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# Piloting the E-Text in an Undergraduate Systems Analysis & Design Course

Wayne E. Pauli  
wayne.pauli@dsu.edu  
College of Business & Information Systems  
Dakota State University  
Madison, SD USA, 57042

Doug Peterson  
Doug.Peterson@usd.edu  
College of Arts & Sciences  
University of South Dakota  
Vermillion, SD USA, 57069

## Abstract

In the summer of 2013 a call for a pilot test of multiple e-text readers was made by the Board of Regents of the State of South Dakota. The goal was to get one course with multiple sections from each of the six member universities to pilot digital content through an e-text reader. One section of the approved courses was to use the digital content while the remainder were to use the traditional text book. Information and data was collected during the fall semester of 2013. This paper discusses the process, the data, observations, attitudes and the conclusions of the pilot at one member institution.

**Keywords:** e-text, e-text readers, electronic book, digital media, digital materials.

## 1. Introduction - The Pilot

The South Dakota Board of Regents (BOR) through their Council of Presidents and Superintendents commissioned a committee to review the use of e-texts and digital materials in the fall of 2012. The committee met over several months to discuss goals and objectives surrounding e-texts. On April 3, 2013 the committee recommended a pilot utilizing e-texts to explore faculty and student attitudes and interest in the use of e-texts in the classroom. The pilot was to take place during the fall of 2013. (South Dakota Board of Regents, 2013)

The pilot would only include courses that have multiple sections. Students would have a choice in selecting the course section that has either

the hard copy text book or the required e-text. Each of the six system universities participated. At the onset of the pilot it was estimated that a total of 323 students would participate. Disciplines ranged from History, to Mechanical Engineering to Psychology, to Spanish, and Systems Analysis and Design.

A Request for Information (RFI) was issued, and the Executive Director of the Board of Regents determined that the RFI would be limited to two content aggregators, those being CourseLoad and CourseSmart. These two vendors provided a high level demonstration of their products to the RFI committee, and were deemed to be a "best solution" by the committee.

The BOR sponsored pilot was framed with eight overarching goals:

1. Evaluate student and faculty attitudes regarding printed and non-printed materials, impact of eText on student learning, engagement and enhancement, and discuss cost savings for students by utilizing an e-text option discussing rental versus purchasing power.

2. Ensure e-texts and open content are accessible and potentially available in printed material or provide for accommodations to allow this opportunity. Ensure disability services can be accommodated through the technology solution.

3. Learn what enterprise technology support will be needed (if any) for campus-wide e-text efforts. Ensure the ability to have reader software that allows annotations in the e-text. Ensure authentication and single sign-on capability and integration with LMS where there is little manual processing in the LMS.

4. Evaluate and recommend a sustainable business plan for e-texts, Textbook, and Rentals by addressing billing aspects, bookstore needs, etc. Understand the influence the sale and rental of textbooks at the University based on a system e-text model.

5. Ensure that the system has a common platform that allows one interface to our Learning Management System versus multiple interfaces from multiple vendors/publishers.

6. Ensure there is an unlimited use of devices for students – e-readers, iPad, iPad mini, Desktop, Tablet, Laptop, etc.

7. Ensure there is unlimited access so long as a student is enrolled in one of the six universities. Therefore, as long as they are a student in the South Dakota public university system, they maintain access to the e-text they purchased.

8. Ensure there is unlimited printing. (Request for Information, 2013)

Courseload was designed with educators to meet the needs of students, faculty, and administrators as their institutions make the transition from print to digital course materials. Courseload's website discussed their innovation around lowering the cost of education and improving learning outcomes, which are also in the aforementioned goals of the pilot. (Courseload.com, 2014)

The second content aggregator is CourseSmart. According to the company website it partners with leading publishers in North America higher education, to make textbooks and course materials available digitally to students, faculty and institutions. (Coursesmart.com, 2014)

## 2. E-Text Perspectives

The review of research on the topic of e-texts and e-readers was confined to the last 5 years with the exception of work done by Gary J. Brown (2001). Brown is the Director of Library Services at Blackwell's Book Services, Evanston, Illinois, and at one time was faculty at Northwestern University. Brown noted from research conducted by O'Donnell (1998) that it takes several generations to get past the point of depending on the old medium (books in this case) for a way to think about the new (e-text), and to get to the point of exploiting the new medium artfully in its own right. The ultimate goal is to look at reading as a process for learning, not to look at a book as an object.

In the decade of the 1980's the software company Voyager charted an interesting course of innovation in electronic books utilizing multimedia capabilities such as video, audio, and graphics, and was a pioneer in CD-ROM production. The technology and naming rights became property of Georg von Holtzbrinck Publish Group, a German company in 1997. The German company holds ownership rights of many US publishing companies and generates approximately 25% of its revenue from US companies. Included in the holding is the multinational publishing company The MacMillan Group.

This departure from just being a digital copy of the actual pages of the book was strengthened by improved screen technology. Time and innovation have provided more tools for active reading such as ability to annotate, highlight, and other similar learning tools. Michael Gorman and Walt Crawford state that "the debate about the future of print is really not about print-on-paper versus electronic technology. It is about reading and the best means to read." (Gorman and Crawford, 1995)

In 2009 Northwest Missouri State University conducted a pilot with 200 undergraduate students. E-texts were given to these students for studying instead of books. (Knutson, Ryan, & Fowler, 2009) On a national stage many

universities as well as high schools and elementary schools were piloting similar initiatives as Northwest Missouri State. The university was met with mixed results as many of the two hundred students dropped the classes after two weeks while others actually bought the physical books for their classes. Knutson, Ryan & Fowler also reported that Penn State piloted a program with one hundred Sony Reader devices and found similar results. The students more often than not, suffered through the pilot or they purchased physical books.

Also in 2009 comes a report by Edward Nawotka (2009) regarding a pilot completed by the University of Texas at Austin. The Vice President and Chief Financial Officer, Kevin Hegarty, formed a Co-op with Wiley for what Hegarty called "Essentially enhanced PDFs". If the e-text test is embraced, said Hegarty, the university might wrap the cost of the books into the class itself. Ultimately he was surprised by the lack of enthusiasm displayed by students and faculty.

The studies from 2009 illustrated that cost alone was not the paradigm shift that the e-text world was looking for. Kuzma, Kuzma, and Thiewes (2013) reported that according to a 2011 study by the American Enterprise Institute that college textbook prices had risen 812% since 1978, exceeding the 559% increase in tuition and fees over the same 30 year period. Despite all the noise about e-readers and e-texts, the evolution to digital is happening at a measured pace with only a small fraction represented by a digital version of a traditional printed book. (McFadden, 2012)

In 2010, Bruce E. Massis stated that it has been difficult, and perhaps too soon, to assess the overall impact of e-readers on student learning. Data is starting to emerge. Massis went on to ask as "evolution continues, is the plethora of electronic e-book readers and hand-held, multi-functional devices designed to download and read electronic books changing the reading habits of college students?" (Massis, 2010)

The study completed at Minnesota State University, Mankato (Kuzma, Kuzma, & Thiewes, 2013) demonstrated that the reading habits of college students, along with their preference in reading medium, were to choose the traditional text as opposed to the e-text. They were asked what their preferred text would be if all costs were equal. 69% preferred the traditional text, 20% preferred a customized text prepared by

the instructor, and only 9% gave a preference of the online e-text. "Thus, even though price is the most important factor in textbook selection, which would support online text usage, students indicated a strong preference for the traditional text in terms of ease of usage and convenience." (Kuzma, Kuzma, & Thiewes, 2013)

The final perspective shared in this research comes from (Miller, Nutting, & Baker-Eveleth, 2013): "In spite of the rapid growth and development of e-books and e-textbooks, little research on it exists. What we know comes from student surveys and anecdotal evidence in the discussion of the pros and cons of e-textbooks and their print alternative."

### 3. The DSU Experiment

Dakota State University is located in the community of Madison in East-Central South Dakota. It is home to approximately 3100 undergraduate and graduate students. By mission, it is the technology university of the South Dakota Board of Regents' (SDBOR) six university system. The campus has enjoyed a completely wireless internet infrastructure since 2002 and since 2005 it has been designated as a wireless mobile computing campus. Each student has a mobile computing device, and every classroom is a computer lab. The university through its Information Technology Services (ITS) supports multiple device platforms, including the Fujitsu tablet (convertible laptop) and the MacBook Air series of laptop computers. Students lease the computers semester-to-semester from the university, which has a 2 year lease with the vendors. At the end of the lease period the computers are offered for sale to the students based on the residual value of the lease. In addition the students may opt out of the program by buying an approved device.

The campus environment is one that ideally should support the concept of e-texts and many forms of digital learning materials for the students and faculty. The Desire 2 Learn (D2L) Learning Management System is employed on campus. The students access the web and login to their D2L site to obtain course material. It was in this system (D2L) that the link to the CourseSmart e-text was made available to the students of the pilot. The students would authenticate to the D2L learning management system and then would have direct access to the e-text.

The curriculum selected for the pilot was CIS 332 – Systems Analysis and Design (Systems). Systems is a required course in many undergraduate technology majors. It walks the student through the system development life cycle (SDLC) by way of 4 functional areas, planning, analysis, design, and implementation. The text book for the course was Systems Analysis & Design fifth edition by Alan Dennis, Barbara Haley Wixom, and Robert Roth. This has been the text of choice by the instructor for multiple years.

#### 4. The Students

In keeping with the goals of the pilot, The Systems course had multiple section offerings. In particular there was a 9:30 AM section and an 11:00 am section held on Tuesdays and Thursdays. Both sections were delivered in the face-to-face environment.

It was determined that the pilot would allow students to self-select the sections, so in early summer of 2013 an email message was sent to all students of the two sections. The purpose was to explain the pilot program, and to discuss options that the students had relative to participation. Four options were provided to the registered students: 1) make no change to your registration, 2) change sections, 3) complete the course online with a different instructor, or 4) drop the course and wait till the next offering of it.

The cost of each method was provided to the student by the BOR. The textbook in use by Systems was printed in 2012, so used copies did exist for those students selecting the hard copy textbook section. The cost of a used copy would be less than the \$174.95 rack rate provided by Wiley Publishing. The cost of the e-text was fixed at \$59.50, the negotiated rate between Wiley and CourseSmart.

The pilot section consisted of 31 undergraduate students and the comparative traditional section contained 41 students. A note based on the size of these course was that each section employed two faculty members, so the course was team taught by instructors from the College of BIS.

Another note to insert into this research is that there was limited migration between sections. All of the students who were in the section chosen to use the e-text stayed in that section. There was one student that moved from the

traditional text book section to the e-text section.

All quizzes and exams were open book, open resources and were taken online from the D2L learning management system. All students were well versed in the content management system employed by Dakota State University.

#### 5. Pretest

An eleven question survey was administered to the students participating in the e-text pilot on the first day of the fall 2013 classes. Twenty of the Thirty-one undergraduate students given the survey URL completed the survey (65% participation rate). The pretest survey focused on four areas: 1) student experience with an e-text reader, 2) to find out if the student had used an e-text reader in an academic setting, 3) how prepared the student felt they were entering this pilot, and 4) what expectations the students had of the e-text reader.

Four of the twenty participants declared themselves to be regular readers of electronic or digital books, while five reported having never used an electronic reader. The majority rated themselves as having read a couple books (11 of 20).

When asked if they had ever used an electronic book in an academic setting, 65% (13 students) responded "Yes". Taking these 13 students to the question of rating your academic experience with an electronic book, 3 rated the experience as positive or very positive, 3 rated the experience as negative or very negative, and the remainder were in the categories of being somewhat positive or negative with their experiences.

The next question dealt with the preparedness of the student to use an e-text. Six students reported that they felt prepared (30%), seven students reported being somewhat prepared (35%), and four selected somewhat unprepared (20%).

The final category of the pretest was the area of expectations. There were four questions that focused on expectations and a seven point Likert scale was employed to evaluate student responses.

The first question was on the e-text features. Thirteen of the twenty respondents (65%)

responded positively that they agreed, or somewhat agreed that the features would positively impact their performance in the course. Five (25%) students had a response that placed them in the neutral category while two students (10%) disagreed on the positive impact the e-text reader would have.

The second question dealt with convenience of the e-text as opposed to a regular text book. Four of the students (20%) gave the convenience factor a rating of 1 (strongly agree), and overall, eleven (55%) felt that the e-text would be more convenient than a regular text book. Five respondents (25%) were in differing levels of disagreement with the concept of the convenience of the e-text.

Ease of use was the third expectation category that was queried. The results of this question were similar to the first two questions with twelve (60%) of the students saying that they were in agreement (strongly, or somewhat) while four (20%) were in disagreement.

The final area of expectations to review is the area of positive impression of electronic textbooks. The evaluative trend continued with twelve (60%) of the students saying that at some level they had a positive impression of electronic textbooks. Five students (25%) responded that they were neither in agreement nor disagreement with the impression while three replies (15%) disagreed or strongly disagreed and had a negative impression of the delivery mechanism.

### 6. Posttest

The posttest survey was provided to the students during the final week of classes. An untimely technical snafu created by system level staff caused quite a bit of consternation with the students at Dakota State University as well as system wide. It is certainly possible that the results of the posttest have been skewed by this unfortunate incident. The posttest focused on three overarching areas, those being functionality of the e-text, student observations, and technical issues. Seventeen DSU students replied to the posttest.

E-text functionality according to the results of the posttest survey went unused by a large percentage of the students. Highlighting, adding notations, adding bookmarks, and printing was never used by up to 88% (15 of 17) students,

with the "never" rating given from 59% of the time up to 88%. Obviously these functionality features, which added to the cost of the e-text were not desired or at a minimum explored by the students at DSU. A document was created by CourseSmart that outlined e-text functionality and provided step-by-step directions for using the e-text. The document was linked within D2L as an additional resource.

Student observations demonstrated a negative trend of opinions by the students. The ten categories and the Agree, Neither, and Disagree percentages are included in the following table.

<u>Student Observations</u>			
	<u>% Agree</u>	<u>% Neither</u>	<u>% Disagree</u>
I would enroll in another course	11.8	23.5	64.7
I would recommend an e-text	17.6	11.8	70.6
I would choose an e-text	23.5	11.8	64.7
I would like other course with e-text	11.8	23.5	64.7
Instructor made use of e-text	76.4	11.8	11.8
Important that I read the e-text	47.1	35.3	17.6
Features of the e-text were positive	17.6	23.5	58.9
E-text more convenient	29.4	23.5	47.1
E-text easy to use	17.6	17.6	64.7
I have an overall positive opinion	11.8	23.5	64.7

Table 1: Student Observations

In excess of 88% of students reported technical issues with the e-text. As mentioned earlier in the paper, much of this came late in the semester. 23.5% reported experiencing technical issues during setup of the e-text. Since the reader came preloaded in the Desire 2 Learn course room we must assume that the technical issues came between the student's computer and browser compatibility as there was no real setup to complete and there were no qualifying questions asked of the students.

In reviewing the subjective comments provided by the students a few themes became obvious: 1) not being able to use the Chrome web browser, 2) not having full page reading

windows, and 3) numerous times that the e-text reader was not available for the student.

Since Chrome has recently overtaken Internet Explorer as the number 1 rated web browser it would appear that this concern was real. With regard to the second point, students were able to access the source code and create a larger reading area. This is something that perhaps not every campus or class would have the expertise to complete. And finally, the unavailability of the reader was caused by human error at the system level near the end of the pilot.

### 7. Comparison of Pretest and Posttest

The comparison of results from the Pretest and the Posttest clearly illustrated that the optimism shared by the students in the course in late August of 2014 had paled considerably by early December of 2014.

In the Pretest 65% of the students reported they had used an electronic book in an academic setting. 15% of the students rated the experience negatively. In the Posttest 70.6% of the e-text and 64.7% stated they would not enroll in another class utilizing this technology.

In the topic of features of the e-text, 65% of the students in the Pretest responded positively that the features would have a positive impact on their course performance. In the Posttest 82.4% of the respondents had either no opinion or disagreed that the features were positive.

During the Pretest 55% of the students replied that they felt the e-text would be more convenient than a traditional text book. During the Posttest 70.6% of the respondents had either no opinion or disagreed that the e-text was more convenient.

The third expectation category was that of ease of use. The results of the Pretest had 60% of the students in agreement that the e-text would be easy to use. The Posttest results had 64.7% of the respondents disagreeing that the e-text was easy to use.

The final comparison that was made for this study was that of an overall positive opinion of the e-text. The student perception in August had 60% of the students saying that at some level they had a positive impression of an e-text. The results of the Posttest had 11.8% of the

students having a positive impression while 64.7% did not.

### 8. IDEA Surveys

Dakota State University employees the Individual Development and Educational Assessment (IDEA) Center evaluative surveys for assessment and feedback purposes to each section of each course on a semester by semester basis. The surveys for the course and sections in question focused on seven academic areas:

1. Gaining factual knowledge
2. Learning fundamental principles
3. Learning to apply course materials
4. Developing creative capacities
5. Learning how to find and use resources
6. Learning how to analyze and critically evaluate
7. Acquiring interest to learn more

Points 1 and 6 were deemed essential while the other 5 were categorized as important. The students used a five point Likert scale as developed by IDEA to evaluate the statements.

The values used in the survey were as follows:

1. Definitely False
2. More False than True
3. In Between
4. More True than False
5. Definitely True

A table below illustrates the replies of the students relative to the 7 categories. The number represent the percent of students giving a rating of 4 or 5 in the specific category:

Category / Topic	
e-text	Book
1. Gaining factual knowledge	
71	85
2. Learning fundamental principles	
79	90
3. Learning to apply course materials	
79	85
4. Developing creative capacities	
86	80
5. Learning how to find and use resources	
71	85
6. Learning how to analyze & critically evaluate	
71	95
7. Acquiring interest to learn more	
77	85

Table 2: Student Percentages

As mentioned above, categories 1 and 6 were deemed essential when the faculty member completed the faculty information form for the IDEA survey.

### **9. Comparing E-Text Pilot with Traditional course**

The sections of the course were taught during consecutive class times, in the same classroom, on Tuesday and Thursday mornings. The traditional section was held from 9:30 AM to 10:45 AM and the e-text pilot section followed at 11:00 AM till 12:15 PM.

The deliverables for the class consisted of twelve (12) assignments, six (6) objective quizzes, and two (2) objective exams. The performance of the two groups of students was comparable, with the traditional section averaging 86.15% and the pilot section averaging 84.75%.

The pilot group did slightly better in the quiz area (85.03% to 84.23%) and in the exam area (81.96% to 81.13%) but slightly worse in the assignments (86.25% to 90.03%).

Survey results and comments made by students participating in the pilot made reference to how easy the search function was in the e-text, so this could have been a determinant in higher quiz and exam scores.

### **10. The system-wide study**

To this point the results have focused on the specific answers from the students in a major specific course at one university. The system-wide study consisted of 6 courses and 6 universities. All six participated in the pretest, with one course not replying to the posttest. A total of 171 students from five universities completed the posttest survey with 149 (87.1%) students responding from general education courses, specifically, Psychology 101 and U.S. History.

As mentioned earlier the Items in this section used a 7/point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree) and 4 as the neutral mid/point. Thus, mean ratings shown below which are below 4 trend in the direction of more agreement and ratings above 4 trend in direction of disagreement. Overall a relatively small number of students were truly neutral, however the balance of student's opinion on both sides produces means that are

near neutral. The mean rating can be used to gain a general understanding of the degree of agreement or disagreement and the percentage provides a look at the distribution on either side of neutral.

The overall results, while still demonstrating that the students were more optimistic during the pretest, or more pragmatic at the conclusion of the semester of studies did not contain the extreme shifts in student opinion that the DSU course contained.

The most commonly used feature was the search box, followed by the Table of Contents. Use of advanced features dropped off notably after the top two with highlighting ranked third based on average frequency of use, although only 27% of students used highlighting more than rarely.

The use, or lack of use, of the advanced features may be cause for concern. The limited research available on eText suggests that students who utilize the advanced features typically report a better educational experience and more satisfaction with electronic texts. Confirming this general finding is that correlations between the reported frequency of various feature use for each and self/reported positive impression and positive academic impact were small but positive (as feature use increased so too did overall impression and perceived positive academic impact). One possible interpretation is that the features were not useful and thus were not regularly used. However, so few students regularly used advanced features, it is a more likely conclusion that student attitude moderated behavior (i.e., they didn't use the features because they didn't think they were useful).

With respect to convenience, students reported that the eText was slightly less convenient than a paper textbook. Of the four general impression items, this one had the highest degree of disagreement both in terms of mean rating and percentage of students reporting some level of disagreement. This is a concern for future use and the correlation between convenience and future use items ranged from .75 to .83 and had the highest correlation with overall impression (.87) of any other survey question. This is also the items with the largest change in rating between the pre/course survey and the post/course survey.

In the area of ease of use the results may appear positive with 60% percent of students agreeing that the e-text was easy to use, however the mean rating of 3.5 on a 7 points scale indicates that most were reserved in their level of agreement and 31.2% of students disagreed that the eText was easy to use. Ease of use is positively correlated with overall impression (.83), future eText use (.71), eText use (.65) and specific feature use (ranging from .12 for printing pages to .36 for searching feature). Student comments also suggest usability of eText could be improved and contributes to their overall impression.

Overall student impression was nearly neutral, on average (3.94), but with slightly more students agreeing that they have a positive impression (45.9%) than those disagreeing with that statement (40.6%). This is neither encouraging nor discouraging and suggests a fair amount of individual variation in student opinion. Thus the technology, like many others things appeal to some students and not to others.

Seventy three students (42.9%) reported some technical difficulties with the e-text system. Those who reported experiencing technical difficulty rated the severity of the difficulty on a 4 points scale (results reported in Table 6) with 1 being the most severe and 4 being least severe. As should be expected, the experience of technical difficulty negatively impacts all measures of impressions of e-text.

Overall the biggest area of concern of the system-wide pilot was the experience of technical difficulties. Just over 40% of respondents reported having difficulties that were, on average, described as moderate, which qualified as problem(s) made use of the e-text frustrating or inefficient.

## 11. Conclusion

This paper concludes by reviewing the 8 goals that the pilot began with in the RFI.

1. Student attitudes were collected and evaluated with the Pretest and the Posttest. Cost was not mentioned by the participating students even though it was a purpose of the study.
2. The e-texts were accessible and printable but few students saw the printing function as a benefit.

3. Enterprise technology support downfall played a large role in the outcome. Reliability of access is vital if an e-text is going to be a requirement.

4. A recommendation for a business plan which includes e-texts cannot be given based on 1 pilot.

5. The interface with the system-wide LMS worked appropriately.

6. The e-text systems did not encounter any negative issues with platforms or devices, but did have an issue with web browsers.

7. Unlimited access to the content was not an issue until the system-level support failed to deliver access to the e-text at a critical time. Investigation found that this was a human error, not a system error or an e-text error.

8. As mentioned in #2 above, printing is just not an issue since the DSU campus was an early adopter of LMS usage and ubiquitous technology via the wireless network employed on campus.

In simple terms, there exist two schools of thought on the subject of e-texts. The first holds that paper is far superior and will never be replaced by screens. The second school favors the use of e-texts, citing ease of storage and retrieval, flexibility of structure and saving of natural resources as major incentives. (Dillon, 1992)

For more than twenty years the debate regarding paper or digital images has been waged. It is obvious that this pilot did not answer the question entirely. The 21<sup>st</sup> century consumers are still debating the issue as their perceptions were seemingly not met.

The e-text faces the challenge of being all things to a generation of consumers with smartphones in their pockets and social media as their backdrop of sharing information as well as opinions.

Ferris Jabr (2013) writing in *The American Scientific* posits as follows: "But why, one could ask, are we working so hard to make reading with new technologies like tablets and e-readers so similar to the experience of reading on the very ancient technology that is paper?"

Research for this paper has shown that a rather large factor for this pilot was cost. But as



reported in item 1 of the conclusion, the factor of cost was not mentioned by the participating students. When presented with the option to complete the course with an e-text as opposed to the traditional text book at a lower cost the students chose to not make a change in course sections.

U.S. News & World Report published an article (Jacobs, L. & Hyman, J, 2010) that enumerated the top 10 annoying things at college. Coming in number 10 and after such notable issues as food, roommates, parking, and accessing the campus network was cost. One solution was to reduce college costs by replacing textbooks by buying e-texts.

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