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Business Students' Learning Engagement as a Function of Reading Assigned E-Textbooks

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RUNNING TITLE: BUSINESS STUDENTS' LEARNING ENGAGEMENT

Business Students' Learning Engagement as a Function of Reading Assigned E-Textbooks

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ABSTRACT

In this chapter we report findings from a quantitative and qualitative pilot study of students from a single university setting in the northeastern United States. The majority of participants were enrolled in either face-to-face or online sections of a business course in organizational behavior, and the textbook modality included both open (PDF) and proprietary (CourseSmart) digital formats. The key research questions focus on the degree to which students feel satisfied with electronic textbooks (e-textbooks). We also explore correlates of students' satisfaction and their positive attitudes regarding the functionality of the use of e-textbooks by examining the impact of prior coursework and students' concurrent use of other Internet sites, e.g., social media networks, while reading e-textbooks. Specifically, we explore the extent to which students' positive attitudes toward the functionality of e-textbook use is sufficient to result in students' engagement. Engagement is measured via their intentions to buy additional e-textbooks in the future, their course grades, and their perceptions of comprehension of the material over time. Students' overall satisfaction with the e-textbook is likewise explored to determine impact on the same measures of engagement.

Keywords: electronic textbooks, e-textbooks, digital reading

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INTRODUCTION

It would appear that electronic and open textbooks are now fully on the radar of colleges and universities in the United States. To understand why this is so, one must cast a wide net around driving factors. They span from campus strategic priorities and resource constraints to national level concerns over access to education, and from student behaviors to economic realities. In the decision to adopt an electronic textbook (e-textbook), faculty preferences matter. Student preferences also matter, and publishers' electronic offerings matter. That operating resources on college campuses are uncertain, and that administrators are worried about being able to invest in capital improvements and human resources in future decades is a vast understatement. Campus leaders across the nation are spending increasing amounts of their time strategizing ways in which they can protect the academic core of their institutions, and at the same time keep the educational engines revving in the midst of dramatic cutbacks in support from state and federal sources.

In this chapter we first briefly explore the factors that are causing renewed interest in e-textbooks on college campuses. Some forces center on student behavior and the learning strategies they employ, and others are driven by harsh economic realities. By knowing more about these forces we can better understand the e-textbook usage trends, students' reactions to e-textbooks, and the ways in which e-textbooks stand to alter engagement in the future. These forces prompt change, and it is important to put them in the proper context as we explore students' satisfaction with e-textbooks, and the possible promulgation of e-textbook use across the higher education landscape. In this discussion we share findings from previously published research on students' reactions to e-textbook use, and on the associated student learning

outcomes when e-textbooks are used. We also explore possible precursors and correlates of students' satisfaction with e-textbooks as suggested by the literature. Lastly, we present research questions that informed a pilot study of student outcomes associated with e-textbook use at a single public university in the northeast United States over the course of three semesters (Fall 2010, Spring 2011, and Fall 2011). Both quantitative and qualitative findings from this study are reported. Results indicate that while students appreciate the benefits e-textbooks offer both in terms of access to learning materials and in terms of engagement, student grades decreased as satisfaction increased. We explore the implications of these findings, offer suggestions for future research, and provide practical advice on the use of electronic resources in college classrooms.

THE TEXTBOOK QUESTION

Public Outcry over the Cost of Textbooks

The fact that textbook prices have begun to represent a serious problem for both colleges and students is no secret. The average cost of textbooks required of a student in a given semester has risen substantially over the last two decades, at a rate estimated to be well over twice that of inflation, according to a report produced by the U. S. Government Accountability Office ([GAO], 2005). And, as a percentage of total tuition costs per year, the GAO report indicates that the estimated cost of textbooks and supplies as a percentage of tuition and fees per year ranges from 8% at a private non-profit four-year school, to 26% at a public four-year school, to 72% at a public two-year school. On average, a single college textbook costs \$125, but in some disciplines this price climb is much higher (Miller & Baker-Eveleth, 2010, p. 39). Textbooks are one of the few one-time large scale purchases made during a semester, and may possibly be the only one for which there are multiple competing sources for the same product, available in multiple formats, and at vastly differing price structures (Beliveau, Hicks, & Stone, 2011).

Textbooks are often bought last, after all other college expenses have been settled, and are often paid for out of pocket. When low and middle-income students do receive grant money to support their college expenses, many fail to receive sufficient funds to cover the cost of their assigned books, and when they do, financial aid checks are often received late, after classes have started (Advisory Committee on Student Financial Assistance, 2007, p. 2).

These factors result in textbook costs falling squarely under a large and very bright spotlight, and there is a nationally growing degree of protest and push back about costs from consumers (Nicholas, Rowlands, & Jamali, 2010). A network called the Textbook Rebellion, supported by the Student Public Interest Groups, is reaching out to broad audiences spanning campus administrators, faculty, parents, and students (Allen, 2011). The Higher Education Opportunity Act of 2008 was passed in an attempt to lessen student debt by, in part, controlling the manner with which faculty and college bookstores report books selected for courses and the associated costs of each book at the time that students are able to register for courses. The Act is intended to give students ample time to search for the least expensive outlet from which to purchase their books (Smith, 2010). The upshot of these factors is that students have plenty of motivation to reduce their financial burden by buying books via online wholesalers, purchasing illegal copies of reproduced books, or sharing copies with other students (Young, 2010a). Reacting to the increasing cost of textbooks, one student newspaper put it this way, "Give us cheap books, and we will give you expensive minds" ("Survey says," 2011, para. 11).

Access to Higher Education and Assessment of Student Learning Outcomes

What is the real cost of students' inability to pay for textbooks? It boils down to access to education; access is the most compelling driver of e-textbook consideration for campuses. As an element of the overall cost of higher education, climbing physical textbook costs have

resulted in students deciding to go without textbooks for classes in which they are enrolled and, in some cases, have kept students from enrolling in college at all. For those who do enroll, one can assume that students who are not reading assigned books are not learning at an optimal level. Thus, the assessment of learning outcomes has become an important goal of researchers who study the impact of alternative textbook models, e.g., electronic and open texts (e.g., Baker-Eveleth, Miller & Tucker, 2011; Ovadia, 2011; Petrides, Jimes, Middleton-Detzner, Walling & Weiss, 2011).

The State Council of Higher Education for Virginia reports that about 40% of their students did without some of the required books for one semester (Dawkins, 2006, p. 30). According to the National Association of College Stores [NACS] (2011), approximately 60% of college students choose not to buy all of their course materials. The U.S. Public Interest Research Group, a consumer-advocacy organization, found a full 70% of 1,905 undergraduate survey respondents reported not buying a textbook at least once because they could not afford to do so. Among this sub-group, 78% “expected to perform worse” (Redden, 2011, para. 4) in classes for which they did not purchase the book. These statistics are staggering when one considers that without textbooks the student relies only on his or her ability to learn from classroom experiences or summaries of materials posted, for example, on course learning management systems. How can we expect students to learn effectively without required books (Bell, 2010)? And, how can we prevent grade inflation and regression to the mean in terms of the quality of instruction on the faculty side of the equation when students come to class so inadequately prepared to learn?

Officials at Daytona State College in Florida were so concerned about the increasing percentage of textbook costs in their students' budgets that they developed a relationship with

several textbook publishers to secure cheaper digital editions of textbooks by buying them in bulk. Books were then made available to students for a vastly reduced course materials fee that substantially lowered their overall textbook expense (Young, 2010a). Though this program is now in question following a change in leadership and mixed student satisfaction reports (Kolowich, 2011; Graydon, Urbach-Buholz, & Kohen, 2011), the model stands as an important benchmark for other schools to learn from. Centralizing the purchase of textbooks at the college level to permit economies of scale is what one administrator at Indiana University at Bloomington refers to as “moving the tollbooth” (Young, 2010a, para. 14). At Indiana an experimental arrangement with a company called Courseload was initiated to determine the value of a books-for-fees system for both their students and academic departments. In this arrangement Courseload provided digital content by striking agreements with multiple publishers, including McGraw-Hill, Pearson, and John Wiley. Projections of fees to be charged to students were anticipated to be \$35 per course per semester (Young, 2010a).

Bookstores report extremely low profit margins on books, and their sales are declining. One bookstore manager stated that the profit margins on textbooks are surprisingly low and in fact, potato chip sales have a higher profit margin. That same bookstore manager describes herself as a “buggy whip salesman” (Young, 2010b, para. 4), referring to the obsolete nature of the traditional college textbook and the need to explore new ways to add value to the campus operation. In what may be an illustration of the changing preferences of students and the obsolescence of hard-copy textbooks, the NACS is now building its own software to deliver e-textbooks (Young, 2010b). On average, the cost of digital textbooks is reported to be 52% lower than the cost of physical, printed textbooks (Allen, 2010, p.5). Despite this fact, many research reports claim that students still prefer to read books the traditional way, via the printed page. A

2011 study conducted by OnCampus Research reports that 75% of students prefer printed textbooks over digital books (NACS, 2011).

LITERATURE REVIEW

Student Reactions to E-textbook Features

One of the reasons commonly given for students' failure to embrace e-textbooks is dissatisfaction with their initial experiences using an e-textbook (Baker-Eveleth et al, 2011). Digital reading requires an additional set of skills for learning, comprehending, and interacting with technology (Coiro, 2003). These skills rely on a foundation of traditional literacy, research skills, technical skills, and critical analysis (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006, p. 4), leading to a new participatory culture "that make[s] it possible for average consumers to archive, annotate, appropriate, and recirculate media content in powerful new ways" (p. 8). It could be that reported dissatisfaction with e-books is a reflection of the students' need to develop some of these new literacies skills. This is indicated by the Daytona State report that students are particularly sensitive to the complications of downloading and using reader software necessary to utilize e-textbooks. These students also struggled with basic e-textbook functionality, e.g., locating readings, creating bookmarks, using highlighting tools, and writing notes (Kolowich, 2011). Conversely, students' confidence with their computer skills were suggested to be one possible predictor of self-selection into class sections for which e-textbooks were used (Miller & Baker-Everleth, 2010). It may be that additional preparedness in other courses using digital technologies, such as English Composition (which includes research using online databases), could have an impact on e-textbook reading comprehension and retention, but, heretofore there is no evidence of such a link in the literature. New literacies research, specifically in cognitive conceptions of reading comprehension, is in its infancy, "...further

complicated by the fact that the technologies of online reading continue to evolve at a rapid pace" (Hartman, Morsink & Zheng, 2010, p. 154).

Research indicates a positive, significant relationship between a person's attitude towards and intent to use technology based on what they perceive to be its usefulness and ease of use. (See: Davis' Technology Acceptance Model (TAM) (1989); Sun, Tsai, Finger, Chen & Dowming (2008); Chung (2010)). Weisberg (2011) observed this during his two year longitudinal study of college business student attitudes and behaviors towards the use of digital textbooks in the classroom. Early in the study, students considered e-textbooks as "two generations away from readiness" (p. 191). At the study's close, 87% of participants reported a preference for e-textbooks and 91% were very interested in using an e-reader as a primary or secondary textbook (p.194). Portability, note taking, and the ability to find information easily are common features explored in research on students' use of e-textbooks.

Some students report their belief that technology helps them do their work faster (Dahlstrom, Grunwald, de Boor, & Vockley, 2011; Weisberg, 2011). 61% to 78% of surveyed students have confidence in their ability to use e-textbooks (Roscorla, 2011; Dahlstrom et al., 2011), while a growing minority (31%) prefer their instructors use more e-books or e-textbooks (Dahlstrom et al., 2011). In fact, 50% of students in a 2010 survey identified e-books and e-textbooks as technologies having a significant impact on their overall learning (Cengage Learning and Eduventures, p. 23). At least one research report suggests that up to 42% of students say they would use additional e-textbooks if only given a chance to do so (Garneau, n.d.; Dahlstrom et al., 2011).

One way faculty and students can increase e-textbook use is by selecting open textbooks. Faculty members will consider adopting an open textbook in order to save students money as

long as the text is of high quality and easy for the student to access and use (Petrides et al, 2011, p. 43). Likewise, Petrides et al found that 67% of the students in their study preferred using the open textbook because of its ease of use in terms of being able to access specific locations in the book via the instructor's use of a URL, and due to their ability to access the book from a lab, in the classroom, on public transport, during class breaks, etc. This easy access to content provided students the ability to better manage their time in light of other family and work obligations (p. 44).

Predictors of E-textbook Use: Subject Engagement

Reading an e-textbook presents opportunities that a printed text does not: the reading device, often a laptop, can be an effective study and research tool as well as a gateway to deeper subject engagement via the Internet. There is a positive correlation between student use of technology and measures of engagement in certain online learning activities such as discussion boards and accessing library databases (Chen, Lambert & Guidry, 2010). Today's students view the Internet as an indispensable part of their lives (Chou, Wu & Chen, 2011), where they can participate in both formal and informal learning cultures. They recognize the "importance of online information to broadening their knowledge base, to enabling them to do creative and interesting things, to facilitating their school work and life routines, and to societal progress" (p.944). When asked to name the one website a student could not live without, Google and Wikipedia were the top two identified (Dahlstrom et al., 2011). 82% of students surveyed use Wikipedia as a starting point for background information, and the strongest predictor of Wikipedia use was also using Google for course-related work (Head & Eisenberg, 2011). Wikipedia exemplifies an "online collective intelligence community" (Jenkins et al., 2006, p. 43)

where students must draw on critical analysis and judgmental literacy skills. The motivated student will expand their search beyond Wikipedia (Chung, 2010).

Instructional technology can increase the amount of time a student spends on a given subject, and there is a positive and relatively strong relationship between effective education practices, student self-reported educational gains, and the use of learning technology (Coiro, 2003; Laird & Kuh, 2005; Chen, Lambert & Guidry, 2010). 86% of students report their academic engagement has improved as they have increasingly used digital tools in their coursework; 31% identify e-textbooks as having the potential to improve engagement and learning outcomes (Cengage Learning and Eduventures, 2010).

Business students, in particular, seem to have an affinity for e-books. In the United Kingdom study business and management titles were found to have been viewed more frequently for longer periods of time, and the use of business titles over time increased at a rate that was higher than that for other subjects (Nicholas et al., 2010). The management title, *Organisational Behaviour and Analysis: An Integrated Approach*, was the most popular e-book, attracting "82,787 page views in the 14-month survey period" (p.269), and "used by 955 students in the entry survey and by 1068 in the exit survey" (p.270). It was also the most recommended e-book (by 21.1% of business and management staff). Across survey administrations of the same students, positive recommendations increased by 10.4% for the business e-textbook.

Correlates of Student Success using E-textbooks: Multitasking and Preparedness

There is evidence suggesting the number of hours spent studying with digital or print textbooks is not as important as the techniques students employ while reading the textbook. Students completing annotations while reading e-texts performed better in their tests and exams (Dominick, 2005; Erturk & Keen, 2010). Students who multitask while studying have been

found to take longer to complete their task and have a lower academic performance (Gurung, 2004; Bowman, Levine, Waite, & Gendron, 2010; Kraushaar & Novak, 2010). Gurung (2005) correlated reported study techniques with exam scores of 229 introductory psychology students and found that reading notes, reading the text, and using mnemonics were significantly related to exam scores. Multitasking activities such as listening to music or the TV and responding to emails while studying were negatively correlated with exam grades. Experiments by Poldrack (2006) indicate high frequency multitaskers use a different part of their brain (the striatum) to gain knowledge and are unable to generalize that knowledge when tested. Interestingly, a study comparing student reading task performance under three conditions (active multitasking, passive multitasking, or reading in silence) indicated students who were comfortable with the subject material performed best when there was a video playing in the background while studying (Lin, Robertson, & Lee, 2009).

In today's participatory culture, students must learn "how to distinguish... between being off task and handling multiple tasks simultaneously" (Jenkins et al., 2006, p. 36), as these are the challenges they will face in their future work environment. Research shows that students are judiciously managing how and when they access the other programs on their laptop or mobile devices (Head & Eisenberg, 2011). Hundreds of students from all types of United States campuses were interviewed to learn how they balance productivity while surrounded by technology. Many of the students considered technology management to be a "practical necessity" (p.28) when studying, especially in the final weeks before exams. After a self-defined period of reading time or completion of a specific task, students describe rewarding themselves by checking for messages or taking a Facebook break (Head & Eisenberg, 2011).

Continued research in student attitudes towards and experience with e-textbooks is required due to the constantly evolving format and delivery platforms. "We live in a society that is experiencing an explosion of alternative texts" (as cited in Coiro, 2003, p. 14). Jenkins et al. (2006) remind us,

The range of opportunities and the transformative possibilities for learning at all levels as a result of readily available and emergent digital technologies are broad.

The transformation in knowledge conception and production as a result of these new technological practices must be considered (p. 194).

In that spirit this study was conducted to: (1) explore student satisfaction with e-textbooks; (2) analyze whether prior coursework predicts students' satisfaction with e-textbooks; (3) investigate the impact of students' concurrent use of other Internet sites while reading; (4) consider how student satisfaction and positive attitudes with e-textbooks correlate with student engagement.

Research propositions follow:

Proposition one. Students' prior preparation in key disciplines such as English Composition, Math, and Computer Literacy will positively impact their level of satisfaction with the use of e-textbooks.

Proposition two. Students' multitasking use of social networking sites, online shopping sites, and Wikipedia while reading e-textbooks will positively impact their level of satisfaction with the use of e-textbooks.

Proposition three. Students' level of satisfaction with the use of e-textbooks will positively impact their level of engagement with the coursework.

METHODOLOGY

Sampling Frame and Research Design

Field survey methodology was employed to gather both quantitative and qualitative data. A single public university setting in the northeastern United State served as the field site. Human subject review approval was sought and received for the use of the surveys. Sample size varied across the three survey administrations. Twenty variables were utilized to address the main hypotheses. Qualitative data was gathered through open-ended questions in the survey and group interviews.

Over the course of three semesters, undergraduate students (N=138) used a digital format of their required course text. 124 of the students were enrolled in an upper-level organizational behavior course with both online and face-to-face sections, all taught by the same instructor. There were also 14 students enrolled in non-business courses (English, health science, education, and geology) who responded to a flyer seeking participants for a study of student use of e-textbooks. The flyer stated participants would receive one free e-textbook for a class they were currently enrolled in (value to \$65). All participants received their e-textbook at no cost. The majority of participants (112/81%) attended face-to-face classes. 77 (56%) of the students were male; 61 female (44%). Participants were predominantly between 18-24 years of age (112/81%) and business majors (120/87%). Non-business majors included the fourteen self-selected participants. While there was a risk that self-selection would introduce a bias, the volunteers made it possible for us to deplete remaining funds and survey a small sample of students in other subject areas for comparative purposes.

This study utilized pre and post survey administrations and focus groups. Survey items were adapted from previously validated research work of Davis, Bagozzi, & Warshaw (1989), Scholnik (2001), Dominick (2005), and the National Survey of Student Engagement (2010). Focus group qualitative findings are reported herein only to the extent they may help us to

understand the empirical results and provide guidance for future research. The pre-survey was designed to gather data about possible precursors to student success using an e-textbook, while also establishing a baseline measurement of student attitudes toward printed and e-textbooks. Students were asked to select statements which best described their use of any course textbook and previous experience with e-textbooks specifically. Participants were also asked how many hours they spent per week engaged in eight Internet activities such as visiting social networking sites, shopping online, or researching by way of Wikipedia or the Library's website. Attitudes towards print/e-textbooks were measured through a duplicate set of statements wherein the first set referenced printed textbooks and the second referenced e-textbooks. Statements about print/digital books used a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The statements measured perceived usefulness ("I can easily find the information I need"), perceived ease of use ("...is portable"), study behavior ("I always highlight"), and intent ("I prefer reading an e-textbook").

The post-survey repeated the pre-survey's print/e-textbook statements in order to measure any changes in attitudes or behavior, followed by a series of structured and open-ended questions intended to measure: (1) subjective satisfaction with the e-textbook experience; (2) how the e-textbook was used; (3) multitasking while reading the e-textbook; (4) intent to continue using e-textbooks; (5) student learning engagement and e-textbook use. Sample items include, "Which of the following statements best describes how you used the e-textbook for this course?" and "Did you visit any of the following sites while reading your e-textbook?" Finally, survey measures of engagement included indicating agreement (five-point Likert scale) with statements such as, "When reading the textbook for this class online, I find that I am often motivated to do

on-the-spot Internet research or other Internet browsing related to the topics I read about in the book.”

Focus group questions investigated student experience with the e-textbook in the context of the course, as well as the electronic device being used to access the digital book. Participants were invited to discuss how they used the e-textbook, any difficulties they were having with it, and whether they were printing any content.

Procedures

There were three semesters of data collection with some variance in the e-textbook title students used. In the first and second semesters (Fall 2010; Spring 2011), 68 students enrolled in an organizational behavior course were provided access codes for their course textbook through the CourseSmart website. During the second semester, an additional 14 student volunteers read different titles in non-business subjects. Most of these other e-textbooks were published by CourseSmart; there were also a few NookStudy and Kindle titles. The third semester participants were exclusively those enrolled in the organizational behavior class. This time, students read an open version of their course textbook available online at FlatWorld Knowledge. At any point in the study participants could elect to purchase at their own expense a print version of their text from the campus bookstore.

Pre- and post-surveys were collected directly from the students during class visits by the researchers without the instructor present. Students were informed the instructor would not see any of their survey responses until after final grades were posted. Since all participants were enrolled in for-credit courses, the instructor wanted to insure there were no immediate barriers to learning that might prevent the students from reading their book. The pre-survey visits provided an opportunity for the researchers to demonstrate e-textbook features and answer any questions

the students might have regarding e-textbook access or the research in general. Midway through each semester, the researchers conducted focus groups. In all semesters, online students unable to be on campus were asked to complete an online survey containing the focus questions.

Measurement

As shown in Figure 1, student preparedness for the use of e-textbooks is modeled as being predictive of student satisfaction. Students' preparedness is captured via archival methods, by determining their grades in the highest math course taken and required in their degree programs. As the vast majority of students in our sample came from business programs, this

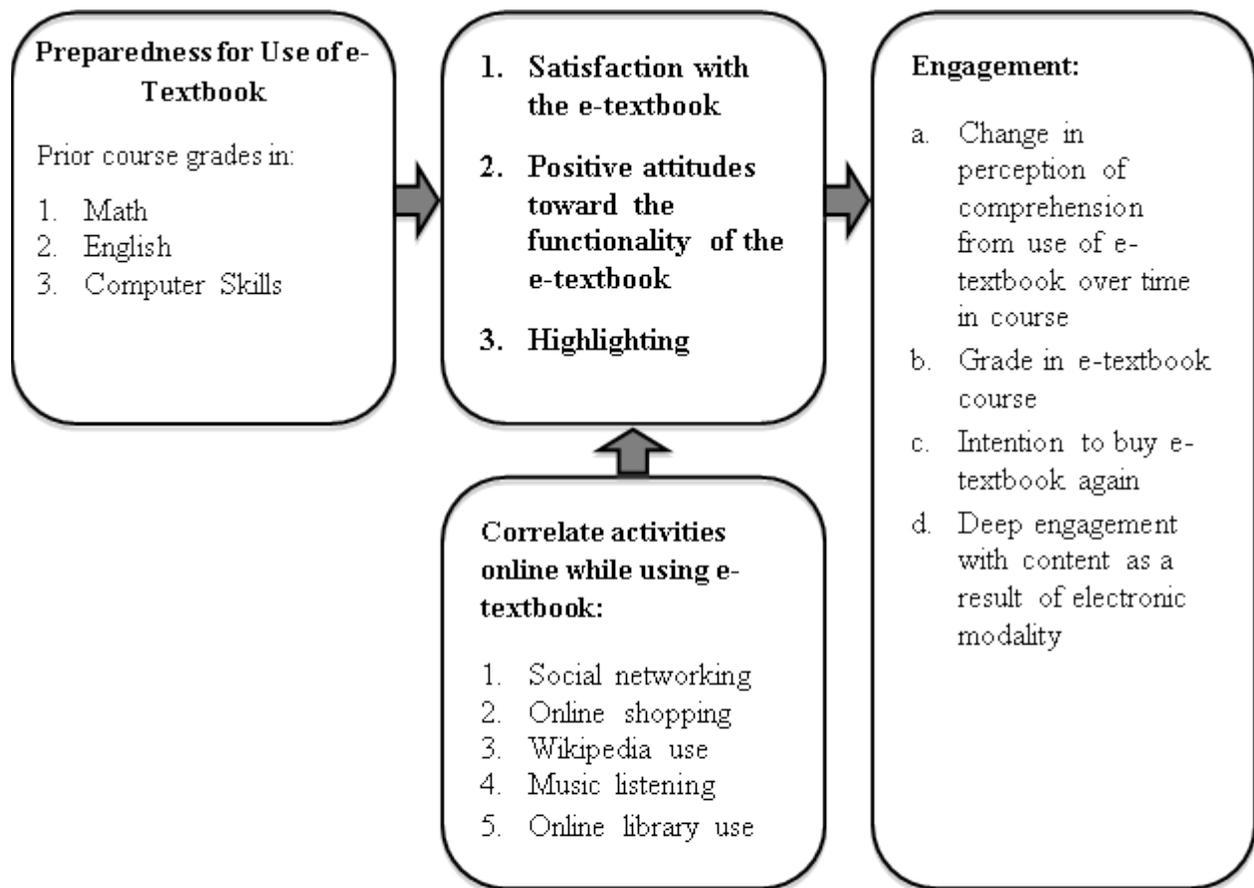


Figure 1. A research model of student engagement with electronic textbooks. This figure illustrates student preparedness and correlate online activities are predictive of student satisfaction and level of engagement with e-textbooks.

course was almost always calculus. The computer literacy course was likewise most often Computer Information Systems, a required course for all business majors. The English literacy course was English Composition, a required course for all students at the College.

Students' satisfaction with their e-textbooks was operationalized via the use of single items and of factor analytic methods across multiple items; factor analytic results are reported in the next section. In total, three aggregated measures for satisfaction and one single item measure are employed: overall satisfaction, satisfaction with e-textbook functionality early in the semester, satisfaction with e-textbook functionality late in the semester and, because of its prominence in the literature we explored, a single item to measure students' satisfaction with the ability to highlight text in the e-textbook.

Students' correlated activities while they were using the e-textbook included measures for: social networking, online shopping, listening to music, online library use, and Wikipedia use. These were captured in single-item measures designed to determine whether or not students accessed these sites while reading their e-textbooks.

Lastly, students' engagement with the course material was analyzed using a multi-measure approach. First, to gauge students' change in their perceptions regarding their own comprehension of the material over time, repeated items were utilized in pre- and post-survey administrations and an index of change was calculated. Second, archival methods were used by capturing students' actual grades in the courses for which e-textbooks were used. Third, students' intentions to buy e-textbooks again were captured via single-item measures. Lastly, students' "deep engagement" with the material was captured using the survey's engagement measures.

RESULTS

Hypothesis Testing

A total of twenty variables were utilized in the primary analyses. Descriptive statistics for these twenty variables are reported in Table 1, and correlations in Table 2. Factor analytic methods were utilized to create key variables in the research: Positive attitudes toward e-textbooks early in the semester (1 factor with an Eigenvalue of 3.065 and Cronbach alpha reliability of .80), positive attitudes toward e-textbooks late in the semester (1 factor with an Eigenvalue of 2.757 and a Cronbach alpha reliability of .788), overall satisfaction with e-textbooks (1 factor with an Eigenvalue of 2.398 and a Cronbach alpha reliability of .763), and students' engagement (1 factor with an Eigenvalue of 4.332 and a Cronbach alpha reliability of .891) with the e-textbooks. Factor analyses are reported in Table 3. Propositions were tested using ordinary least squares regression. Results are reported in tables 4, 5, and 6. A summary of findings appears below.

Control Variables

Three control variables are utilized in each of the equations: age, gender, and whether the student took a face-to-face course (coded as 1) or an online course (coded as 0).

Proposition one findings. Proposition one states students' prior preparation in key disciplines such as English Composition, Math, and Computer Literacy will impact their level of satisfaction with the use of e-textbooks. Results shown in Tables 4-a, 4-b, and 4-c indicate that proposition one is not supported. There were no findings in support of students' altered satisfaction as a direct result of students' prior coursework and, therefore, preparedness for the use of e-textbooks. Thus, using the three course grades in English, Mathematics, and Computer

Literacy as representative of preparedness, students seem to require no preparation to be satisfied with the use of the e-textbooks that they employed.

Proposition two findings. Proposition two states that students' use of social networking sites, online shopping sites, and Wikipedia while reading e-textbooks will have a positive impact on their level of satisfaction with the use of e-textbooks. Results shown in Tables 5-a, 5-b, and 5-c indicate that proposition two is only partially supported. Among the correlate activities explored, i.e., social networking, Wikipedia use, online shopping, library use, and listening to music, only Wikipedia use was found to be related to one of the measures of student satisfaction: their overall satisfaction. The Wikipedia use variable was found to be significant in predicting students' overall satisfaction at the .05 level of significance.

Proposition three findings. Proposition three maintains students' level of satisfaction with the use of e-textbooks will positively impact their level of engagement with the coursework. Results shown in Tables 6-a, 6-b, 6-c, and 6-d indicate that there is mixed support for proposition three. Table 6-a results indicate that, among the variables explored, overall satisfaction has a direct and positive impact on students' deep engagement with the content of the course. Table 6-b findings indicate that among the variables explored, students' overall satisfaction has the most significant impact on students' grades in the course in which the e-textbook was used, but the direction is not as predicted; as found here, the satisfaction level predicted lowered course grades. Table 6-c shows more promise in supporting the proposition: Both early and late satisfaction with the e-textbook functionality predict the change in reading comprehension index, at .01 and .052 levels of satisfaction respectively. Similarly, results from Table 6-D show some support for the proposition. Among the variables explored, students' overall satisfaction, and their late semester perceptions of the functionality of e-textbooks are both predictive of their

willingness to recommend e-textbooks, at .015 and .025 levels of significance, respectively.

Counter to expectations, students' perceptions regarding the importance of highlighting is shown to have a negative impact on their willingness to recommend the use of e-textbooks again.

Experimental Variables

The majority of survey respondents (70%) indicate they are willing to use more e-textbooks in the future; an even larger majority (83%) would recommend e-textbooks to other students. There appears to be a slightly stronger preference for e-textbooks among males (74% compared to 65% of females willing to read more e-textbooks), however 33% of these male students report they will only use more e-textbooks if they are free. Women are more willing to pay for an e-textbook (48% compared to 41% of men willing to pay for an e-textbook).

Focus groups and open-ended questions provide further insight into the digital reader's experience with an e-textbook. Table 7 lists e-textbook features most liked/disliked by participants, as well as some of the difficulties students reported.

In the study's first semester, students expressed frustration with CourseSmart server issues that resulted in slow page loadings and delayed highlighting. One student stated, "I only tried highlighting at first but I never used it [again] because you had to click on too many things and couldn't tell if it was on." 26% of post-survey participants reported waiting for pages to load or highlighting to apply. Midway through the first semester (Fall 2010), CourseSmart upgraded its reader platform. In follow-on semesters, student comments such as, "Highlighting was great because it really helped during tests and quizzes" became more common. Students found the keyword search function very easy to use and a time saver: "It [the search function] was, in my opinion, the best part of having an e-textbook. It made everything so easy and it helped with

cutting down re-reading EVERYTHING [participant's emphasis]". Many students reported using the search function to find answers for quizzes and homework.

Very few students reported using other tools included with the e-reader software such as annotation, bookmarking, or even copy/paste. During each initial class visit by the researchers, several students would complain the text size was too small. These students expressed surprise to learn the software included a zoom feature that would enlarge the size of their text font.

Students describe pursuing deeper engagement with the subject by switching between the e-textbook, their Learning Management System (LMS), and Internet sites such as the Library, Google, and Wikipedia: "I used other sites like Google if I was making a discussion post and had to relate the chapters to Internet articles." Another participant wrote, "I access[ed an]... internet site that is about same textbook. I obtained practice questions there and studied before each chapter quiz." Many of these same students reported it was "hard to stay on one site when using it [e-textbook]", finding themselves "drifting" into a Facebook break or "checking email". Other focus group participants responded this was often a challenge even if reading a printed textbook.

The low cost (free) of the e-textbook was very appealing to students. This was noted nineteen times in quotations such as, "I really enjoyed not paying for a book that would have cost me over a hundred dollars. It made me less stressed. I also did not need to carry a book around which made my life easier." Another student wrote, "If the price is cheap it is worth it because it's not hard to use at all. Just need to know if the teacher would be okay with it."

Hearing other students share their experience reading an e-textbook on their dedicated e-reader or smartphone inspired other participants to want to try the same. "I liked it but I think I would have enjoyed it more if I had a Kindle or an iPad, something easier to access and carry around," was a frequent comment. At a Fall 2011 focus group of 28 students, five (18%)

indicated they intended to ask for an e-reader as a Christmas gift. As one student stated, "To me it just seems more convenient. If I could just bring a Kindle to all my classes it would mean I wouldn't have four textbooks - in addition to other supplies to carry around all day." In another focus group, a student (who was reading the book on her smartphone) observed, "You know what the problem is with reading the e-textbook? Sometimes I read too much!" She explained that the phone's small screen size limited any clues to book location, and so she tended to read beyond the assigned number of pages.

Post survey comments about the open text format suggest that readers who prefer printed textbooks will use the e-textbook as a secondary reference source. 8 of 24 (33%) students who chose to purchase a printed version of this study's open textbook reported alternating between both the digital and print versions throughout the semester. One student explained:

"I never used an e-textbook before. This semester I alternated between both the digital and print. I now feel more comfortable with an e-textbook from now on. I will buy e-textbooks if they are available on my iPad...It [is]... so much easier and faster."

DISCUSSION

The most interesting findings of this research center on students' positive perceptions of the functionality of e-textbooks. These positive attitudes prove to be quite resilient, irrespective of their prior coursework in English, Math, and Computer Literacy courses, and regardless of the multitasking students engaged in while reading e-textbooks. Only one multitasking activity was found to increase students' favorable attitudes toward the use of e-textbooks: the use of Wikipedia. It is reasonable to assume that students are using Wikipedia in support of their reading and homework assignments as described by Chung (2010) and Head & Eisenberg

(2011). Importantly, students' positive perceptions of e-textbooks were found to predict their engagement with the course materials, much like that reported in the Cengage Learning and Eduventures 2010 survey and Dahlstrom et al's "ECAR National Study of Students and Information Technology in Higher Education" (2011). These findings give pause, and cause us to think broadly about the future of e-textbooks in the college classroom.

That students report they can adapt readily to e-textbook formats and functionality, and that they can multitask successfully without regard to satisfaction with the experience of reading electronically speaks to the powerful potential of the medium. When one considers all of the drivers of the use of e-textbooks reviewed at the outset of this paper, spanning from financial incentives to the reduction of operating budgets on college campuses, these findings, in combination with the proliferation of e-reading devices in the college student population, would seem to suggest that students are ready and willing to use e-textbooks. In fact, only 30% of this study's participants continue to prefer print, compared to earlier studies reporting up to 75% (NACS, 2011).

As noted by Nicholas, Rowlands & Jamali (2010), business students may be particularly receptive to the use of e-textbooks. One possible reason for this receptivity may be the values that underlie a business education. Students may be encouraged to be open to ambiguity and to practice adaptive behaviors in order that they may find success in the labor market as practitioners after they graduate. In order to judge the generalization of these findings beyond one discipline, one may also need to explore the extent to which faculty themselves are open to the e-textbook technology, and the values that are inculcated in students within those unique disciplinary areas. Further, faculty must consider the new literacies skill set advocated by

leaders such as Coiro (2003), Jenkins et al (2006), and Davidson & Goldberg (2010) for success in digital and participatory learning.

These findings are indeed important to better understand student learning and engagement. They are also important to college administrators who are in search of ways to engage students more fully in the college experience, with their coursework, and with their programs. Students may very well continue to clamber for cheaper books. If, as this study suggests, they need not be uniquely prepared to succeed in terms of mastery of preparatory coursework, and if we need not worry about the impact of multitasking on students' positive perceptions of the experience of reading e-textbooks, it may be possible to meet both students' low-cost motives and the campus's goals of increased engagement at the same time. Both campus-level personnel and students have something to gain by paying attention to the new offerings in e-textbooks. As providers improve the delivery mechanisms and formats through which students may read the books, and as more and more publishers come aboard with the medium, we will all face wider choices. While there may continue to be hold-outs among the faculty who continue to prefer traditional print books, the use of these paper media can be joined side-by-side with e-textbooks in order that students may engage in the learning process fully.

Research Limitations, Unexpected Findings, and a Research Agenda

Study limitations. Because the majority of participants were enrolled in the F2F (face-to-face) version of an upper level business course primarily comprised of business majors, findings might have limited applicability to students enrolled in other subject areas. Non-business participants' intent to purchase more e-textbooks was slightly lower than the business students: 75% were likely to use more e-textbooks (compared to 85% of the business students). Some participants completed the final survey even though they had switched to a printed version

or only briefly used the e-textbook. Only a small percentage of the participants were adult learners, thus presenting another challenge in terms of extrapolation. Throughout the various waves of data collection employed in the survey there are relatively small sample sizes, which make interpretation of the data more precarious. At the same time, we note that many of the previous studies reporting on the use of e-textbooks have a similar limitation. Because of this shortcoming in the data, we prefer to view this as a pilot study and look forward to using the data in the future to further validate the measures and secure greater generalization across disciplines.

Unexpected findings. In this study student grades decreased as satisfaction increased. Though this finding was probably a function of small sample size, it does present tantalizing research questions regarding the possible deleterious impact of being “too satisfied” or too comfortable in the course of learning. It may be that first, students are lacking new literacies skills in support of a digital environment, and second, students’ motivation was lowered as a result of their perceived ease of use of e-textbooks. Earlier, we stated students are willing to use an e-textbook. But, their neutrality towards using digital study tools accompanying the e-reader software (copy/paste, annotate, bookmark) and the apparent lack of initiative of some participants to discover how to make the text font larger suggests students are lacking technical skills at best, new literacies skills at worst.

In consideration of student comments regarding not having to re-read passages, their satisfaction with keyword searching to find quiz and homework answers, and their “drifting” off to Facebook, it could be that some students are not effectively employing the multitasking discipline observed by Head & Eisenberg (2011) nor committing the acquired subject knowledge to long-term memory as suggested by Poldrack, Gurung, and others. Additional insight into this dynamic may be found in terms of students’ use of highlighting, for which the mean on a

response scale of 1 to 5 was 2.22. This suggests most students did not highlight passages when using their e-textbooks. Early focus group conversations confirmed that many students had difficulty with highlighting, finding the process to be cumbersome and unreliable. It may be that because they did not highlight, students did not enjoy the same level of motivation or engagement as when using a printed textbook, thus causing their performance to suffer.

It should be noted that there are additional facilities-related complications surrounding the use of e-textbooks in the classroom. For example, in terms of laptop use, 77% of students surveyed by Petrides et al reported not ever taking their laptops into the classroom (2011, p. 45). One probable cause we have observed on our own campus relates to the issue of classroom furniture and the instability of the students' desks; students openly voice their discontent over the safety of their laptops when using wobbly tablet-style desks that they deem to be unwise for laptop use. We echo the call of Davidson & Goldberg (2010) that over time universities will need to align student learning behaviors with their own master plans for classroom instruction. Students also complain that the physical weight of the laptop, when added to their books in their backpack, is too burdensome. For now, it may well be that students are avoiding using e-textbooks because they don't want to risk dropping their laptops, carrying them around all day, or loss due to theft.

A research agenda. Further exploration of the impact of the use of e-textbooks on students' learning and academic performance is warranted in order to understand how instructors can help students "master the skills and knowledge they need to function in a hypermediated environment" (Jenkins et al., 2006, p. 57). Since the time of this data collection, new purveyors of e-textbooks have announced their foray into the distribution process, and features continue to improve as comparative prices continue to go down. These conditions will need to be explored

for their relative impact on students' receptivity to the medium. In addition, we would like to explore the factors that motivate and propel faculty to adopt e-textbooks. Lastly, we would like to better understand the sources of resistance to the electronic medium for other campus personnel, including librarians. In our conversations with broad audiences, and in our review of the literature, we find that there continue to be barriers to entry to the fuller use of e-textbooks. Only by studying these factors may we fully understand what might be holding back what we view as a natural progression in the use of resources that are critical to teaching and learning processes.

REFERENCES

- Advisory Committee on Student Financial Assistance. (2007). *Turn the page: Making college textbooks more affordable*. Retrieved from the U.S. Department of Education website: <http://www2.ed.gov/about/bdscomm/list/acsfa/turnthepage.pdf>
- Allen, N. (2010). Cover to cover: How open textbooks are the path to textbook affordability [press release]. Retrieved from http://www.copirgstudents.org/sites/student/files/reports/A-Cover-To-Cover-Solution_1.pdf
- Allen N. (2011, April 6). Exorbitant costs spur launch of national 'Textbook Rebellion' [press release]. Retrieved from <http://studentpirgs.org/news/exorbitant-costs-spur-launch-national-%E2%80%98textbook-rebellion%E2%80%99>
- Baker-Eveleth, L. J., Miller, J. R., & Tucker, L. (2011). Lowering business education cost with a custom professor-written online text. *Journal of Education for Business*, 86(4), 248-252. doi:10.1080/08832323.2010.502911

- Baum, S. & Ma, J. (2011). Trends in college pricing [*Trends in Higher Education Series*]. Retrieved from the CollegeBoard website: http://trends.collegeboard.org/college_pricing
- Beliveau, B., Hicks, L., & Stone, R. (2011). Why college students sell back their textbooks. *College Student Journal*, 45(2), 288-295.
- Bell, S. (2010). Textbook turmoil: The library's role in the textbook revolution. *Library Issues*, 31(1), Retrieved from <http://www.libraryissues.com/sub/PDF3101Sep2010.pdf>
- Bowman, L.L., Levine, L.E., Waite, B.M., & Gendron, M. (2010). Can students really multitask? An experimental study of instant messaging while reading. *Computers & Education*, 54, 927–931. doi:10.1016/j.compedu.2009.09.024
- Cengage Learning and Eduventures. (2010). Instructors and students: Technology use, engagement and learning outcomes [PDF document]. Retrieved from <http://www.cengage.com/trends/pdf/CL - EduventuresSurvey2010.pdf>
- Chen, P. D., Lambert, A.D., & Guidry, K.R. (2010). Engaging online learners: The impact of Web-based learning technology on college student engagement. *Computers & Education*, 54, 1222–1232. doi:10.1016/j.compedu.2009.11.008
- Chou, C., Wu, H., & Chen C. (2011). Re-visiting college students' attitudes toward the Internet-based on a 6-T model: Gender and grade level difference. *Computers & Education*, 56, 939–947. doi:10.1016/j.compedu.2010.11.004
- Chung, S. (2010). Factors influencing the use of social media in learning: A case of Wikipedia. *Proceedings of Interactive Computer-aided Learning*, Belgium, 2010, 490-500.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(5), 458-464.

- CourseSmart (2012). Media. Retrieved from <http://www.coursesmart.com/media#pr7>
- Dahlstrom, E., Grunwald, P., de Boor, T., & Vockley, M. (2011). ECAR national study of students and information technology in higher education: Key findings [PDF document]. Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved from <http://net.educause.edu/ir/library/pdf/ERS1103/ERS1103pdf.pdf>
- Davidson, C. N., & Goldberg, D. T. (2010). *Future of thinking: Learning institutions in a digital age*. Cambridge, MA: MIT Press.
- Davis, F., Bagozzi, P., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Dawkins, W. (2006). Textbooks: the big squeeze. *Black Issues Book Review*, 8(5), 30-32.
- Dominick, J.L. (2005). *The in-situ study of an electronic textbook in an educational setting*. UMI No. 3170422. Retrieved from Dissertations and Theses database.
- Ertuk, N. & Keen, R. (2010). An investigation of using textbook annotations as a study aid for college students. In Chen, J. (Ed.), *EDULEARN Proceedings*, (pp. 6594-6601). Barcelona, Spain: International conference on education and new learning technologies.
- Garneau, E. (n.d.). The digital generation doesn't want digital textbooks [Web log post]. Retrieved from http://education-portal.com/articles/The_Digital_Generation_Doesnt_Want_Digital_Textbooks.html
- Graydon, B., Urbach-Buholz, B. & Kohen, C. (2011). A study of four textbook distribution models. *Educause Quarterly*, 34(4), 1-11.

- Gurung, R. (2004). Pedagogical aids: Learning enhancers or dangerous detours? *Teaching of Psychology, 31*(3), 164-166. doi: 10.1207/s15328023top3103_1
- Gurung, R. (2005). How do students really study (and does it matter)? *Teaching of Psychology, 32*(4), 238-240.
- Hartman, D. K., Morsink, P. M., & Zheng, J. (2010). From print to pixels: The evolution of cognitive conceptions of reading comprehension. In E. A. Baker (Ed.), *The new literacies: Multiple perspectives on research and practice*. New York: The Guilford Press.
- Head, A. & Eisenberg, M. (2011). Balancing act: How college students manage technology while in the library during crunch time. Retrieved from:
http://projectinfolit.org/pdfs/PIL_Fall2011_TechStudy_FullReport1.2.pdf
- Higher Education Opportunity Act, 20 U.S.C. § 1015b (2008).
- Jenkins, H., Clinton, K., Purushotma, R., Robison, A. J., & Weigel, M. (2006, October 19). Confronting the challenges of participatory culture: Media education for the 21st century. Retrieved from <http://www.macfound.org/press/publications/white-paper-confronting-the-challenges-of-participatory-culture-media-education-for-the-21st-century-by-henry-jenkins/>
- Kolowich, S. (2011, December 23). Daytona State reins in its push toward e-textbooks. *Inside Higher Ed*. Retrieved from <http://www.insidehighered.com/news/2011/12/23/daytona-state-reins-its-push-toward-e-textbooks>
- Kraushaar, J.M. & Novak, D.C. (2010). Examining the affects of student multitasking with laptops during the lecture. *Journal of Information Systems Education, 21*(2), 241-251.

- Laird, T. F. & Kuh, G. D. (2005). Student experiences with information technology and their relationship to other aspects of student engagement. *Research in Higher Education*, 46(2), 211-233.
- Lin, L., Robertson, T., & Lee, J. (2009). Reading performances between novices and experts in different media multitasking environments. *Computers in the Schools*, 26, 169-186.
- Miller, J. R., & Baker-Eveleth, L. (2010). Methods of use of an online economics textbook. *American Journal of Business Education*, 3(11), 39-44.
- National Association of College Stores. (2011). Electronic book and ereader device report. Retrieved from <http://www.nacs.org/research/industrystatistics/oncampusresearchbriefs.aspx>
- Nicholas, D., Rowlands, I., & Jamali, H. R. (2010). E-textbook use, information seeking behaviour and its impact: Case study business and management. *Journal of Information Science*, 36(2), 263-280. doi:10.1177/0165551510363660
- National Survey of Student Engagement (NSSE). (2010). http://nsse.iub.edu/pdf/US_paper_10.pdf
- Ovadia, S. (2011). Open-access electronic textbooks: An overview. *Behavioral & Social Sciences Librarian*, 30(1), 52-56. doi:10.1080/01639269.2011.546767
- Petrides, L., Jimes, C., Middleton-Detzner, C., Walling, J., & Weiss, S. (2011). Open textbook adoption and use: implications for teachers and learners. *Open Learning*, 26(1), 39-49. doi:10.1080/02680513.2011.538563
- Poldrack, R. (2006). Modulation of competing memory systems by distraction. *Proceedings of the National Academy of Sciences of the United States of America*, 103(31), 11778–11783. doi: [10.1073/pnas.0602659103](https://doi.org/10.1073/pnas.0602659103)

- Redden, M. (2011, August 23). 7 in 10 students have skipped buying a textbook because of its cost. *Chronicle of Higher Education*. Retrieved from chronicle.com/article/7-in-10-Students-Have-Skipped/128785/
- Roscorla, T. (2011, March 14). CSU system shares e-book pilot results. *Converge*. Retrieved from <http://www.convergemag.com/classtech/California-State-University-Shares-E-book-Pilot-Results.html>
- Scholnik, M. (2001). A study of reading with dedicated e-readers. (Unpublished doctoral dissertation). Retrieved from www.ebookcult.com.br/ebooks/scholnik.pdf
- Smith, D. (2010, July 22). New federal rules aim to help college students with textbook costs. *The Fort Worth Star-Telegram*. Retrieved from <http://www.star-telegram.com/>
- Sun, P., Tsai, R., Finger, G., Chen, Y., & Dowming, Y. (2008). What drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50, 1183–1202.
doi:10.1016/j.compedu.2006.11.007
- Survey says: Students can't afford books. (2011, September 1). *The Journal*. Retrieved from <http://websterjournal.com/2011/09/01/editorial-survey-says-students-cant-afford-books/>
- U.S. Government Accountability Office. (2005). *College textbooks: Enhanced offerings appear to drive recent price increases* (GAO Report 05-806). Retrieved from <http://www.gao.gov/cgi-bin/getrpt?GAO-05-806>
- Weisberg, M. (2011). Student attitudes and behaviors towards digital textbooks. *Publishing Research Quarterly*, 27(2), 188-196. doi: 10.1007/si2109-0JI-9217-4

Young, J. R. (2010a, October 24). To save students money, colleges may force a switch to e-textbooks. *Chronicle of Higher Education* 57(10), <http://chronicle.com/article/The-End-of-the-Textbook-as-We/125044/>.

Young, J. R. (2010b, November 14). As textbooks go digital, campus bookstores may go bookless. *Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/As-Textbooks-Go-Digital/125363>

BUSINESS STUDENTS' LEARNING ENGAGEMENT

Table 1.

Descriptive Statistics for Undergraduate Students Reading e-Textbooks at a Public University

	N	Minimum	Maximum	Mean	Standard Deviation
Age ¹	152	1	4	1.25	.567
Gender ²	153	0	1	.55	.499
Class Type (Online or F2F) ³	155	0	1	.83	.381
Math Grade ⁴	117	1	4	2.98	.881
English Grade ⁴	129	0	4	3.24	.758
End-User Computing Grade ⁴	100	2	4	3.59	.621
Overall satisfaction ⁵	117	1.00	5.00	3.41	.823
Positive Attitude at Study Start ⁵	82	1.67	4.67	3.14	.620
Positive Attitude at Study End ⁵	105	1.67	5.00	3.30	.688
Visits social networking sites ⁶	86	0	1	.76	.432
Visits Wikipedia ⁶	86	0	1	.28	.451
Visits online shopping sites ⁶	86	0	1	.22	.417
Visits Library Website or databases ⁶	86	0	1	.35	.479
Visits music sites ⁶	86	0	1	.26	.439
Visits other online sites ⁶	86	0	1	.14	.349
Engagement ⁵	37	1.13	5.00	3.15	.781
Grade in e-textbook course ⁴	137	0	4	3.15	.898
Comprehension change index ^{5,7}	54	-.75	1.00	.08	.371
Would recommend e-textbooks ⁶	107	0	1	.82	.384
Highlights in e-textbook ⁵	103	1	5	2.22	1.163

¹ Age was presented in 4 categories: 1=18-24 years; 2=25-34 years; 3=35-44 years; 4=45 and older.

² Nominal scale: 1=male, 0=female

³ Nominal scale: 1=F2F, 0= online

⁴ Grades computed on four-point scale, with 4 = A

⁵ Likert scale with 5 = strongly agree, 1 = strongly disagree

⁶ Nominal scale: 1=Yes, 0=No.

⁷ Measure of the average change over time in the respondents' perceived ability to comprehend the content in the e-textbook.

Table 2. Correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Age	<i>R</i>	1.0	0	-.221**	0	0	0	0	.217	.108	-.105	-.052	.202	.199	-.176	-.082	.331*	.114	.094	.016	.048
	Sig. (2-tailed)		.151	.006	.212	.368	.450	.115	.053	.279	.340	.636	.064	.067	.108	.455	.046	.188	.502	.873	.634
	<i>N</i>		152	152	117	129	100	115	80	103	85	85	85	85	85	85	37	136	53	105	101
(2) Gender	<i>R</i>		1.0	.304**	.003	-.047	-.119	.143	-.048	.111	-.184	.284**	-.035	.016	.047	-.072	.010	.227**	-.126	.056	-.083
	Sig. (2-tailed)			.000	.978	.595	.237	.128	.674	.264	.091	.008	.754	.882	.671	.511	.953	.008	.368	.569	.412
	<i>N</i>			153	117	129	100	115	81	103	85	85	85	85	85	85	37	137	53	105	101
(3) Class Type (Online or F2F)	<i>R</i>			1.0	-.010	-.019	-.143	-.107	-.060	.011	.126	.048	-.017	.057	.224*	.031	-.034	-.114	.408**	-.013	-.110
	Sig. (2-tailed)				.916	.829	.155	.252	.590	.908	.249	.658	.875	.602	.038	.774	.841	.184	.002	.896	.268
	<i>N</i>				117	129	100	117	82	105	86	86	86	86	86	86	37	137	54	107	103
(4) Math Grade	<i>R</i>				1.0	.126	.218*	-.040	-.032	.015	-.011	.163	-.013	-.069	.029	-.121	.076	.014	.137	-.059	.025
	Sig. (2-tailed)					.182	.035	.705	.798	.894	.928	.192	.920	.582	.818	.333	.683	.887	.362	.592	.827
	<i>N</i>					114	94	93	68	82	66	66	66	66	66	66	31	111	46	84	81
(5) English Grade	<i>R</i>					1.0	.226*	-.139	-.090	.030	-.080	-.005	.252*	-.005	.060	-.047	-.128	.254**	.062	-.161	.039
	Sig. (2-tailed)						.024	.165	.460	.779	.501	.969	.030	.969	.613	.689	.458	.005	.678	.128	.719
	<i>N</i>						99	101	70	90	74	74	74	74	74	74	36	122	47	91	89
(6) End-User Computing Grade	<i>R</i>						1.0	-.206	-.030	-.116	-.189	-.130	-.025	.034	-.302*	.009	-.267	.426**	.237	-.051	-.103
	Sig. (2-tailed)							.070	.824	.342	.156	.333	.850	.803	.021	.949	.170	.000	.140	.675	.404
	<i>N</i>							78	58	69	58	58	58	58	58	58	28	94	40	70	68
(7) Overall Satisfaction	<i>R</i>							1.0	.399**	.700**	.011	.240*	.073	-.031	-.084	.037	.688**	-.152	.062	.664**	.314**
	Sig. (2-tailed)								.001	.000	.920	.026	.505	.775	.443	.738	.000	.112	.655	.000	.001
	<i>N</i>								64	105	86	86	86	86	86	86	35	110	54	107	103
(8) Positive Attitude at Study Start	<i>R</i>								1.0	.610**	-.068	.011	-.044	.068	.065	-.048	.260	-.022	-.270*	.320*	.432**
	Sig. (2-tailed)									.000	.637	.939	.757	.637	.650	.737	.297	.850	.048	.011	.001
	<i>N</i>									58	51	51	51	51	51	51	18	75	54	63	58
(9) Positive Attitude at Study End	<i>R</i>									1.0	-.044	.186	.041	-.038	.032	-.030	.441**	-.161	.143	.471**	.539**
	Sig. (2-tailed)										.693	.090	.711	.734	.773	.787	.008	.113	.302	.000	.000
	<i>N</i>										84	84	84	84	84	84	35	98	54	100	103
(10) Visits social networking sites	<i>R</i>										1.0	-.250*	.172	-.038	.147	-.162	-.178	-.100	-.138	.073	-.194
	Sig. (2-tailed)											.020	.113	.726	.176	.137	.364	.376	.356	.510	.078
	<i>N</i>											86	86	86	86	86	28	80	47	85	84
(11) Visits Wikipedia	<i>R</i>											1.0	-.081	.089	-.008	-.026	.318	-.221*	.076	.259*	.155
	Sig. (2-tailed)												.456	.418	.940	.811	.100	.049	.612	.017	.159
	<i>N</i>												86	86	86	86	28	80	47	85	84
(12) Visits online shopping sites	<i>R</i>												1.0	.081	.202	.028	-.121	.049	-.063	.150	-.173
	Sig. (2-tailed)													.460	.063	.796	.538	.667	.676	.172	.116
	<i>N</i>													86	86	86	28	80	47	85	84
(13) Visits Library Website or Databases	<i>R</i>													1.0	-.150	-.224*	.211	.157	-.269	.109	-.052
	Sig. (2-tailed)														.169	.038	.280	.165	.067	.322	.640
	<i>N</i>														86	86	28	80	47	85	84
(14) Uses music sites	<i>R</i>														1.0	.072	.149	.061	-.139	.027	-.153
	Sig. (2-tailed)															.513	.449	.593	.352	.805	.164
	<i>N</i>															86	28	80	47	85	84
(15) Visits other online sites	<i>R</i>															1.0	-.032	-.269*	.233	-.031	-.011
	Sig. (2-tailed)																.871	.016	.115	.779	.922
	<i>N</i>																28	80	47	85	84
(16) Engagement	<i>R</i>																1.0	-.157	.034	.436*	.403*
	Sig. (2-tailed)																	.361	.894	.013	.016
	<i>N</i>																	36	18	32	35
(17) Grade in e-textbook class	<i>R</i>																	1.0	.005	-.149	-.189
	Sig. (2-tailed)																		.974	.140	.066
	<i>N</i>																		52	100	96
(18) Comprehension change index	<i>R</i>																		1.0	-.023	.191
	Sig. (2-tailed)																			.871	.166
	<i>N</i>																			53	54
(19) Would recommend e-textbooks	<i>R</i>																			1.0	-.029
	Sig. (2-tailed)																				.774
	<i>N</i>																				99
(20) Highlights in e-textbook	<i>R</i>																				1.0
	Sig. (2-tailed)																				
	<i>N</i>																				

** Correlation is significant at the 0.01 level (2-tailed). □

* Correlation is significant at the 0.05 level (2-tailed).

R = Pearson's Correlation

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Table 3.
Factor Analysis

Variables	N	Cronbach's alpha	Factor	Eigenvalue
Positive attitude towards the functionality of the electronic textbook at beginning of semester: <ol style="list-style-type: none"> 1. E-textbooks are easy to use. 2. E-textbooks are portable. 3. I can easily find the information I need when using e-textbooks. 4. The text in my e-textbook is easy to read (no eye strain). 5. I always highlight text in my e-textbook. 6. I prefer reading an e-textbook. 	66	0.801	1	3.065
Positive attitude towards the functionality of the electronic textbook at end of semester: <ol style="list-style-type: none"> 1. E-textbooks are easy to use. 2. E-textbooks are portable. 3. I can easily find the information I need when using e-textbooks. 4. I prefer reading an e-textbook. 	91	0.788	1	2.757
Undergraduates' overall satisfaction with the electronic textbook: <ol style="list-style-type: none"> 1. The e-textbook was a useful addition to the class. 2. I would recommend using e-textbooks for other classes in the future. 3. I would prefer to have all of my textbooks in electronic format. 4. Participation in this study influenced my enthusiasm for e-textbooks. 	101	0.763	1	2.398
Undergraduates' engagement: <ol style="list-style-type: none"> 1. Time spent reading/reviewing e-textbook compared to all other classes; 2. Time spent reading/reviewing e-textbook compared to all other business classes; 3. Motivation to perform assignment-related research on the Internet when reading the e-textbook; 4. Motivation to ask more questions in class than in other classes; 5. Feeling connected to the assigned subject; 6. Confidence about subject matter; 7. Using e-textbook to learn more after viewing podcasts/videos; 8. Using ANGEL (LMS) to read supplemental course materials posted there; 9. E-textbook increases interest in the course; 10. Videos/audios posted by instructor makes student want to learn more. 	34	0.891	1	4.332

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Table 4-A.

Impact of Students' Preparedness for Use of eTextbooks on Overall Satisfaction

Variable	β	Significance	N
Constant	4.768	0.000	72
Math grade	-0.007	0.952	
English composition grade	-0.061	0.662	
Computer literacy grade	-0.281	0.113	
Age	0.103	0.684	
Gender ¹	0.367	0.074	
Online/F2F ²	-0.529	0.046	
R^2	0.140		
F	1.761		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 4-B.

Impact of Students' Preparedness for Use of eTextbooks on Early and Late Positive Attitudes Toward eTextbook Functionality

Variable	Dependent Variable					
	Early Positive Attitude			Late Positive Attitude		
	β	Significance	N	β	Significance	N
Constant	3.122	0.000	55	3.701	0.000	63
Math grade	-0.083	0.447		-0.012	0.921	
English composition grade	-0.029	0.827		0.049	0.735	
Computer literacy grade	-0.004	0.978		-0.156	0.369	
Age	0.156	0.473		0.057	0.821	
Gender ¹	0.075	0.728		0.390	0.055	
Online/F2F ²	0.148	0.618		-0.341	0.175	
R^2	0.031			0.094		
F	0.255			0.175		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 4-C.

Impact of Students' Preparedness for Use of eTextbooks on Importance of Highlighting

Variable	β	Significance	N
Constant	3.701	0.000	63
Math grade	-0.012	0.921	
English composition grade	0.049	0.735	
Computer literacy grade	0.156	0.369	
Age	0.057	0.821	
Gender ¹	0.390	0.055	
Online/F2F ²	-0.341	0.175	
R^2	0.094		
F	0.971		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

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Table 5-A.
Impact of Multitasking Correlates on Overall Satisfaction

Variable	β	Significance	N
Constant	2.938	0.000	77
Social networking	0.300	0.211	
Wikipedia use	0.485	0.034	
Online shopping	0.051	0.839	
Online Library use	-0.088	0.684	
Listening to music	-0.152	0.533	
Other online activities	0.166	0.556	
Age	0.264	0.298	
Gender ¹	0.167	0.427	
Online/F2F ²	-0.201	0.419	
R^2	0.110		
F	0.920		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 5-B.
Impact of Multitasking Correlates on Satisfaction with Highlighting in eTextbooks

Variable	β	Significance	N
Constant	2.402	0.000	83
Social networking	-0.281	0.426	
Wikipedia use	0.390	0.221	
Online shopping	-0.415	0.216	
Online Library use	-0.210	0.470	
Listening to music	-0.202	0.537	
Other online activities	-0.067	0.868	
Age	0.348	0.313	
Gender ¹	-0.115	0.685	
Online/F2F ²	-0.248	0.476	
R^2	0.109		
F	0.993		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 5-C.
Impact of Multitasking Correlates on Early and Late Positive Attitudes Toward eTextbook Functionality

Variable	Dependent Variable					
	Early Positive Attitude			Late Positive Attitude		
	β	Significance	n	β	Significance	n
Constant	2.957	0.000	50	2.852	0.000	83
Social networking use	-0.131	0.541		0.050	0.818	
Wikipedia use	-0.015	0.940		0.299	0.133	
Online shopping	-0.119	0.592		0.037	0.860	
Online library use	0.123	0.585		-0.123	0.497	
Listening to music	0.174	0.420		0.085	0.677	
Other online activities	-0.089	0.715		-0.066	0.792	
Age	0.179	0.536		0.281	0.193	
Gender ¹	-0.063	0.736		0.108	0.539	
Online/F2F ²	0.015	0.955		-0.089	0.679	
R^2	0.038			0.071		
F	0.175			0.617		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

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Table 6-A.

Impact of Satisfaction on Engagement with Content

Variable	β	Significance	N
Constant	0.783	0.625	18
Overall satisfaction	0.809	0.024	
Early functionality positive attitude	0.080	0.770	
Late functionality positive attitude	-0.345	0.578	
Highlighting importance	0.168	0.590	
Age	0.234	0.670	
Gender ¹	-0.306	0.478	
Online/F2F	N/A	N/A	
R^2	0.608		
F	2.847		

1. Male was coded as "1".

Note: Type of course (online or F2F) was omitted as a variable in this model because all students were enrolled in F2F classes.

Table 6-B.

Impact of Satisfaction on Grades in eTextbook Course

Variable	β	Significance	N
Constant	3.204	0.000	51
Overall satisfaction	-0.359	0.062	
Early functionality positive attitude	-0.172	0.412	
Late functionality positive attitude	0.404	0.155	
Highlighting importance	-0.075	0.549	
Age	0.539	0.195	
Gender ¹	0.262	0.225	
Online/F2F	-0.140	0.637	
R^2	0.167		
F	1.229		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 6-C.

Impact of Satisfaction on Change in Perception of Reading Comprehension

Variable	β	Significance	N
Constant	0.638	0.058	48
Overall satisfaction	-0.080	0.340	
Early functionality positive attitude	-0.331	0.001	
Late functionality positive attitude	0.245	0.052	
Highlighting importance	0.061	0.301	
Age	0.119	0.457	
Gender ¹	0.045	0.638	
Online/F2F	-0.347	0.013	
R^2	0.388		
F	3.627		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

Table 6-D.

Impact of Satisfaction on Positive Recommendation to Buy More eTextbooks

Variable	β	Significance	N
Constant	-0.389	0.167	51
Overall satisfaction	0.172	0.015	
Early functionality positive attitude	-0.006	0.946	
Late functionality positive attitude	0.240	0.025	
Highlighting importance	-0.094	0.053	
Age	-0.077	0.585	
Gender ¹	0.017	0.839	
Online/F2F	0.152	0.184	
R^2	0.562		
F	7.892		

1. Male was coded as "1".

2. Face to Face (F2F) courses were coded "1".

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Table 7.

Free text responses about using e-textbooks

Likes (n=46)	Dislikes (n=55)	Challenges noted
<ul style="list-style-type: none">• Cost: free! (19 of 46)• Accessibility (from any computer) (19 of 46)• Searchability (including TOC navigation) (11 of 46)• Can print (8 of 46)• Easy to use (7 of 46)• Notetaking features (highlighting, tagging, sharing) (5 of 46)	<ul style="list-style-type: none">• "Tied to Internet" (16 of 55)• Network/Server Lag (15 of 55)• Eye Fatigue (13 of 55)• View/Zoom options (9 of 55)• Referencing page numbers (7 of 55)• Navigating through e-textbook (7 of 55)• Making handwritten notes while reading from computer (5 of 55)• Can't access while in class (3 of 55)	<ul style="list-style-type: none">• Not an object (to remind me to read) (5 of 15)• Prefer eReader/Tablet format (6 of 15)• Learning how to use (5 of 15)• Distractions (4 of 54)• Printing multiple pages (2 of 15)• Initial setup (1 of 15)