a student would be able to access and interact with the textbook for 45 hours in order to generate 1 kg of emissions.
I was unable to access information on the power consumption necessary to store books within the cloud. There are, however, a number of key considerations which would indicate a minimal impact. Because each textbook stored on the CourseLoad servers are used by many students, the impact of one text will be negligible. Furthermore, annotations and notes take up a relatively small amount of data so regardless of a particular student’s usage habits, the footprint directly associated with power usage from the CourseLoad server will stay relatively consistent across users. Due to economies of scale as well as the efficiency of servers, digital storage most likely comprises a small amount of an eText’s footprint.

Besides power consumption, the other component of an eText’s footprint comes from printing selections of the textbook. A previous IUOS intern report evaluating printing at the Bloomington campus found that the largest component of emissions resulting from printing came in the paper production process. Although there is no data available in terms of how many individual pages students print, the E-Reserves study mentioned above noted that roughly two-thirds of students printed at least some of the readings (Ji). Assuming that two-thirds of students print 50 pages, this will equate to only 1.28 kg of CO2 per student. Furthermore, students have the option of ordering a loose leaf copy of the book through CourseLoad. Using data supplied to me by the company, I was able to determine that just fewer than 10% of students choose this option. Assuming that students access the textbook for 45 hours, print 50 pages 2/3 of the time and order a loose leaf copy 10% of the time I arrived at a final estimate of 2.855 kg CO2, less than the estimate of 4 kg CO2 for a traditional textbook. All calculations can be found in Appendix A.

CourseLoad Software

As noted above, CourseLoad is a third party software provider which supplies the eText reading software for IU. The company is an Indianapolis based startup in which IU has a small ownership stake through the Indiana Innovate Fund. The company was started in 2009 and has provided all iterations of the software used for the eText initiative at IU. It has expanded its product over recent years to accommodate other universities piloting similar eText programs. The number of support issues has been relatively low and the company has a quick response rate in dealing with technical issues (About CourseLoad). The platform is designed to differentiate itself from other eText reading software on the market through its education features, cross platform capability, and potential for data analytics. While the software does offer a number of useful features there is little data as to how often these features are used.
The Courseload platform offers a number of features that have the potential to enhance learning, specifically for courses which are heavily entwined with the textbook. The software appears to faculty and students as a tab in Oncourse and displays all content for every class a student is enrolled in using Courseload. If students were to have multiple courses enrolled in the eText initiative, all of their texts for those classes would be accessible through the Courseload start screen. The notes/annotation and highlighting features are designed to allow students to interact with the text; the scrolling bar on the bottom of the text shows where these markups are located in the text. Additionally, the software offers a searching function for looking through both the text and notes.

One of the main features that the company and initiative promote is the potential for sharing notes and annotations. Students and instructors can share their mark ups with each other. There are many potential applications for this feature, ranging from textbook centered group projects to instructors adding supplementary content (relevant articles, YouTube videos, in-depth explanation of concepts) directly into the text. The University offers information on how to use these features through the UITS Knowledge Base in addition to a workshop offered each semester through the Center for Innovative Teaching and Learning (CITL). Courseload also offers self-paced training modules. While there

Example of eText
are a number of features which have interesting potential applications, the onus is solely on the user when it comes to learning about and developing competence with the software. Furthermore, the study completed at the end of the pilot program found that shared annotations were only valuable when the professor rather than other students shared.

Because the software is written in HTML5, it is accessible across a range of devices and operating systems. Because of this, there is no need for a standalone e-reader device and users can access the text virtually anywhere. While an internet connection is necessary to make notes/annotations and use the sharing features, it is possible to “check out” the book (i.e. make it available offline). Additionally, students and instructors can print out up to 50 pages of the book at a time. Similarly, if a student is set on getting a paper copy, they can order a loose leaf copy of the book through Courseload for a significantly reduced price as they have already paid for the copyright through their initial course fee.

The third piece of the Courseload value proposition is the potential for data analytics. Currently, faculty have access to individualized student data on how much is being read, what sections are being read, as well as where annotations/notes are occurring. This data is available through two bar charts, entitled “Who’s Reading” and “Who’s Engaged”. While application of this data will differ from course to course, the feature was designed as a way to identify patterns in student reading and interaction with the text. The end goal is to be able to identify students that are falling behind as well as what information they may be overlooking. Furthermore, a team of IU faculty is currently pursuing a grant to create a dashboard run through the Courseload software that will provide an early warning system for faculty and students when an individual falls behind. The program will be piloted in large introductory classes where many underclass students struggle. It is important to note that there is no data on how much faculty use the analytics features offered to them.

**Impact on Cost**

On the surface, students are paying a significant sum every semester for textbooks; College Board has estimated the yearly cost of books nationwide at $1200 per student in 2011 (Average). With new editions being priced at about 58% above previous editions and an average release time of only 3.8 years between editions (Pressler), many students are paying excessive amounts for minor changes in the text. While many are familiar with the skyrocketing costs of healthcare and college tuition, the prices for college textbooks have outpaced even those sectors, growing 812% over the past three decades; over three quarters of the textbook price goes to the publisher (Kingkade).

There are a number of factors influencing the rise in textbook prices, ranging from the publisher’s lack of control of the resale market to new practices designed to package more materials with the text. The traditional college textbook market involves publishers selling textbooks at wholesale prices to college bookstores, who in turn make the sale to the end customer, students. At the end of the semester, students either choose to keep the book or sell it back at a price dictated by the bookstore,
who will then offer the used version until a new edition comes out. In this model, the publisher is left out of the secondary market for used books and raises the upfront cost of a new book to compensate.

Recently, publishers have begun to engage in the practice of packaging additional learning materials with the text to, among other reasons, justify further price increases. These learning materials are increasingly taking the form of Integrated Learning Systems, software that accompanies the text and offers supplementary practice problems, activities, etc. Although studies have shown that students believe that ILS helps improve their learning (Book Industry, “Student Response”), they increase costs and are perceived by many students to be superfluous. If the ILS is integrated with the course using the text, students become captive customers and are forced to purchase a new text packaged with the access code or buy an access code individually at an exorbitant cost. As publishers grapple to boost sales of new editions and increase the amount of learning materials packaged with the textbook, prices are pushed upward along a very steep trajectory.

From this standpoint it would seem that the IU eText model does reduce costs for students. Depending on the agreement with the publisher, prices can be negotiated down to as low as 30% of the new textbook, with only a small fee going to Coursereload and the option to purchase a loose-leaf copy of the book for a relatively low price. Even when taking in variables such as resale value, a recent study by the Office of the Vice Provost President for Information Technology (OVPIT) found that eText prices were about at least 10% lower than traditional textbooks (Fater). Although this figure does seem promising there are a number of other factors to consider when examining the possible cost advantages of eTexts. The traditional textbook marketplace is eroding and it remains to be seen where the IU model lies in this new marketplace.

New avenues for obtaining textbooks are opening up through the internet. Used book prices are noticeably cheaper online when compared to the campus bookstores. This allows students to resell their used book via the internet for a better price than is offered at the bookstore. As such, the most frugal students are able to obtain lower purchase prices and higher sell back prices than in the traditional market. Additionally, students have the option of buying previous editions of the textbook for drastically reduced prices. There are also a number of students that get their textbooks illegally. An industry survey revealed that photocopying of textbooks had doubled from 2010 to 2011 and that many students were also downloading digital copies of the textbooks illegally (Book Industry, “Photocopying”). This behavior was concentrated primarily among underclassmen, indicating that a new generation of students is pursuing illicit means to circumvent high prices. Additionally, public opinion on copyright protection appears to be shifting as well. Although the struggles of the music and film industries to fight increased “pirating” activity have been well documented a 2011 Digital Entertainment Survey found that 36% of tablet owners admitted to illegally downloading eBooks (Williams). These new ways to purchase and sell textbooks combined with shifting attitudes towards copyright protection indicate a fundamental shift in the marketplace.

Accompanying the trend of increasing textbook prices has been the trend of students opting out of purchasing the textbook altogether. Although price is a large factor in this decision, many students are waiting to purchase the textbook until they can gauge how extensively it will be used in the class.
According to the 2012 National Survey of Student Engagement, one in four freshmen and one in three seniors frequently opted out of purchasing a textbook due to cost (National). Because each student learns differently, they will have a unique utility for the textbook that is independent of the textbook price, i.e. the amount they personally value the text. If the IU model locks them in at a price below their individual utility, they will receive a surplus value. Conversely, if the IU model offers a price that is above what a student values the textbook at, they will not be able to opt out of the system and search for other options.

While on the surface the eText program offers a substantial cost advantage there are other factors to consider ranging from the condition of the book purchased to the location from which it was purchased. There are documented cost savings over buying and reselling the book from the campus bookstores but beyond that the picture becomes murky. It is entirely possible for a frugal student to get a better deal than that offered through the eText program and some students would still rather forgo the textbook entirely than pay the price offered through the program. To get a better sense of the possible cost advantages to eTexts one would need data for online prices and resale values as well as data on how much value the students personally pay for the textbook.

Effects on Education

A key differentiating factor of eTexts delivered through the Courseload software is the promotion of eTexts as an instrument for improving learning through increased instructor-student interaction. This idea is neither new nor confined to digital texts as an industry survey has found that student satisfaction with the textbook is highest when instructors use the annotation/highlighting features. The Courseload software offers features that the developers believe can improve the learning process. These features include: annotation/highlighting, sharing features, accessibility and analytics available to instructors.

Research done at IU on the potential of digital material to improve learning paints a mixed picture of the effect digital materials has on education. At the end of the initial eText pilot study, research was done to evaluate the impact of eTexts on student performance. Researchers had access to activity logs for all student, over 700 surveys (71% response rate), over 400 final grades (95% response rate), as well as interviews with faculty and students. Looking at the activity logs, the vast majority of students read primarily on the computer (Denis). While this could be viewed as an implicit backing for eTexts it is worth noting that people read about 20% slower on a computer than they normally would (Noyes). This could be viewed as an impediment to learning, although there are many other factors to take into account, such as reading comprehension. While students who annotated just a moderate amount had noticeably higher grades, overall more students reported annotating less than they would in a printed textbook.

According to the student surveys, the most attractive feature of the eTexts were instructor annotations, which most instructors did during the pilot study; the little feedback they received from students was generally thanking them for the annotations. Beyond a handful of annotations in the text,
most instructors did not interact with the text. Sixty percent of students reported enjoying eTexts more than traditional books, with this number being higher in courses where the instructor used more features and in follow up courses with eTexts; one caveat to this is that with the 71% response rate, it is possible that a portion of students did not enjoy the book but didn’t feel strongly enough to respond.

In addition to this broad study, an instructor involved in the pilot program collected information from her students as well. She used the software over three semesters with differing levels of engagement to see the effects on eText perceptions. When there was a moderate amount of instructor interaction with the texts, students preferred it over the traditional book; grades were not noticeably affected, however. Ultimately, she came to the conclusion that instructor interaction drives the usefulness of the eText. This relates to some of the feedback received during the pilot study that using the eText made the instructors think more of how to integrate the text into the class. The counterpoint to this is that when an instructor builds strong ties between the text and the class, the educational experience is likely to be improved, regardless of what format the text is delivered in.

A main factor behind the rationale that digital materials improve learning is that current university students are more comfortable with digital technologies than any other generation and as digital natives, they prefer to work online. A working paper being written by IU faculty looks at the effectiveness of digital materials at improving learning outcomes. The paper involved analyzing the grades and surveys from students of two undergraduate classes where all readings were administered through an electronic reserve system offered by the library. Two thirds of students chose to print at least some of the readings and the only reported benefit of using the e-reserve system over a course pack was a large perceived savings in cost. Although there was no difference in grades, the study found that many students preferred to print off readings and felt more comfortable reading print. Although the e-reserves system does not offer many of the features Courseload does, it is important to consider that if students choose to print the readings they have access to electronically, they won’t be utilizing additional benefits that the technology brings.

Although eTexts have been offered for many years, the market is stagnant and many students prefer traditional textbooks; despite the notion that the so called digital generation would flock to eTexts, people read faster and still prefer to use paper. The software features that Courseload brings to the fold have the potential to improve the learning experience. Although the software has evolved since the initial pilot study, evidence and feedback showed that eTexts can provide value to students beyond cost savings. This value, however, seems highly contingent on at least a moderate degree of instructor involvement with the text. Although such involvement would be ideal, there are many courses in a university environment which do not require heavy usage of a traditional textbook. Additionally, some faculty may not have the time to interact with the text outside of the classroom. Although the potential for an improved learning experience exists, it is dependent on other factors for this potential to be realized.
Primary Research Methodology

I chose the subject of my project with the goal of conducting first person interviews. I began this process by sending out an email to people affiliated with the Sustainable Computing Working Group asking for recommendations of faculty who would be willing to meet with me and may have some reservations about technology in the classroom. I was able to gather contact information for 24 different faculty members. I began emailing them to schedule interviews at the beginning of second semester as well as emailing additional contacts as they were referred to me. Around one week after an interview took place, I would email the interviewee a short informational PowerPoint as well as a short questionnaire. The goal of this was to gauge whether there was information presented in the PowerPoint they were unaware of and whether this information affected their opinion of eTexts. If I received no response from a contact for either scheduling or the questionnaire, I would send a follow up email one week later. Ultimately, I was able to conduct interviews with 15 faculty members across 4 schools and 9 disciplines.

Interviews lasted from 30 minutes to a full hour with the average lasting about 40-45 minutes. I began developing my questionnaire in November with the help of my two mentors and using a textbook entitled *Investigating the Social World: The Process and Practice of Research*. Using this book as a reference, I designed my questionnaire into four distinct sections: general demographic information, general teaching questions, questions about technology in general, and questions about eTexts; each section contains a mix of closed and open ended questions. Prior to each interview I explained my internship and the purpose of my study. My goal going into each interview was to create a conversational atmosphere but stick to my predetermined questions as much as possible. Although there were a few minor changes, the list of questions was consistent throughout the interviews and can be found in Appendix B.

When I had completed all of my interviews I gathered the questionnaire responses into an Excel grid. At this point I went through each question and attempted to aggregate the responses. For some questions this involved calculating a median number while for others it involved categorizing different types of responses and determining the number of faculty whose responses fit that category. For example, I found that 12 faculty members used Oncourse to distribute resources while 9 use it as a communication tool. For opinion based questions I would analyze if there were an average opinion and summarize. I would take demographic information and responses to previous questions into account in the analysis.

**Interview Findings**

One of the most surprising findings I came across during my research was the disparity between what instructors thought they knew about the eText program and many program specifics. Almost every instructor (13 out of 15) had heard of the initiative and when asked to gauge their knowledge on a scale
of 1-10, the median response was a 6. There were, however, a number of misconceptions about the program that came from instructors in this range. Commonly cited concerns were lack of ability to print and unease with mandating students use an electronic copy. Although students are allowed to print directly from the eText and can order a Print On Demand copy, I didn’t get the sense that those options were apparent to faculty. Overall, there were two main types of barriers, institutional and informational.

The largest barrier I identified were issues faculty had with the program itself. Although not a majority, a solid number of faculty were strongly opposed to the concept of mandating that their students purchase something. Faculty who predicted greater student opposition typically opposed the program on these grounds. In my interviews I also asked about adoption of Oncourse, a learning technology which has extensive institutional and financial support, two oft-cited barriers in academia (Butler). While every class has an Oncourse page automatically created for them, there is a minority of instructors who avoid using the system. While the almost all interviewees currently use only Oncourse for course management, there are still instructors who divide their course management among multiple websites. Furthermore, among faculty who were teaching before Oncourse’s release, most created a personal webpage. One of the prevailing themes among academia is the sense of independence and as such there may be an ingrained resistance to centralized systems such as the eText initiative.

Another problem related to disagreement over the core of the initiative is the program’s lack of flexibility. The instructors that I interviewed work across a range of disciplines and teach a variety of classes. Most instructors taught at least one lower level course but maintained a mix of undergraduate and graduate level courses. The number of students taught ranged from 1000 to 25 per semester. This variety is indicative of the wide array of courses taught at IU. In terms of the eText initiative there was a belief that the eTexts wouldn’t fit the format of some classes, especially higher level courses that aren’t closely related to the textbook. Although the program might work well for introductory courses reliant on a traditional textbook, there were a number of questions as to how it could be adapted for a course that doesn’t follow a traditional format. For example, in a class that relies primarily on case readings chosen by the instructor, there is no apparent role for eTexts as offered through the IU system.

Related to this problem is that while the majority of faculty doesn’t know what the specific cost savings are, those that do aren’t convinced students save enough. Instructors believe that the cost of textbooks needs to come down and even among eTexts, the price is too high. One lecturer in particular stated her belief that faculty and the University have greater leverage with publishers than they realize; she has been able to push for significant price decreases and has gotten the publisher to offer an optional eText at the same price quoted to the eText initiative. Among the four instructors I interviewed who had at one point used eTexts, all cited decreased cost among their reasons for continuing with the program. Although a minority, some instructors are aware that some students choose to forgo the book entirely. In this sense, while the costs of eTexts are low enough for some faculty to consider joining the program, there are others who believe the cost needs to come down more to justify a mandatory purchase.

When asked about structuring their class, most instructors tend to make only minor changes from semester to semester. The main reason for changing something in the course’s structure is to
improve the student learning experience. Similarly, the main benefit seen in Oncourse is its ability to disseminate information to students and improve access to essential learning materials. Furthermore, six professors currently make annotations to their readings, something that could translate to a noticeable benefit should they embrace eTexts. Faculty are focused on improving the student learning experience and eTexts still need to cultivate a stronger image in this regard.

Among the four instructors who have taught a course through the eText initiative, the reviews are positive. Although three of the four experienced some technical problems, none of these problems were significant; relatedly, the Courseload support staff got great reviews. Furthermore, only one instructor used the training resources available through CITL and the UITS Knowledge Base. This lines up with the expectation among non-users that the software should be intuitive to use and that formal training sessions wouldn’t be required. A study previously conducted at Ball State University identified the time to learn new technologies as a major barrier to adoption in higher education (Butler). It appears that eTexts don’t suffer from this particular barrier. The downside to this is while the basic features of the software are all intuitive, the more complicated, value adding features can go unused without training. For example, although Courseload has promoted the ability to share notes and annotations, the faculty who have used the platform are hesitant to embrace this feature. Generally, there is a sense that eTexts can bring educational benefits but that these will become evident over time. Overall, the eText initiative got positive reviews from faculty who had been enrolled in it, which cited cost and student access to the book as the most important factors in their decision.

In terms of how faculty learned of the eText initiative, most responders had heard of the program either through an email or during a department wide meeting. Additionally, about half of the interviewees had visited the eText at IU website with only 4 being able to recall finding helpful and relevant information. This represents a substantial portion of the interviewees who were unaware of many specifics of the program and software. Across my six questionnaire responses, three faculty said they were aware of less than half of the information in my debrief PowerPoint. More so than education software features or environmental benefits, cost appears to be the biggest motivator especially among faculty already using an eText. It is worth noting however, that while only two instructors cited the environment as a powerful motivator, they had not thought about eTexts as helpful in this regard. It is possible that promoting eTexts as a sustainable way to study would improve its standing in the eyes of some professors.

**Recommendations**

There appear to be a variety of barriers to adoption of eTexts, some of which are more ingrained than others. It isn’t feasible at this point to fundamentally change the structure of the program; although current enrollment is small relative to the size of IU, it is still significant. Furthermore, as the main proponent of this centralized purchasing model, IU’s image would benefit if the model were to take off in popularity. There are a number of ways, however, to deal with some of the identified barriers without changing the fundamental structure of the initiative.
The lower cost of eTexts has factored heavily into the decision of faculty currently using eTexts. There is a sense among others, however, that costs could be further pushed down. Because of the bulk purchasing dynamics of the program, where publishers save on almost all production costs, the University could continue to push for steeper discounts. Because of the changing marketplace for textbooks, the eText initiative must establish itself as a value compared to not only to textbooks sold through traditional outlets but through the internet as well. Professors listen to students and want to provide them with a value but if they feel as though they will be hurting many students by requiring an eText, they will be less inclined to join the initiative. Continuing to promote dramatic cost reductions would be the most effective way to increase adoption.

While I was able to develop a solid case for the environmental benefits to eTexts over traditional textbooks, there is room for this rationale to be developed. Future research could focus on developing a primary estimate of the carbon footprint of a physical textbook. Additionally, looking the estimate for eTexts, the only missing piece is the environmental impact of the servers on which the books are stored. By developing an estimate of this and a physical textbook, the comparison would be a lot more concrete. I wasn’t able to conclude that environmental factors weigh heavily on the decision to use eTexts, it did appear to be a secondary consideration for some however, and by developing and promoting this, the eText initiative could incentivize some faculty who are already on the fence.

Additionally, there seemed to be a number of misconceptions that if addressed properly could actually highlight benefits to the program. If the eText initiative publicized the print on demand and offline reading features better, they would be able to directly address misconceptions. In general, the initiative could benefit by publicizing ways in which they improve student access to the text. One of the main takeaways from the interviews was that student comfort and ease of learning factor heavily into a course’s structure and by promoting the ways in which eTexts do not detract from this, the initiative could gain momentum. Concentrating communication around a message of ease of learning and benefits to students would be helpful.

While the software is ambitious and designed with learning in mind, there is room for improvement. I did not have access to data on how many instructors actively use the highlighting/annotation sharing but did not get the sense that it was used often. Courseload should look into what features are being used often and which features get neglected. Once the company gets a sense of how the eTexts are being used, they can incorporate features accordingly. For example, if instructors aren’t using the annotation feature, Courseload could approach the author of the book about annotating it. For texts that many classes are using, the company could potentially contract with a lecturer actively using it about making their annotations available to students outside that class. If the software hopes to offer educational value missing in traditional textbooks, it needs to evaluate its current strengths and weaknesses and develop from there.

Electronic textbooks have the potential to replace their traditional counterparts and in the process benefit students and the environment. Although adoption is slow, the eText initiative should continue to focus on keeping costs down and communicate better with faculty. The textbook market is
undergoing a fundamental shift and IU has the potential to direct that shift to lower costs and improved learning.
Appendix A

Emissions from computer usage

Power Usage of Computer at Moderate Use = 28-32 watts/hr ("Approximate")

Local Grid: .689 kg CO2 = 1 kw/hr therefore 1451 watts = 1 kg CO2

1 kg CO2 emissions equates to 1450 / 32 = 45 hours of moderate use

Emissions from printing

11,134 kwh = 200,000 sheets of paper ("Paper Facts")

2.7855 kwh = 50 sheets

1.85 kwh = 50 sheets when there is a 2/3 chance of printing

*.689 kg CO2 per 1 kwh

1.28 kg CO2 = 50 sheets when there is a 2/3 chance of printing

Emissions from loose-leaf copy

Assuming that the loose-leaf process is strictly printing the book and transferring to a binder and that the average textbook is 300 pages/150 total sheets:

2.7855 kwh (50 sheets) * 3 = 8.3565 kwh for the paper

*.689 kg CO2 per 1 kwh

5.7576 kg CO2 per loose-leaf copy

Average emissions through IU model

1 kg CO2 (45 hours of use)

1.28 kg CO2 (2/3 of student prints 50 sheets)

.575 kg CO2 (10% of students purchase loose-leaf copy)

2.855 kg CO2 = average emissions per text
Appendix B

General Questions:
- How many courses do you typically teach in an academic year?
  - What level are these courses (i.e. 100, 200, etc.)
  - Approximately how many students are enrolled in each of your courses?
- How many years have you been teaching?
- Approximately, how is your time split between teaching, research or scholarship, and other activities?
- Are you tenured or on a tenure track?
- Have you heard of the Center for Innovative Teaching and Learning?
  - How many workshops have you attended?
  - What is your opinion of the workshop(s) you attended?

Course Specific:
- What types of readings do you require for your courses?
- How frequently do you give out printed handouts in class?
- How frequently do you require students to print out readings or other materials to bring to class?
- If you require a textbook, how long have you used this current textbook (including past editions)?
  - Do you annotate/make notes in your personal copy?
  - How often do you assign problems from the textbook?
  - What is the publisher of your required text(s)?
- What would be your main driver for you to change your course’s format?
- What percentage of your students do you think purchase a new textbook in your course?
  - What percentage purchase used textbooks?
  - What is the approximate cost of the required readings in your course(s)?

Digital – General:
- Do you use Oncourse?
  - If yes:
    - How long have you actively used the platform?
    - What were your original reasons for adopting OnCourse?
- Thinking back to a specific course, what features of OnCourse do you use?
  - If eReserves not mentioned: Are you aware of the eReserves function the library offers through Oncourse?
  - If so, do you use it?
  - If yes, how much of your course material is available through eReserves?
- How has adoption of OnCourse been encouraged or discouraged in your department?
- Do you use any other digital resources prominently in your course(s)?
  - If yes, what are these digital resources?
  - What are the benefits associated with these resources?
  - Would you like to incorporate more digital resources in your courses?
If so, what?

eText – specific:

- Are you aware of the eText initiative at IU?
  - How did you hear about it?
  - On a scale of 1 to 10, with 10 being very informed, how informed about this initiative are you?
  - Have you visited the eText website?
    - Were you able to find relevant, helpful info on the site? (instead of/in addition to the “difficulty navigating” question)
- Have you ever used eTexts in your course(s)?
  - If yes, did you use the Courseload platform?
    - How did it work for you?
    - Did you ever contact the Courseload support staff for help?
    - What are your opinions of the Courseload support staff?
    - How long did it take to become comfortable with the software?
    - How extensively did you take notes or make annotations within the software?
    - Did you use any tutorial resources provided by either IU or Courseload itself?
    - Do you intend to continue using eTexts?
      - If Yes: What is your main reason for doing so?
      - If No: What is your main reason for not doing so?
    - Do you see educational value in using eTexts?
  - If no, have you ever considered using an eText?
    - What are your reasons for not using eTexts?
    - How much time do you think it would take you to become comfortable with the platform?
    - Would you anticipate a need for formal training to use eTexts?
    - Would you expect to devote class time to explaining eTexts?
    - To what extent do you anticipate technical problems to be an issue?
    - How would you expect your students to react to using an eText?
- Thinking back to the specific course from earlier, what is your sense regarding the relative cost to students of an eText compared to what they currently spend on readings in your course?
- How do you think requiring eTexts would be received among the students in that course?
  - Would you be concerned about the effect it might have on teacher evaluations?
Works Cited


Environmental Defense Paper Calculator http://www2.edf.org/papercalculator/index.cfm


"Nik Osborne Interview." Personal interview. 2 Nov. 2012.


