Indiana University e-textbook Project

Spring 2010 Findings

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Introduction

In the spring of 2010, Indiana University conducted a research project on e-textbooks with the goal of understanding the impact on teaching and learning, student acceptance, and the factors influencing student acceptance. We studied 10 faculty and approximately 700 students in ten courses in the Kelley School of Business and the College of Arts and Science. Most of the students were located on the Bloomington campus, but approximately 100 students were enrolled in two online courses taught from the Indianapolis campus. We used the CLIP e-textbook software developed by Courseload LLC.

The research was organized into seven separate studies to understand potential differences across courses and students, and to permit different faculty to explore different research questions. This preliminary draft contains information on only the first four studies. Given the scope of the project, there are a lot of data and results, but the short take-away is that when asked which they preferred, about three quarters of the students selected e-textbooks over traditional paper textbooks.

Study 1: e-Textbook use in Undergraduate Classes

Five undergraduate classes with approximately 350 students were included in this portion of the study. Three were major courses in the computer information systems area, one was a major course in the operations management area and one was a large section freshman astronomy course. Students were invited to participate in an end-of-semester survey in the last week of the course. We received 212 responses (a 60% response rate).

How did students use the e-textbook? Most students reported reading the e-textbook primarily (50% or more of the time) on their laptop computer (38%), Tablet PC (10%) or desktop computer (6%). About 5% used a desktop computer and a laptop computer equally. About 41% reported they primarily printed and read on paper. Students who primarily read on a computer printed an average of 14% of the book. Students who primarily read on paper read an average of 31% of the book on a computer.

In general, students found the CLIP software easy to use and were satisfied with its speed and its printing capabilities (See Table 1). For example, 88% of students felt that students with average technical skills would be able to use the e-textbook. Twelve students (6%) reported contacting the help desk with questions.

Table 1. Accessing the e-textbook

Question	Percent Agree or Strongly Agree	Percent Neutral	Percent Disagree or Strongly Disagree
Using the e-textbook was easy*	68	23	9
Any student with average technical skills can use e-textbooks*	88	9	3
I was satisfied with the speed of the download of my e-textbook.*	48	31	11
The options for printing the e-textbook content met my needs.*	46	38	16

* Statistically significant at p<.05 or better

How did e-textbooks affect teaching and learning? We asked students about how their instructors taught and about how they learned using the e-textbooks. The survey questions used five point scales, but for ease of presentation, we discuss the results in percentage terms by collapsing the responses into three groups: those above the midpoint value of 3, those at the midpoint, and those below the midpoint. For example, for the first item in Table 2 (did you read more or less), rather than reporting the mean was 2.79, we report the percentages choosing 1 or 2 (reading more), 3 (the same), and 4 or 5 (less). All statistical tests are done on the original scale (not the percentages), comparing the sample mean to the midpoint value because this test is more powerful than a Chi-square test on the percentages

Changes in learning behaviors are influenced to some extent by the way in which the instructors used the textbook. The instructors in two classes made no changes to the way they traditionally taught their courses, which was to use the book only as background material for their lectures. Students were not required to read the book. Not surprisingly, students in these classes were significantly less likely to report that the instructor made use of the book ($F(5,205)= 8.54$, $p<.001$) and did not believe that reading the book was important to the class ($F(5,205)= 5.35$, $p<.001$).

Table 2 shows the students' perceptions of their reading, engagement and learning from the e-textbook. If we examine the three courses that actively used the e-textbook, we see that students reported that they read more of the assigned readings using the e-textbook than they would have using paper textbooks ($t(155)=4.33$, $p=.001$), and that they engaged more with the book through highlighting and annotating than they would have with paper books ($t(155)=5.12$, $p=.001$). They also reported learning more with the e-textbook ($t(155)=2.11$, $p=.036$).

Table 2. Differences from Paper Textbooks

	Courses that actively used the e-textbook			Courses that did not actively use the e-textbook		
Question	**More**	**Same**	**Less**	**More**	**Same**	**Less**
Did you read more or less of the assigned material than you would have if it was a paper textbook*	51	23	27	18	44	39
How much did you highlight, annotate and/or use sticky notes in the e-textbook compared to what you normally do with paper textbooks*	54	20	26	16	39	45
How much did you learn from using the e-textbook with highlighting, annotations and/or sticky notes (yours and others) compared to what you normally learn from reading paper textbooks*	39	32	29	14	59	27

* Statistically significant at $p<.05$ or better

One of the features in the CLIP software is the ability for the instructor and students to share highlights, annotations and sticky notes with others. Table 3 presents the data only from the three courses whose instructor actively used the e-textbook. This shows that students perceived the instructors' highlights, annotations and notes to be useful ($t(155)=10.70$, $p=.001$). It was less clear whether students' saw value in other students' highlights, annotations and notes; this was statistically significant ($t(155)=2.49$, $p=.014$), but the modal response was neutral. Students thought accessing the book through the learning management system (Oncourse, the Indiana University version of Sakai) was useful ($t(155)=13.23$, $p=.001$). Interestingly, only a third of the students expected to use the textbook after they completed the course ($t(155)=1.48$, p=ns).

Table 3. Using the e-Textbook

Question	Percent Agree or Strongly Agree	Percent Neutral	Percent Disagree or Strongly Disagree
The instructor's highlights, annotations, and/or sticky notes were useful for studying*	66	26	8
Other students' highlights, annotations, and/or sticky notes were useful for studying*	38	41	21
Having access to the e-textbook through Oncourse was valuable.*	79	14	6
I will likely use this e-textbook after the course is over.	31	30	39

* Statistically significant at $p<.05$ or better

Do students prefer e-textbooks or paper textbooks? We asked students which they would prefer, a paper book they would sell-back for a total cost of $70 (after selling it back), an e-textbook priced at $45, or an e-textbook with a print on demand softbound edition for $65. Approximately 73% of students chose one of the two e-textbook options: 33% choose e-textbook only (no softbound edition) while 40% chose the e-textbook with the softbound edition.

There were no significant differences in preferences depending on the course ($F(5,205)=1.38$, p=ns) or the primary device students used to read the book ($F(4,206)=0.34$, p=ns). See Table 4.

Table 4. Student Preferences

	Percent Preferring e-textbooks
Overall Sample	**73**
By Primary Reading Device	
Tablet PC	77
Laptop Computer	76
Paper	72
Desktop Computer	67

Table 5 shows the factors that influence the preferences for e-textbooks or paper textbooks. The one factor that is significantly more important than the others is price: e-textbooks are cheaper ($t(211)=12.38$, $p=.001$).

The next four factors are also important, but not as important as price. Students reported that instructor highlighting ($t(211)=5.76$, $p=.001$), student highlighting ($t(211)=2.30$, $p=.023$) and environmental benefits ($t(211)=3.18$, $p=.001$) were significantly important factors leading them to prefer e-textbooks , but are not different from each other in importance. An equally important factor leading them to prefer paper textbooks is the fact that paper is easier to read ($t(211)=7.07$, $p=.001$).

The remaining three factors (the ability to sell paper books, the fact that e-textbooks are lighter, and paper books are easier to use) were not rated by a significant majority of students as being important.

Table 5. Factors influencing Student Preferences

	Factor	Percent Saying Important
Very Important	e-textbook are cheaper*	86
Important	e-textbooks enable instructors to share their highlighting, etc.*	80
	Paper textbooks are easier to read*	78
	e-textbooks are better for the environment*	72
	e-textbooks let you (i.e., the student) highlight, etc.*	71
Less Important	Paper textbooks can be sold	64
	e-textbooks are lighter to carry	62
	Paper textbooks are easier to use	59

* Statistically significant at $p<.05$ or better

What role should the university play? We asked students what role their university (Indiana University) should play in the e-textbook market. Table 6 shows that students overwhelming believe that the university should play a key leadership role (all questions were significant at $p=.001$).

Table 6. The University's Role in the e-Textbook Market

Question	Percent Agree or Strongly Agree	Percent Neutral	Percent Disagree or Strongly Disagree
IU should move as quickly as possible to a digital future*	66	21	12
IU should try to shape the digital future by leading new initiatives in this area*	71	22	6
IU should experiment with new digital options that can reduce cost and provide user advantages*	86	10	3
IU should stay out of the course materials market and let students, bookstores, and publishers do their own thing*	18	30	52

* Statistically significant at $p<.05$ or better

Conclusions. In general, students found the e-textbook easy to use. Most students reporting using the e-textbook induced them to read more of the book, engage more with it through notes and highlighting, and learn more. Reading the instructors highlights and notes was perceived to be more valuable than reading those of other students. About three quarters of the students preferred the e-textbook to traditional paper textbooks. Most students believed that the university should play a key role in shaping the e-textbook market.

Study 2: e-Textbook Use in Online Business Courses

Two online classes were included in this study. One was a fourth year undergraduate major course in finance and the other was a first year MBA course in operations management. All students were invited to participate in an end-of-semester survey in the last week of the course. We received only 8 responses out of a population of about 100 students who completed the courses (8%) so the response rate is too low. Because the results may not be representative of the entire group of students, we choose not to report them.

Study 3: e-Textbook Use in a Graduate Language Course

One graduate class (a master's level Italian course) was included in this study. All 11 students participated in the end-of-semester survey in the last week of the course. Most students printed the book and read on paper (55%), three used a laptop as their primary reading device (27%), and two used both desktops and laptops (18%).

Students felt that the book was easy to use (100%), and that students with average technical skills could use it (81%). They felt printing met their needs (100%), and were satisfied with the speed of downloading (81%). All students (100%) felt that using the e-textbook did not change the amount they read or the amount they learned, but 45% felt they highlighted less

Students felt the instructors' highlights were useful (63%) as were those of other students (72%). Access through Oncourse was valuable (72%) and 45% felt they would use the book after class was over.

Despite the fact that most students printed their book, most strongly preferred the e-textbook to a paper book (91%). The two most important factors driving this preference were cost (82%) and environmental impact (82%). Instructor highlighting (73%) was a close second. The ease of using paper books (73%) and ease of reading paper (64%) were important factors influencing students' desire to read on paper. The other factors were less important.

About 36% said that IU should move quickly to a digital future; the rest were neutral. Only two students (18%) felt IU should try to shape the future, but ten students (91%) felt that IU should experiment with new digital options. Only one student (9%) felt that IU should let the e-textbook market be shaped by publishers.

In general, the pattern of results is similar to those from the undergraduate courses.

Study 4: Faculty Perspectives on e-Textbook Use

The goal of this study was to gather the instructors' perspectives on the use of CLIP and on how CLIP fit into their teaching philosophy and practices. Eight of the eleven instructors were interviewed. Rather than a fixed set of interview questions, the interviews followed the lead of the instructor being interviewed. The interviews began with a statement that the interviewer wanted to understand the instructor's reaction to using CLIP. It was explained that we were interested in whatever the instructor saw as important in relation to motivation, teaching philosophy and strategy, student learning and reaction, etc. The interviews lasted between 30 and 45 minutes.

In general, the faculty believe that many students do not read the text unless forced to do so. In some cases, faculty do not expect them to; they basically say that they will not test on things not in their lectures (thought the book may help them understand material in the lectures. Others use CLIP to promote reading of the text in a variety of ways. In some cases students are required to annotate the text based on particular questions asked by the instructor. In other cases, the instructor will insert annotations that offer extra points if the students respond to the annotation (may be simply acknowledging they saw it or it could be a very short extra credit paper.) One instructor inserted a comment saying the first 10 people to respond to having seen this post will get extra credit – only 8 people ever responded.

Most faculty entered this pilot with little detailed planning of the integration of the e-book into their pedagogy. Indeed, several don't even expect their students to read the textbook. Nonetheless they are all committed to using CLIP in the future. It seemed that there was more of an attitude of "let's see what it is like and then see what we can do". It will be interesting to see what growth there is in their pedagogical strategies.

It is clear that faculty need help in thinking about how to use CLIP. This guidance should identify potential pedagogical goals that might be realized in moving to an e-book format (promoting reading, promoting critical reading, promoting collaboration, recognizing alternative perspectives, etc) and strategies for reaching those goals in the context of the technology, topic, and class size.

Faculty wanted a stronger link between OnCourse and CLIP. In their view, threaded discussions should be added to CLIP – having separate annotations does not promote discussion. CLIP should provide links to notes, problems, etc in OnCourse. The faculty identified numerous new features that would be helpful; perhaps the most important of these new features are data and analysis of student activity in CLIP should be available just as it is for use of OnCourse.

An important impact of the e-book project is that faculty became more aware of the text and how it is used. First, they became more aware of what they were asking students to do with the text. In essence, the act of annotating the text for the students (rather than just highlighting) caused them to think more about what was important in the various sections. Second, they became aware of how little reading of

the text the students do and thus there were plans (some implemented this semester) to try to increase reading.

Overall Conclusions

This project suggests that students are motivated and interested in using electronic textbooks, if they save money compared to paper textbooks. The most important features driving student acceptance are cost, instructor highlighting, their own ability to highlight and environmental concerns (i.e., "going green"). Most students read the e-book on their computers, but a significant minority printed sections of the book and read on paper, especially in those classes where the instructor did not make use of the e-textbook as an important component of the class. Nonetheless, students who primarily printed and read on paper were as likely to prefer e-textbooks as those who read on laptops, tablets, or desktops.

Faculty were likewise supportive of e-textbooks. Most tried to adapt their teaching styles to use the features offered by the e-textbook, but this was a learning semester. More research is needed to identify those features that make the most impact on students, and more guidance is needed to help faculty integrate the new features that e-textbooks offer into their teaching. Nonetheless, even those faculty who made no changes to their teaching style and used the e-textbook primarily as a reference to their classroom lectures still believed there was value in the e-textbook for their students.