From Books to Bits: Digital Content for a New Age

Melissa Hunsicker-Walburn
Fort Hays State University

Wally Guyot
Fort Hays State University

Robert Meier
Fort Hays State University

Loretta Beavers
Southwest Virginia Community College

Many factors influence higher education affordability. Rising tuition costs, changes to financial aid qualifications, costs associated with room and board, and textbook costs contribute to increases in higher education expense--which put higher education pursuits out of reach for some. Making traditional texts available as e-books for purchase or rent and utilizing Open Education Resources (OERs), which are typically free, are methods to control rising textbook expenditures for students. This paper reports findings from a study of the preferences of students from a community college, including textbook expenses, impact on higher education affordability, e-book rental satisfaction, and OERs.

INTRODUCTION

The purpose of this study was to examine the attitudes of community college students toward e-books and open education resources, as well as assess the trends in textbook costs for community college students. More and more students are financially unable to acquire, or deliberately choose to go without course textbooks. A variety of commercial and noncommercial initiatives have been developed to enhance learning success. Faculty are beginning to experiment with freely available and licensed library materials as a substitute for costly commercial textbooks and course packaged textbooks. The results thus far are promising. Some courses can be delivered today using only "freely available" learning resources, some using a mix of fee based and free, while others cannot be delivered using any freely available resources at all due to a lack of availability (Buczynski, 2006; Caswell, Henson, Jensen, & Wiley, 2008).

E-BOOKS AND OPEN EDUCATION RESOURCES (OER)

Previous research has demonstrated that the experience of reading e-books is not equivalent to reading textbooks, and might impair the adoption of cost-reducing innovations. When factors influencing preference for e-books as well as reported use of e-book content was examined, it was determined that

students preferred textbooks over e-books regardless of their gender or computer skill. Participants who had previously used an e-book still preferred print texts for learning. Despite the ability to easily access supplemental content through e-books via hyperlinks and other features, students were more likely to use special features in print books than in e-books. (Woody & Daniel, 2010).

Given the limited understanding of the factors that drive students' attitudes and willingness to use new or innovative devices for learning, a study by Lai (2011) found that usefulness, convenience, compatibility, and perceived enjoyment significantly contribute to dedicated e-textbook acceptance.

In contrast to the type of material that is characterized as commercially distributed text and student learning material, early forms of Open Educational Resources (OER) were defined as, "The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes" (UNESCO, 2002, p. 43). The term first came to use in 2002 at a conference hosted by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). The most-used definition of OER has been developed to reflect, "Open Educational Resources are digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research" (Organization for Economic Cooperation and Development, 2007, p. 132). To further clarify this, OER is said to include:

- Learning Content: Full courses, courseware, content modules, learning objects, collections and journals.
- Tools: Software to support the development, use, re-use and delivery of learning content including searching and organization of content, content and learning management systems, content development tools, and on-line learning communities.
- Implementation Resources: Intellectual property licenses to promote open publishing of materials, design principles of best practice, and localization of content. (OECD, 2007, p. 30-31)

Educators and policymakers around the globe are attracted to the promise of OERs to provide equal access and open licensed educational materials for students, teachers, and scholars alike. (Hewlett Foundation Education Program, 2010; Wiley, Green, & Soares, 2012). It is still early days for the OER movement and at the moment it is not possible to give an accurate estimation of the number of on-going OER initiatives, but innovation in this area continues around the world.

RISING COSTS AND THE IMPACT OF INNOVATION

Textbook issues are particularly important in light of considerable debate that has recently transpired concerning the cost of textbooks. In 2005, California Public Interest Research Group (CALPIRG) found that students at California public universities spent about $898 on average in 2004-2005 academic year, and predicted that with a growth rate of 6% per year costs would reach $1,009 in the 2006-2007 academic year and that would make up 6.1% of a four year public university tuition. The report also indicates that students with the opportunity to rent e-books spend less than previous estimates--on average between $130 and $240 *per year* (CALPIRG, 2005). A recent national survey of higher education institutions across the United States indicates students spend an average of $1,122 annually on textbooks and course materials (College Board, 2014).

CALPIRG is not the only group to have noticed a trend in the increase in price for college textbooks. The Government Accountability Office (GAO) looked back over a decade from 2002 to 2012 and found that while overall consumer prices increased by 28%, the price for college textbooks increased 82% and tuition and fees for college rose 89%. Additionally, the GAO cited that students are somewhat of a captive audience in the textbook market. Instructors choose the required textbooks for their courses; and while students do have some variation in where they can obtain the book, they still must buy the specified textbook (Government Accountability Office, 2013).

In 2012 a survey was conducted in Florida by the Florida Distance Learning Consortium (FDLC). This survey was accomplished through a grant offered by the U.S. Department of Education with the

main focus of learning more about the textbook habits of students in the university and college setting. A total of 22,129 students took part in the survey with 53% enrolled in universities, 47% of students enrolled in community colleges, and 2% enrolled in both simultaneously. Every Florida State university participated, 11 state universities, while 22 out of 28 colleges, community colleges, and state colleges participated as well. Other studies mainly focused on state colleges or universities, but finding studies focusing specifically on community colleges has been overwhelmingly unfruitful. However, this Florida study provides a generous amount of information regarding higher education, textbook costs, and OERs; but it does not specify the differences between the 11 state universities and the 22 colleges, community colleges, and state colleges (Florida Virtual Campus, 2012).

The 2012 Florida Student Textbook Survey (FSTS) found that students wanted to reduce costs for courses, but were unaware that OERs and open textbooks existed. When asked if familiar with open textbooks, only 26%[1] of responding students indicated that they had encountered open textbooks before and knew of their existence. Also, the FSTS found that a majority of students (54%[2]) spent over $300 on books for the spring 2012 semester. Moreover, 18.5%[2] of students spent over $500 for their textbooks for the same semester. Surveyed students also indicated that the cost of textbooks influenced their choices on a few issues including whether or not to purchase a required textbook for a course (64%[3]), not to register for a course (45%[3]), to take fewer courses (49%[3]), to drop a course (27%[3]), or fail a course (17%[3]). Also, a vast majority of students (97.3%[3]) looked to reduce the cost of textbooks through various means including, but not limited to, buying used textbooks from the campus bookstore (63.4%[3]), buying e-books (28.5%[3]), renting printed books (41.5%[3]), sharing textbooks with classmates (43.3%[3]), and buying from sources other than the campus bookstore (78.3%[3]). When asked, if financial aid assisted with textbook expense, a large portion of students (25%[2]) indicated they did not receive financial aid, while 29%[2] of students indicated financial aid was not used for textbook expenses. With textbook costs rising and students seeking a variety of means to reduce the cost of required textbooks, assistance from beyond their university and community college has begun to emerge (Florida Virtual Campus, 2012).

State and federal lawmakers have identified textbook prices as a significant concern for students, and have sought to legislate solutions to offer relief (Higher Education Act of 2008). Since 2004, at least 34 states have proposed more than 100 bills related to textbook expenses. According to Berry, Cook, Hill, and Stevens (2011), proposed bills that included suggestions such as eliminating state sales tax on textbooks, recommending rental programs, improving the process of financial aid distribution as it affects textbook purchase and providing guidelines for the various textbook stakeholders – students, faculty, colleges, bookstores, and publishers. Other alternatives considered by states and the federal government include either a state or federally funded program that compensates higher education institutions for developing and using OERs.

Rising textbook costs for higher education students was an issue that the Virginia Assembly sought to ameliorate with HB1478, which was signed in 2006. Since OERs was a new idea at the time, HB1478 sought to reduce cost of textbooks by imposing restrictions on instructor choice. Instructors were required to commit to using all items if choosing a pre-packaged bundle, ensure the university bookstore has an adequate inventory of the textbook choice, evaluate and consider bookstore prices, avoid most recent editions of textbooks unless significantly changed, and to develop alternatives for students who could not afford the price of required textbooks. The bill did not provide any state grants (H.B. 1478, 2006).

Although Virginia tried curbing the ever increasing price of textbooks, the effort did not provide an adequate solution. California Bill AB-798, also known as the College Textbook Affordability Act of 2015 (CTAA), passed in 2015, took an additional step to reduce textbook costs. CTAA created a state-funded financial incentive program designed to accelerate adoption of OERs for higher education institutions. The state legislature appropriated $5,000,000 to the program, allowing individual colleges up to $50,000 for start-up funding (Assem. Bill 798, 2015).

In 2013, the federal government proposed a similar program in the Affordable College Textbook Act (ACTA). Though introduced, the bill did not advance. ACTA was reintroduced to the Senate (S. 2176, 2015) and the House of Representatives (H.R. 3721, 2015) on October 8, 2015. Substantively, the bill

would create grants to fund pilot programs at colleges and state universities to expand the use and access to open education resources. ACTA included some additional reporting requirements[4].

This could compel disclosure of pertinent data, largely unavailable according to the literature, but necessary to develop a solid cost study that considers quality of material and/or student achievement (Hilton, Wiley, & Bliss, 2012). The literature suggests students need more information than is presently available to evaluate whether OERs are appropriate, which may reflect a deficit of knowledge (Hilton, Gaudete, Clark, Robinson, & Wiley, 2013).

STUDENT ACCEPTANCE OF OERS

Although OERs provide students with the means to accomplish their education at a lower cost, this factor may be null if students do not enjoy using these materials or if the OERs prove ineffective in educating students. Qualitative studies allow for examination of student reaction to use of OER alternatives. In 2012, Southern New Hampshire University conducted a study on undergraduate students in eight sections of an Introduction to Marketing class. Faculty, in conjunction with the Business Department and Library, presented students with an alternative to textbooks at the beginning of the semester. Students were allowed to choose one of three options: the standard textbook, e-book links through the library[5], or both. Of the 441 students, 22% selected the textbook only, 50% selected to use the e-book, and 28% chose the combination option (Lynch & Ratto, 2012).

At the beginning of the semester, students completed a preliminary survey focused on students' prior experiences with OERs and e-books. The results indicated 87% of respondents had never used an e-book. Students who had previously used e-books reported having a positive experience. Throughout the semester, students completed surveys about their experience with the course materials. At the conclusion of the semester, data from all the surveys was analyzed.

Considering that a vast majority, 87%, of surveyed students had never used e-books before, lack of familiarity did not deter interest in trying e-books only or in combination with textbooks. Half of the students selected the e-book only option, and an additional 28% selected the combination of e-book and textbook. When students were asked about the content quality of their selected material, the textbook scored lower than the e-book.

When comparing content quality, at the end of the semester, the traditional textbook option scored lower than both the e-book and the combination option. Students were also asked to evaluate the convenience of the option they chose. Convenience in this case refers to the overall course design integrated with the reliability of the technology used. Students indicated only a minor difference in convenience between the e-book only and traditional textbook selections. However, the combination option, the e-book coupled with the standard textbook, had a much lower perceived level of convenience.

The Southern New Hampshire University research concluded overall that students were willing to adopt e-books and perceived content quality of e-books to be equal to or better than traditional textbooks. Additionally, students indicated that the convenience of e-books was slightly better than traditional textbooks.

In another study, Sawyer Business School of Suffolk University examined student attitudes toward e-books. The two year study was administered to one management strategy class composed of all senior and undergraduate students. Each section of the course was randomly divided into six teams. After the teams were created, each team was randomly given textbook devices to use for the semester. Textbook devices included the Amazon Kindle, Sony eReader Touch, Apple iPad, enTourage eDGe, CourseSmart, and traditional textbook (Weisberg, 2011).

The study found that student attitudes toward e-books generally improved over the course of the study. When the study began in 2009 fall semester, students were not as familiar with the technology they were given; and the devices, mostly only useful for reading, were somewhat limited in their capabilities. Students noticed this and cited that the e-books were a good idea, but were not quite ready for classroom use yet. During both semesters in 2010, there was a change in technology that allowed students to do more with the e-books than just reading. The addition of basic note taking, highlighting, and search

function, provided some of the features that students wanted. In the final semester of the study, students had become much more familiar and were willing to use e-books in the classroom. Device functionality continued to evolve with the addition of features like note-sharing, note-highlighting, and note-searching. Some students even purchased their own e-reader device and used it for the course. When compared to traditional textbooks, students preferred greater convenience, portability, lower cost, and a search function of e-books (Weisberg, 2011).

Although students had mostly positive experiences with the e-books, they did cite reasons why they preferred a traditional textbook as a primary resource and an e-book as a secondary resource. Some of the reasons included the ability to focus with a textbook (less social media distractions), easier to comprehend the content, and personal preference for traditional textbooks (Weisberg, 2011).

METHODOLOGY

A survey about textbook preferences was administered to students at a community college in the eastern portion of the United States. The community college offers both traditional face-to-face instruction, as well as distance learning. The survey instrument contained a combination of Likert-Scale, multiple choice, and yes/no questions which were summarized using frequency distribution and percentages. SPSS was utilized during the data analysis process for cross tabulations for comparison purposes. The survey instrument requested information about student expenditures for class materials as well as student use of e-books, traditional materials, and open education resources. The respondents were also asked to provide information about purchasing habits of materials, device use and preference, implications of financial aid status, and text material purchases.

FINDINGS

Of the 202 respondents surveyed, 114 were male and 88 were female. Thirty-one respondents declared themselves as business majors, and 171 respondents were from other majors. Respondents classified themselves as 131 freshmen, 51 sophomores, and 20 identified as other. The data analysis included frequency distributions and a one-way ANOVA. The findings were as follows:

When asked to indicate how much students spent for textbooks in the current semester, students indicated expenditures that were much lower than the average costs cited in the literature. As Table 1 indicates, most (72%) of the students surveyed are spending less than $450 for textbooks for a semester. Nearly 45% of the students reported spending less than $300 for a single semester. Utilizing $561 as a national average of what students spend per semester based on the $1,122 annual expenditure figure reported by College Board, students appear to be spending less than average (2014).

TABLE 1
STUDENT EXPENDITURES

Text Cost Range	Frequency	Percentage	Cumulative Percentage
<=$150	31	15	15
$151-300	59	29	44
$301-450	56	28	72
$451-600	40	20	92
$601-750	9	5	97
>=$751	7	3	100
Total	202	100	100

The survey responses indicated that text cost contributes to student perception of higher education affordability. Fifty-seven of the 202 respondents (28%) indicated the textbook cost would greatly impact their ability to attend an institution of higher learning (See Table 2).

TABLE 2
IMPACT OF TEXT COST ON AFFORDABILITY

	Student Expenditure	Percentage
Greatly	57	28
Somewhat	72	36
Slightly	44	22
Not at all	29	14
Total	202	100

In response to the question, "Have you ever chosen not to purchase a textbook because of its cost?" One hundred twenty respondents, or 59%, answered "no" while 82 (41%) of the 202 respondents indicated they have chosen not to purchase course materials because of cost (See Table 3).

TABLE 3
HAVE YOU EVER CHOSEN NOT TO PURCHASE A TEXTBOOK BECAUSE OF ITS COST?

	Frequency	Percentage
Yes	82	41
No	120	59
Total	202	100

E-BOOKS AND OERS

Table 4 refers to the 121 individuals who rated their experience with e-book rentals, 93% of whom indicated having satisfactory or higher experience. Since there were only eight unsatisfactory responses, it appears most students who rent are at least satisfied with that experience.

TABLE 4
STUDENT SATISFACTION WITH E-BOOK RENTALS

	Frequency	Percentage	Cumulative Percent
Excellent	16	13	13
Very Good	42	35	48
Satisfactory	55	45	93
Not satisfactory	8	7	100
TOTAL	121	100	100

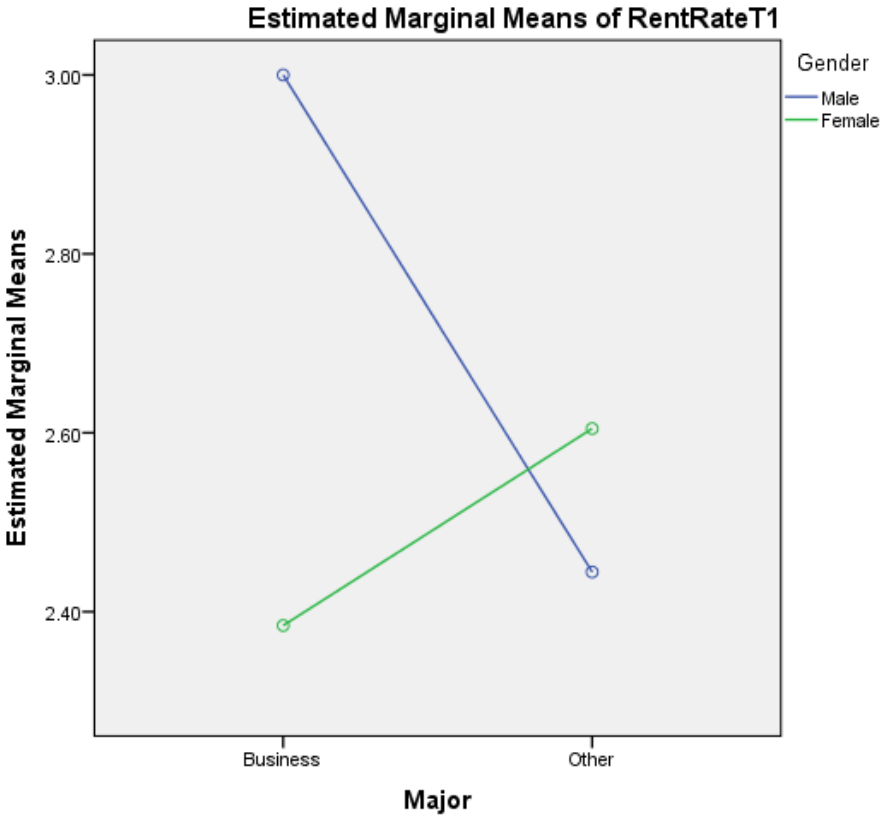
A one-way ANOVA was performed with e-book rental student satisfaction as the dependent variable. Independent variables were gender and major. No significant differences were found in mean e-book rental student satisfaction by gender and major; however, the interaction effect between gender and major was significant (p=.036). Although the gender by major interaction was significant, the effect only accounted for 3.7% of the variance. Thus the interaction was not considered meaningful.

TABLE 5
A ONE-WAY ANOVA COMPARING GENDER AND MAJOR MEANS FOR E-BOOK RENTAL STUDENT SATISFACTION

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3.311[a]	3	1.104	1.729	.165	.042
Intercept	519.365	1	519.365	813.580	.000	.874
Gender	.988	1	.988	1.548	.216	.013
Major	.537	1	.537	.841	.361	.007
Gender * Major	2.870	1	2.870	4.496	.036	.037
Error	74.689	117	.638			
Total	862.000	121				
Corrected Total	78.000	120				

Figure 1 is the plot of the estimated marginal means for gender and major and is the best way to illustrate the magnitudes of differences in e-book rental student satisfaction.

FIGURE 1



Interestingly, however, while students indicated general satisfaction, only 24, or 12%, students indicated "yes" they would prefer to have e-books for all their textbooks. Forty one students (20%) answered "no" to this question, while 55 students, or 27%, indicated a "maybe/depends on the class" response (See Table 6).

TABLE 6
IF POSSIBLE, WOULD YOU PREFER TO HAVE E-BOOKS FOR ALL OF YOUR TEXTBOOKS?

	Frequency	Percentage
Yes	24	12
No	41	20
Maybe/Depends	55	27
N/A	82	41
Total	202	100

Students using e-books also indicated that laptops/computers are more often used to read e-books than any other device option provided. While many students possess phones with the capacity to support e-book use, only 31 students responded that they use a phone-type device. Respondents were asked to indicate all devices which applied (See Table 7).

TABLE 7
WHAT TYPE OF DEVICE DO YOU USE TO READ E-BOOKS?

	Frequency
Laptop/Computer	74
Kindle/Nook or other e-reader	12
Phone	31
iPad	16
Other tablet	13
*Multiple responses were given	

When asked if students were familiar with Open Source or OERs, 168 students, or 83%, answered no, while 34 (17%) answered yes. This may indicate that more education about OERs would raise student awareness. It is possible that OERs are in use and students do not distinguish this type of delivery modality from other electronic deliveries, though the non-commercial, and often "free" nature of OERs could have implications for affordability perception if it were better understood.

LIMITATIONS AND FUTURE RESEARCH

This study provided research on a population that has not been the subject of significant focus. The researchers were precluded from making generalizations to a broader population of community college students because this pilot study was limited to one community college, which is geographically located in the eastern part of the country. A larger population of community colleges could be sampled to provide results more reflective of the greater community college environment across the country and include analysis of student demographics.

Also, while this study explores the perceptions, satisfaction, adoption, and cost-savings of students in a community college, additional exploration could be undertaken to evaluate quality of the text material and impact of cost-lowering initiatives on learning outcomes, or the perceptions students have about assurance of learning with electronic materials--OERs or otherwise.

New studies, conducted periodically which evaluate the rate of OER adoption, efficacy in terms of learning achievement, cost-savings, and student satisfaction could prove useful to the developing body of knowledge in this area. Additional studies will be needed to enhance the review of literature for the use of textbooks, e-books, and OER for instructional purposes.

ENDNOTES

1. Number of responding students = 13,733
2. Number of responding students = 19,608
3. Number of responding students = 18,587
4. Institutions that receive funds must also complete effectiveness reports on their program, improved requirements that publishers make materials available for individual purchase rather than bundles, and the Government Accountability Office to submit an updated report on the price of college textbooks to Congress.
5. If students chose the e-book or combination option, they were able to access their educational resources through a library database named Books 24x7.

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