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# Electronic Textbooks: An Empirical Study of Adoption Potential

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# Electronic Textbooks: An Empirical Study of Adoption Potential

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## Abstract

Mounting conflict brews between collegiate textbook publishers and their end users, college students. Currently, issuing a new textbook edition every 2-3 years provides the only primary revenue source for publishers and authors while escalating prices have spawned alternative outlets of new and used textbooks for students seeking lower prices. A popular publisher solution focuses on electronic textbooks, however, will college students adopt that technology? Research in this study of almost 800 Liberty University residential students reveals a strong reluctance to embrace e-books, and provides insightful rationale for such avoidance behavior.

## Introduction

The college textbook publishers and their consumers are engaged in an epic clash between intrinsic goals that appears to have no solution in sight. On the one hand, publishers require ongoing revenues to continue publishing their products, and yet, they only receive revenues when they issue a new textbook or a revision to an existing textbook. Once that product sells through the original retail outlet, typically campus bookstores or designated distributors like MBS Direct, future sales occur in the reseller market similar to stock market trading in the financial sector. This revenue requirement results in publishers and authors making cosmetic alterations to the previous textbook edition every 2-3 years and raising the prices to offset the loss of income from the growing used textbook market.

“Textbook prices have skyrocketed at four times the rate of inflation over the last decade” (Murphy & Zomer, 2007, p. 1). While many factors affect textbook pricing, the increasing costs associated with developing products requested by instructors to accompany textbooks, such as CDRoms, test databanks, video case studies, workbooks, and other supplements increase the cost of the textbooks 10 to 50 percent (Casey, 2007). Yet, Jeff Neel, a sales manager for McGraw-Hill Companies, Inc., stated that publishers are not profitable despite the high textbook prices (Michigan, 2007). Industry revenues over the past five years increased only 13.5% (3.4% annually) primarily due to the abandonment by end users from traditional college campus bookstores seeking lower prices on alternative internet resources. This factor alone contributed to the industry’s recent responses of issuing newer editions on an average of every 3.5 years in an effort to restore slumping revenue streams (Casey, 2007).

Online alternative sources such as Amazon.com, Half.com (managed by eBay), and even fellow students have created a growing marketplace for used textbook sales. Another major cause for students bypassing the campus bookstore is the low amount of money they receive when they sell their used textbook back to the same bookstore where they purchased it months earlier. These students complain about the differential between the price they receive for a returned textbook and the price their fellow students will pay for that same textbook. They also complain about the long lines when buying and selling their textbooks through the bookstore. Students prefer ordering online and having the textbooks delivered to their mailing address, and then returning the textbook after the school term via the mail service to the online textbook seller in order to receive a cash rebate or credit towards another textbook.

Various collegiate administrations have taken their own steps to solve the crisis by purchasing the textbooks and offering them to students on a rental basis. Approximately 20 U.S. colleges or universities currently use a textbook rental program, some for more than a century. The California Student Public Interest Research Group (CALPIRG) reported that textbook rental systems benefit students, colleges, and college bookstores by lowering book charges from \$775-\$875 to \$130-\$240 annually. The report also states that, if more colleges and universities develop similar rental programs for their students, they would pressure publishers to change their pricing practices (Service, 2007). In some universities, professors no longer require textbooks for their classes.

Political pressure also is developing from constituents complaining of the high prices associated with textbooks. In 2004, the United States Congress introduced a bill that addresses the pricing practices of publishers after the U.S. House of Representatives

conducted hearings on college textbook pricing. In addition, Governor Arnold Schwarzenegger signed a California law challenging textbook publishers to rethink their pricing policies. The Government Accountability Office launched an investigation of college textbook prices. The publishers are facing intense public scrutiny, and are under tremendous pressure to provide affordable textbooks to lower and middle-income students (Carbaugh & Ghosh, 2005, p. 95).

The American culture's demand for skilled professionals directly relates to the growing demand for higher education. College enrollment hit a record level of 17.5 million in the fall 2005 term. College enrollment projections reveal an expected increase of 13 percent between 2006 and 2015. With these target market growth projections, future revenue opportunities abound for the textbook publishers who connect with this market socially and partner with them for their personal achievements (Sciences, 2006).

The combination of a huge population of students seeking high technological solutions for their textbook content at lower costs offered through suppliers directly, should lead one to conclude that electronic books (or e-books) provide the perfect solution. However, the perception of many students who responded to this study's survey indicates that they do not believe they learn as well with digital text than with traditional print medium. They cite distractions readily available on their computer, eye fatigue sometimes leading to headaches from too much time in front of a digital monitor, and the inability to highlight text and write notes in the margins as examples of their resistance to adopting the electronic book format. The research results further suggest that major improvements must occur in current formats and features that overcome several strong objections (refer to Table 4 below).

## Method

### *Participants or subjects*

The entire residential student body of Liberty University received an email in November 2007 through the university system inviting them to participate in the online confidential survey available through a direct link to an off-site server maintained by Qualtrics, Inc. The potential universe of respondents equals 10,400 students. The total number who did respond totaled 785 students, a 7.5% response rate, that provides a sufficient base for statistical analysis purposes. One advantage in using Liberty University students revolves around the geographical dispersion since the Liberty student body comes from every state of the United States and many foreign countries. In this sample, 502 unique zip codes were recorded and 254 unique regions (as represented by the first three digits of the zip code).

Ninety-one percent of the respondents were undergraduate students with the nine percent graduate students participating in the few residential graduate degree programs. Sixty-seven percent of the participants were females; 33% were males. Fifty-five percent of the respondents were upperclassmen with an additional 9% graduate-level students. Over one-third (37%) of the respondents have participated in both residential and distance learning class formats; the other 63% participate only in classes held on campus. The top major fields of study included: Business (13%); Theology (11%); Communications (10%); Medical Sciences (10%); Science (10%); Education (9%); Psychology (9%). Of all respondents, 69% claimed they paid for their own textbooks.

### *Apparatus*

The survey consisted of 24 questions. Students accessed the survey through a web link provided in their email invitation to participate in the study. The survey resided on a separate web host site operated by Qualtrics, an independent company. The estimated time to complete the survey was 5-7 minutes. Most questions were multiple choice radio buttons with two forced ranking questions, and some narrative questions, usually providing additional choices when answering the prior question with the “Other” option. Question #24, the final survey question, prompted the respondents to state reasons for their choice of “yes”, “no”, or “maybe” in willingness to purchase electronic books.

### *Procedure*

The invitation to participate in the study assured potential respondents that their responses would remain confidential. To that end, the survey program assigned a random identification number to each respondent. The survey was available for ten days in mid-November 2007 prior to the students’ Thanksgiving break. Respondents could ignore any question although they answered most of them. The demographic questions provided the dependent variables with the options selected by the respondents providing the independent variables in the study.

On the primary question concerning adoption potential for electronic books, respondents read a brief overview of the concept including key advantages and disadvantages of the e-book format. In addition to the tabulated results for “Yes”, “No”, or “Maybe” responses, participants described specific rationale for that selection in the following question. These narrative responses were translated into a set of key categories

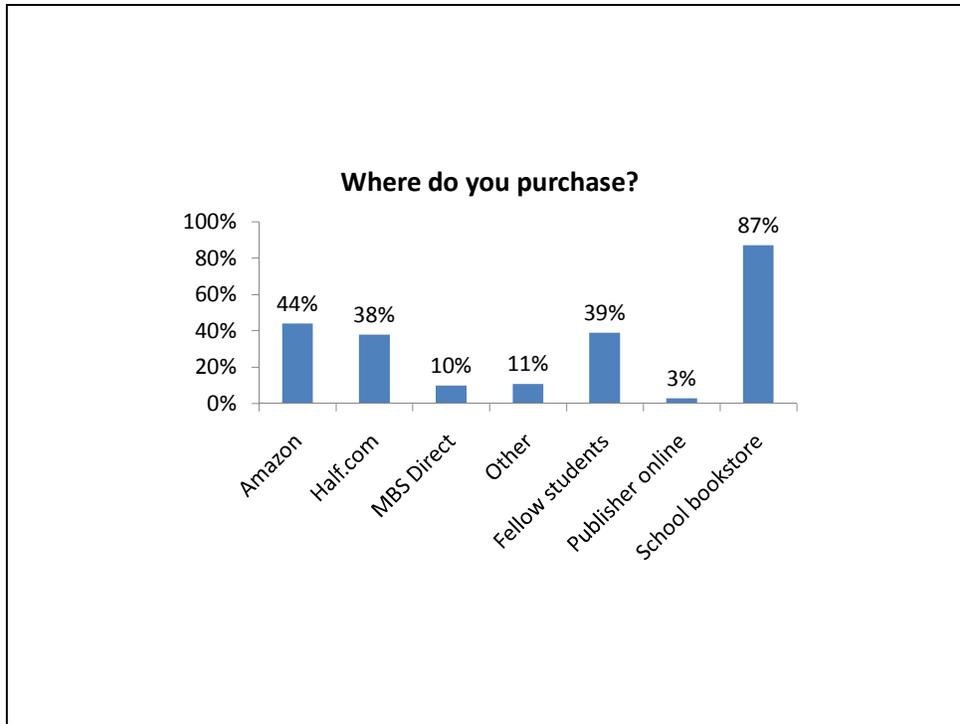
(i.e., cost, technology limitations, prefer traditional books, etc.). Quantification of those categories provided the results described in this research paper (refer to Table 4 below).

The question for preferences on textbook format required the respondents to force rank their choices between: (1) print – new; (2) print – used; (3) electronic download to their hard drives; (4) electronic access online; or (5) audio downloads to iPod/MP3 players. After compiling the weighted values for each option, the results were tabulated, and they are summarized in the ensuing section. This question offers insights into student proclivity to adopt electronic delivery systems over the traditional print media.

## Results

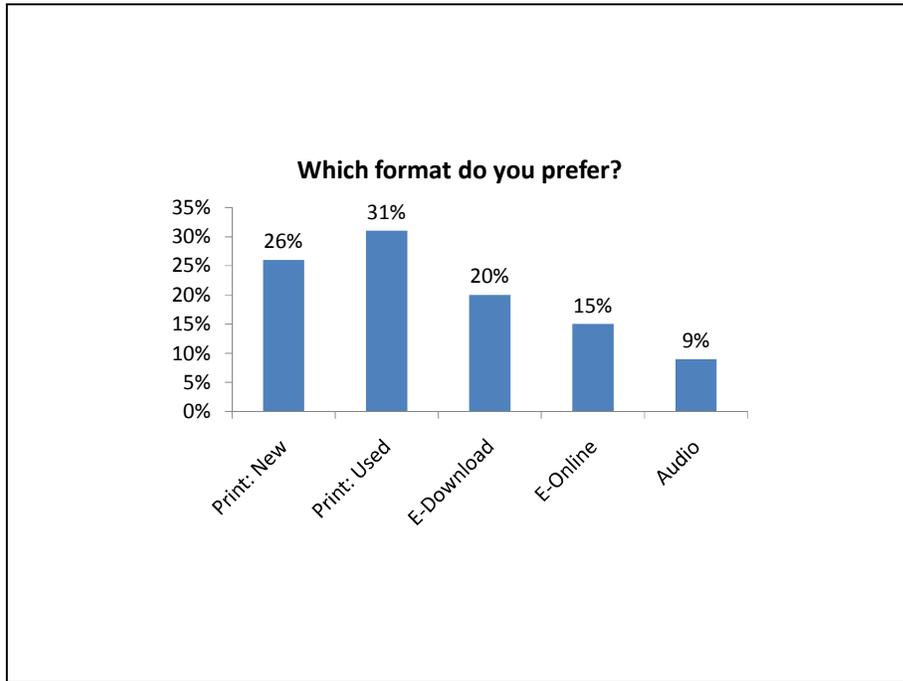
### *Tables and Figures*

Figure 1: Percentage of respondents who have purchased from selected textbook suppliers



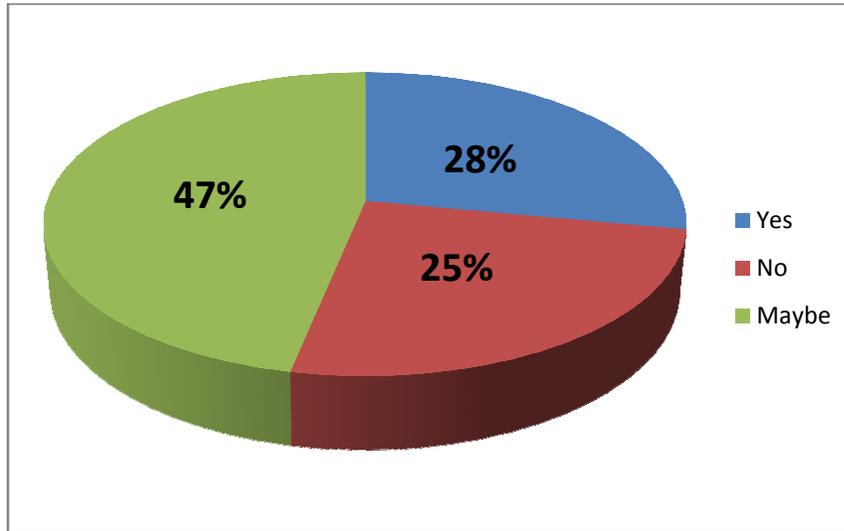
The data contained within Figure 1 above reveals the propensity of the respondents to purchase at least once within the established traditional supply chain provided from the textbook manufacturers and their retail outlets represented by the bookstore for residential courses and MBS Direct for the DLP courses. Respondents could select all sources they have used in the past to purchase their textbooks. Amazon, Half.com, and fellow students represent alternative sources to purchase textbooks and usually represent the desire on the part of students to pay less than the traditional outlets, even used book prices found in both the bookstore and MBS Direct. Detailed analyses of the results in Figure 1 appear in the *Statistical Presentation* section below.

Figure 2: Ranking by respondents on preferences of textbook content delivery systems



Currently, as illustrated in Figure 2 above, most respondents prefer their textbooks in print format (57%) versus electronic format (35%) with only 9% preferring an audio book format. Within the print format, used books prevailed over new books by five percentage points while the same five-percentage point spread exists between the two electronic forms with the download option preferred over the internet access option.

Figure 3: Percentage of student respondents who would consider purchasing electronic books



As illustrated in Figure 3 above, using the raw statistical data, 28% of the respondents stated they would consider using electronic books in the future while 25% declared they would not convert willingly to that format. Of the remaining 47% who stated “maybe” they would adopt e-book format, 75 respondents’ comments about e-books primarily were favorably inclined to try the new format while 137 “maybe” respondents cited mostly negative comments about the proposed e-book format leaving 144 “maybe” respondents with no clear positive or negative bias in their comments. Factoring in these additional skewed results based upon the narrative comments, the adjusted tally reveals 38% “Yes” respondents, 43% “No” respondents and 19% true “neutral” respondents (illustrated in Figure 4 below).

Figure 4: Adjusted proclivity to e-books adoption based upon respondent comments' bias

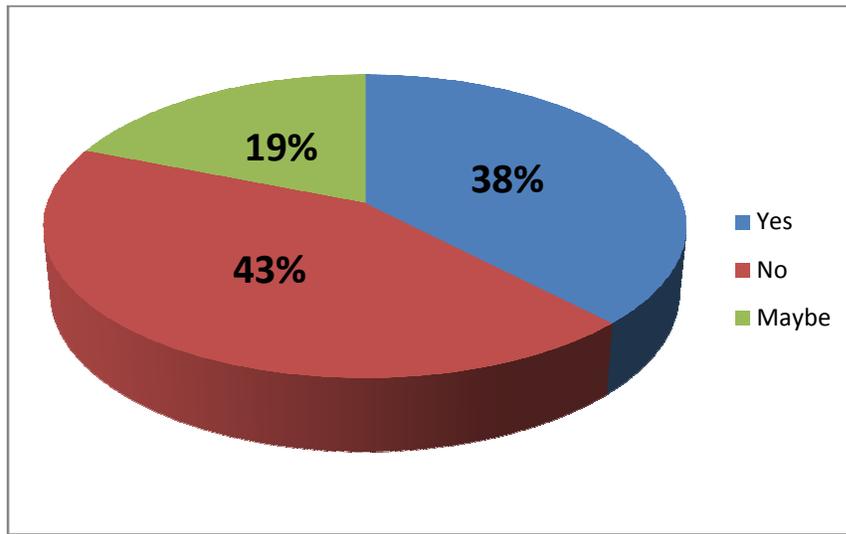


Table 1: Tendency for females to resell while males keep textbooks after term ends

**Crosstab**

			Gender		
			Male	Female	Total
Sell or Keep	Sell textbook	Count	29	85	114
		% within Sell or Keep	25.4%	74.6%	100.0%
		% within Gender	11.1%	16.3%	14.5%
		% of Total	3.7%	10.8%	14.5%
	Keep textbook	Count	47	36	83
		% within Sell or Keep	56.6%	43.4%	100.0%
		% within Gender	17.9%	6.9%	10.6%
		% of Total	6.0%	4.6%	10.6%
	Sell some; Keep some	Count	186	402	588
		% within Sell or Keep	31.6%	68.4%	100.0%
		% within Gender	71.0%	76.9%	74.9%
		% of Total	23.7%	51.2%	74.9%
Total	Count	262	523	785	
	% within Sell or Keep	33.4%	66.6%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
	% of Total	33.4%	66.6%	100.0%	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.212 <sup>a</sup>	2	.000
Likelihood Ratio	22.983	2	.000
N of Valid Cases	785		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 27.70.

b. Normal population distribution equals 33% male; 67% female

Table 2: Males more apt to adopt e-book format than females

**Crosstab**

			Gender		
			Male	Female	Total
Ebooks purchase?	Yes	Count	107	116	223
		% within Ebooks purchase?	48.0%	52.0%	100.0%
		% within Gender	40.8%	22.2%	28.4%
		% of Total	13.6%	14.8%	28.4%
	No	Count	55	143	198
		% within Ebooks purchase?	27.8%	72.2%	100.0%
		% within Gender	21.0%	27.3%	25.2%
		% of Total	7.0%	18.2%	25.2%
	Maybe	Count	100	264	364
		% within Ebooks purchase?	27.5%	72.5%	100.0%
		% within Gender	38.2%	50.5%	46.4%
		% of Total	12.7%	33.6%	46.4%
Total	Count	262	523	785	
	% within Ebooks purchase?	33.4%	66.6%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
	% of Total	33.4%	66.6%	100.0%	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.890 <sup>a</sup>	2	.000
Likelihood Ratio	29.042	2	.000
N of Valid Cases	785		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 66.08.

b. Normal population distribution equals 33% male; 67% female

Table 3: Students who pay textbook bill more apt to adopt e-book format than when others pay

**Crosstab**

			Who Pays?		
			Me	Others	Total
Ebooks purchase?	Yes	Count	171	52	223
		% within Ebooks purchase?	76.7%	23.3%	100.0%
		% within Who Pays?	31.7%	21.2%	28.4%
		% of Total	21.8%	6.6%	28.4%
	No	Count	133	65	198
		% within Ebooks purchase?	67.2%	32.8%	100.0%
		% within Who Pays?	24.6%	26.5%	25.2%
		% of Total	16.9%	8.3%	25.2%
	Maybe	Count	236	128	364
		% within Ebooks purchase?	64.8%	35.2%	100.0%
		% within Who Pays?	43.7%	52.2%	46.4%
		% of Total	30.1%	16.3%	46.4%
Total	Count	540	245	785	
	% within Ebooks purchase?	68.8%	31.2%	100.0%	
	% within Who Pays?	100.0%	100.0%	100.0%	
	% of Total	68.8%	31.2%	100.0%	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.362 <sup>a</sup>	2	.009
Likelihood Ratio	9.662	2	.008
N of Valid Cases	785		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 61.80.

b. Normal population distribution equals 69% Me; 31% Others pay for textbooks

*Table 4: Category totals for narrative comments provided by respondents on e-book adoption*

Categories	Ebook Positive		Ebook Negative		Total Comments	
	Qty	%	Qty	%	Qty	%
Convenience	95	23.8%	77	10.7%	172	15.3%
Environmentally friendly	7	1.8%	9	1.2%	16	1.4%
Highlighting/notes feature	1	0.3%	116	16.1%	117	10.4%
Keeper value	6	1.5%	24	3.3%	30	2.7%
Learning aid	0	0.0%	55	7.6%	55	4.9%
Less bulk/weight to carry	30	7.5%	0	0.0%	30	2.7%
No waiting in lines/hassle	7	1.8%	0	0.0%	7	0.6%
Personal preference	8	2.0%	130	18.0%	138	12.3%
Price	176	44.0%	2	0.3%	178	15.9%
Professor issues	0	0.0%	11	1.5%	11	1.0%
Resale value	16	4.0%	84	11.6%	100	8.9%
Screen/monitor issues	0	0.0%	110	15.2%	110	9.8%
Search engine capability	52	13.0%	0	0.0%	52	4.6%
Technology issues	2	0.5%	100	13.9%	102	9.1%
Other	0	0.0%	4	0.6%	4	0.4%
<b>Total</b>	<b>400</b>	<b>100.0%</b>	<b>722</b>	<b>100.0%</b>	<b>1,122</b>	<b>100.0%</b>

### *Statistical Presentation*

Within the sample illustrated in Figure 1 above, 87% of the students have purchased from the bookstore that sells publishers' products. The bookstore offers new or used condition textbooks. The data suggest that no significant pattern exists with who pays for the books, gender, or residential only versus a combination of residential and distance learning students. College status also followed the normal distribution with a slight increase in the freshman class at 22% of those who purchased from the bookstore where they constitute 19.5% of the sample mix.

MBS Direct is the official provider of textbooks for distance learning students, similar to the role performed by the bookstore for residential students. The one significant

result from the data for MBS Direct was that 84% of the combination residential/DLP students had purchased from MBS Direct while only 8% of residential only students had purchased from the company. This data support the concept that DLP students order through the official textbook distributor in the same way as residential students order through the bookstore.

Amazon and Half.com provided two examples in the survey of online companies in direct competition with the publisher's official sales channel, the campus bookstore, where students can purchase new or used textbooks at discount rates compared with the bookstore prices. Both examples revealed similar demographical patterns. When survey respondents stated that they paid for their own textbooks, they selected Amazon and Half.com more than their counterparts who stated that others pay for their textbooks. Seventy-five percent of those who pay for their own textbooks purchased from Amazon and 76% from Half.com when they constitute only 69% of the sample. Those students with "others" purchasing their textbooks have used Amazon 25% and Half.com 24% when they constitute 31% of the sample.

Those students who participate in distance learning classes in addition to residential courses, selected Amazon and Half.com more than purely residential students. The combination students represent 37% of the sample population but 45% have used Amazon and 46% have used Half.com. Residential only students represent 62% of the sample population, however, only 53% used Amazon and 52% used Half.com. Gender did not factor into Half.com as a significant pattern, but more males have used Amazon than females with males representing 33% of the sample but 38% having purchased from Amazon. Females represent 67% of the sample but only 62% of the females purchased

from Amazon. Class status followed normal distribution patterns with a slight elevation in the upperclassmen over the freshmen and sophomores. The same patterns appeared for purchasing from other students with the stronger tendency to use bypass companies like Amazon and Half.com occurring with those who pay for textbooks themselves, those who take a combination of residential and DLP classes, and upperclassmen. No significant gender bias existed.

In the area of selling or keeping the textbooks at the end of the course, this survey attempted to establish the residual value that a textbook might have in the minds of the students and whether or not that would influence their decision of where to buy their books. No significant patterns emerged in who pays for the books, class status, or residential versus a combination of residential and DLP students. However, females tend to sell their books while males tend to keep their books (refer to Table 1 above). Females represented 67% of the sample population, however, 75% of those who stated they sold their books at the end of the term were females. On the other hand, males represented 33% of the sample and yet 57% of those who kept their textbooks were males.

In determining the key question of the survey, whether or not the students would consider purchasing an electronic book format, no significant patterns emerged for those residential only students versus combination residential and DLP students, or for college status levels. Males were more likely to try the new format than females when 48% of those students who answered “yes” on the question were males though they only represented 33% of the sample; 52% of the respondents who answered “yes” were females but they constitute 67% of the sample. Females replied “no” (72%) or “maybe”

(73%) while their male counterparts represented 28% and 27% respectively of those responses (refer to Table 2 above).

Using “who pays for textbooks” criteria, a strong correlation exists between those who pay for their own books and the willingness to try the lower priced e-books solution (refer to Table 3 above). Those who pay for the books themselves represent 69% of the sample and 77% of those who responded “yes” while those students who have others to pay for the books represent 31% of the sample population and 23% of those who responded “yes” to the question. Those who answered “no” to adopting the e-book format followed their normal distribution curve while those who answered “maybe” came more from the student group where others pay for the textbooks.

Respondents had the opportunity to write narrative comments on why they selected “yes”, “no”, or “maybe” in willingness to adopt the electronic book format. Most of the respondents chose to write a comment. Seventy-eight percent of those who responded “yes” wrote a comment; 89% of those who responded “no” commented; and 79% of those who responded “maybe” provided comments. Each statement within a comprehensive narrative, received an assignment into a category. This resulted in some respondents having multiple statements, covering both positive and negative aspects.

In Table 4 above, all statements’ major categories are listed and quantities for each of the categories tabulated under appropriate columns whether they represented a positive or negative statement for electronic format. Some respondents viewed the e-book format as more convenient while other respondents viewed the printed textbook as more convenient. In Table 4, those who considered the print textbooks more convenient are

represented under the “ebook negative” column while those who considered the electronic format more convenient are counted under the “ebook positive” column. Though a small portion of the overall sample, those represented under the negative column for “environmental friendly” stated that they would not save any trees with the e-books because they would print out most of the book anyway.

Highlights from the data provided in Table 4 indicate that the positive features for willingness to adopt electronic textbooks comprise the lower price, providing a convenient method for storing the content over carrying many heavy print versions, and possessing the ability for rapid search functions to aid study habits. The primary obstacles that electronic textbooks must hurdle, in order to invite more acceptance of the application, include: (1) overcoming traditional preferences of printed materials; (2) providing a means to highlight text and provide marginal notations to aid study habits; (3) reducing or eliminating physical maladies associated with long-term exposure to monitor viewing; and (4) overcoming technological concerns about hard drive crashes, battery loss, connectivity to the network, etc. One complaint not feasible for electronic systems to deliver for the students involves the lack of resale capability. However, with lower prices, students eventually would drop this concern, especially if the retail price for the e-book was lower than the net price after rebate offered by the bookstores.

## Discussion

### *Limitations of the Study*

Mostly undergraduate students participated in this research. Including graduate students as more of the sample might alter the results in a significant way. Limiting the

student population to those enrolled at Liberty University might bias results because of local conditions and processes associated with Liberty and its campus bookstore outlet since a significant amount of dissatisfaction revolved around long lines and “hassles” associated with the buying and selling process here. However, reducing those frustrations would actually benefit the traditional printed format over the electronic format. Further research should investigate the body of knowledge from the medical profession on the physical abnormalities caused by extended exposure to video monitors.

### *Conclusions*

The continuing spiral of escalating textbook prices cannot continue indefinitely and should experience a significant paradigm shift soon given the pressures that are mounting against maintaining the status quo. The fact that publishers are exploring alternative delivery methods in an effort to lower costs for students suggests that they understand the realities facing them. What is the optimum solution to this dilemma? It may not include offering electronic textbooks given the results from this study’s research.

In order to alleviate some of the major concerns stated by these students, the e-books format must adapt to common features offered by the print books such as ability to highlight, ownership of the content without removing it after the course term ends. The scientific community must determine how to minimize, if not alleviate, the physical reactions such as headaches, eyestrain, etc., in order to convince students to adopt that technology medium. E-book pricing should aim for the same approximate level as the net price achieved by purchasing a new or used textbook less the rebate allowed by the bookstore in a repurchase transaction.

The future technology of e-books should provide larger screens requiring less scrolling function to view the content and yet provide sufficient portability to replace carrying many bulky print textbooks. The more that the new technology can recreate the same “feel” as the traditional print textbook, the quicker and more extensive the adoption by this generation of college students will occur.

### *A Christian Perspective*

The most surprising result from this study centers around the complaints of the predominantly Generation Y survey participants concerning the fatigue and headaches they experience already in their young lives from overexposure to viewing computer screens. This generation has embraced technology as none before, and their complaints raise the question of reaching possible saturation levels accumulated over years of playing games, watching programs and communicating through digital monitors. When does one hear of fatigue or health-related issues occurring from overexposure to the viewing of a sunset over the mountains, or gazing upon flowers blooming in the spring, or marveling at God’s majestic splendor arrayed throughout His creation?

Technology advancements create awe and wonder among modern man, but at what price? The psalmist declared, “I will meditate on your majestic, glorious splendor and your wonderful miracles” (Psalm 145:5, NLT). The prophet further proclaimed, “There will be an abundance of flowers and singing and joy! The deserts will become as green as the mountains of Lebanon, as lovely as Mount Carmel’s pastures and the plain of Sharon. There the Lord will display his glory, the splendor of our God. With this news, strengthen those who have tired hands, and encourage those who have weak knees” (Isaiah 35:2-3, NLT). One lesson learned from this study should serve as a reminder to

“think about things that are pure and lovely and admirable. Think about things that are excellent and worthy of praise” (Philippians 4:8, NLT). Life may become more pleasant and rewarding then.

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