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Student Perceptions of the Learning Effectiveness of Printed Versus Digital Textbooks in College Accounting Classes

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Abstract

Previous studies investigated the use of e-texts with regard to creating stress for students and whether or not e-texts are beneficial for student understanding. This study adds to the literature as it investigates college student perceptions of the usefulness of e-texts versus printed texts in learning accounting. Undergraduate and graduate accounting students in online, hybrid, and face-to-face courses with access to e-texts, in-print text purchases, and in-print text rentals at two postsecondary institutions in North Texas answered questions about whether using e-texts or printed texts better aided them in learning accounting. Students answered questions about their preference in textbook format and were asked, as open-ended questions, to explain their preferences in learning with purchased printed texts, rented printed texts, and e-texts. T-tests are used to determine if the choices in each hypothesis tested are significantly different from one another. Results indicate that a vast majority of those surveyed report better learning with the use of a purchased, printed text.

Keywords: accounting education, e-text, learning technology, accounting texts, learning accounting, reading comprehension.

I. INTRODUCTION

New technologies continuously, and sometimes even miraculously, improve the human condition. From the invention of the wheel, to the guidance of the sextant, to the artificial intelligence and machine learning of today, human fascination with new technology waxes rampant. Today's pervasive thought appears to be that, if some technology is good, more technology must be better, and new technology will be even better yet. The iPhone 13 was good, but surely the iPhone 14 will be even better.

Technology is used more and more in education. Increasing emphasis on technological advances and the importance of students' understanding technology in general—business students in particular—drives educators to seek new methods to both assist learning and benefit students after graduation (Bessai, 2014). The use of technology in learning accounting and performing accounting tasks is so widespread that, in today's business schools, assessment of technological literacy is an essential success measure (Grenci, 2013).

As college tuition and fees continue upward (CollegeBoard, 2015), postsecondary institutions seek ways to lower the cost of texts (Marklein, 2012) as one way of reducing overall college costs (Miller, 2012). The digital book provides one new technology with the possibility of cost reduction. Just because the e-text is a newer technology, however, does not mean it is better in all situations and for all purposes. In colleges and universities, the primary focus should be on what best helps students learn. The

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purpose of this study, therefore, is to help determine the format of text that best helps students learn accounting.

II. LITERATURE REVIEW

2.1. History of the Accounting Textbook

Books have been an essential part of learning for millennia. Records of accounting information date back as far as the ancient city of Jericho, 8000 B. C. E. (Giroux, 2017), and accounting instruction is found even in the Bible (Hagerman, 1980). It was not until 1494, however, when monk and mathematics teacher Luca Pacioli published a textbook with a chapter on accounting that, thanks to the Gutenberg printing press, was shared around Europe. Over time, accounting practices, in verbal and printed form, came from Europe to the Americas. In 1789, American math teacher Thomas Sarjeant published an introduction to the counting house with 52-pages used to explain and teach double-entry bookkeeping (McMickle & Jensen, 1988). While books were widespread, texts did not become widespread as the preferred medium for educational purposes until the late 19th century (Darnton, 1982). Gradually, book publishers provided materials for almost every discipline.

Today's digital formats provide the most significant change in books since the development of Gutenberg's printing press. The number of e-books in university libraries now is massive. Reading digital materials, such as newspapers, is a conventional method of access (Lam et al., 2009). Technologies are already available at schools to expand the library media center's collection of e-books, thus making many books more accessible to students at more reasonable prices. The University of Virginia's I.T. team has turned its entire library into a digital format, eliminating the process of checking out books entirely. Called the "electronic text center, many resources were found to be ineligible for online access, usually due to copyright reasons" (UVA Library, 2015). E-texts are now available for almost every subject from major and minor publishers.

2.2. Use of e-Texts

There is little research on the use of e-texts in college classes. Many faculty and administrators assume that students want to purchase e-books because they are often less expensive than new editions of hardcopy printed texts. Moreover, even less has been done to research the use of e-books in learning a specific discipline. In general, therefore, students' perceptions of the methods and value of using digital educational materials are not well known.

Lam et al. (2009) found that students' perceptions of the use of e-books in classrooms changed over their time of use. One group of students was provided with e-books accessible on computers or mobile book readers. These students recorded initial impressions of e-books. The second group of students was assigned work over a 12-week reading period. Results suggested that the technology has the potential to enhance teaching and learning in a university setting. However, while most students reported an initial positive reaction, students using the e-book over time showed decreased satisfaction, preferring to return to the printed text.

Anderson-Inman and Horney (2007) noted that e-books could be adapted to assist with improving reading. They also indicate that modifying textbooks without using computer technology for specific audiences has shown positive results through various means, such as reading text aloud to students, using related pictures, and other methods. Many of the strategies for improving reading skills are believed to be

appropriate for use with today's e-books and electronic readers (Schumm & Stickler, 1991).

One experiment shows that the cost of digital books may help their use among those who can afford them. However, another study suggests that, while students find e-books acceptable in reading for pleasure, they may not be as helpful or helpful in use as college class textbooks (China Daily, 2006).

Selvaratnam (2008) found that different students react differently to e-books. While some students embraced online e-text technology, others reported a preference for printed texts. Another study looked at brief, online summative assessments in helping students learn accounting. Per student self-reports, short online assessments that require the students to sum the data are helpful for students in learning accounting (Marriott & Lau, 2008).

In promoting the Kindle, Amazon partnered with Arizona State University, Case Western Reserve University, Princeton University, Reed College, and the University of Virginia. Amazon provided their students with Kindles loaded with all necessary class materials. Universities involved hope that students would print less, spend less money on their textbooks, and find the e-book format equal to the traditional printed textbook. Results show that, while the students were at first excited about the new format, students at all levels of undergraduate and graduate classes reported disliking the e-book and preferring in-print text (Vault Education, 2010).

Researchers at Notre Dame provided students with iPads as a replacement for regular hardcopy texts to determine if digital books work well in the classroom. Findings suggest the "greatest value of the iPad may not be its ability to function as an e-book, but instead its capacity to consolidate or aggregate information" (Angst & Crutchfield, 2011). Students reported that the iPad made the class more interesting, encouraged exploration, gave them additional tools, and helped them manage their time. Some problems noted involved technology failures, interruptions with the need for repairs, and cost. Additionally, most students in Angst's study reported frustrations in taking notes on the iPad and found that a computer was more helpful in that multiple windows or files could not be kept open on the iPad as with a computer (Woyke, 2011).

Goodwin (2014) compared e-books at the Duke library to the same texts used in hardcopy. While 73 percent of the e-books garnered enough interest for someone to click on them, only 12 percent of the online texts showed substantive use. Students clearly preferred to access the hardcopy versions of the book. Tsai and Yen (2014) discovered that the perceived ease of use of e-readers did not show significant impacts on the readers' choices to use an electronic reader over a hardcopy book.

Educational book providers report that there is an increased use of e-texts, indicating that 79% of students state having used an e-text; 53% said that they would likely to read if the material is accessible on other mobile devices, while 40% of students report that e-texts do not add to their learning and studying (Course Smart, 2013). Another report, however, states that the increase in book purchases in 2012 only saw a one percent increase in e-texts (E-texts are not leading the digital transformation, 2013).

Buntrock (2011) asks if e-books are merely the proverbial "better mousetrap". He points out that ownership issues are an issue with digital technology because one only has access during the subscription period, asking whether the e-text and e-books are blessings or curses. While cheaper in the short-term, they are more expensive in the long-term.

E-texts are being adopted rapidly (DeNoyelles & Raible, 2017). They can be less expensive, easy to access, and updated more frequently than printed texts (Ross et al., 2017). Many research studies show that students prefer reading from a book than from a screen and tend to concentrate and retain information better (Greene, 2018).

Alexander and Singer (2017) report that while students discuss a preference for using a screen in many instances, the students' overall comprehension was better for print versus digital reading. Therefore, learning was more effective, even though students indicated that they could read faster on a screen. Other research suggests that students are more engaged with e-texts and learn more effectively (Abaci et al., 2017).

Students in college classrooms today have grown up with computer technology. One might logically assume, therefore, that students who are part of this technologically savvy generation will respond better using digital e-books and prefer them over printed texts. However, Naomi Baron's recent book suggests that, when given a choice of a cell phone, tablet, e-reader, laptop, or hardcopy book, 91% of all students queried indicated that they could concentrate best when reading from a hardcopy text (Baron, 2015).

The ultimate technological contrarian, Stoll (2000), warns that assuming more or newer technology is always better is a mistake. Technology has not, in Stoll's opinion, improved society in every instance. In fact, the use of technology has, in many cases, per Stoll, made humans weaker and reduced skills and knowledge. For this reason, humans should take care of adopting every new technology just because it exists (Stoll, 2000).

2.3. This Paper's Addition to the Literature

While previous studies examine the growing use, cost savings, and summative statements online in aiding learning accounting, no studies specifically address student perceptions of the value of learning accounting using e-texts versus printed texts. This paper adds value to the literature by studying the value of e-texts and printed texts in learning a specific discipline – accounting.

2.4. Research Problem and Research Question

Accounting is a complex discipline to learn, yet essential knowledge for all businesspersons. Even more, all persons need some understanding of accounting to improve their financial literacy and resultant financial health. Because of the difficulty in learning accounting, academics continuously seek the most helpful tools and methods to aid student learning. If one form of material better serves the purpose of learning, professors should choose that format.

Therefore, this study's specific research question examines what students report about the type of materials that best help them learn accounting—printed texts or e-texts.

III. RESEARCH METHODOLOGY

3.1. Methodology

This study surveys 159 undergraduate and 138 graduate students taking accounting classes at two colleges and universities in North Texas to determine students' impressions of the most effective form of text format for use in learning accounting, including purchased printed texts, rented printed texts, and e-book access rented online. Nine students turned in incomplete surveys, leaving 288 total students in the usable sample. Demographic data were collected on the following items: 1) age; 2) gender; 3) college major; 4) online, hybrid, or traditional course setting; 5) university attended; 6) concern about book costs, and 7) graduate or undergraduate student.

Students answered questions about their preference in textbook format and were asked, as open-ended questions, to explain their preferences in learning with purchased printed texts, rented printed texts, and e-texts.

T-tests are used to determine if the two choices in each hypothesis tested are significantly different from one another. Additionally, demographic data is included in a multivariate regression model to determine if age, gender, level of coursework, course delivery method, university, and concern for book price are significant in the student decision for each hypothesis.

The model created for that purpose is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 \dots\dots\dots (1)$$

Where:

Y = text format preference;

X₁ = age;

X₂ = gender;

X₃ = major;

X₄ = course delivery method;

X₅ = university attended;

X₆ = concern about costs; and

X₇ = graduate versus undergraduate.

3.2. Hypotheses

The first hypothesis tests if students report learning more effectively when using printed texts or e-texts in college accounting classes.

H₀₁: students do not report learning more effectively using printed texts than using e-texts in college accounting classes.

H_{a1}: students do report learning more effectively using printed texts than using e-texts in college accounting classes.

Hypothesis 2 investigates whether students prefer renting printed textbooks over purchasing printed textbooks.

H₀₂: students do not prefer purchasing printed texts over renting printed texts for use in college accounting classes.

H_{a2}: students do prefer purchasing printed texts over renting printed texts for use in college accounting classes.

IV. RESULTS AND DISCUSSIONS

4.1. Hypothesis 1

Of the 288 accounting students surveyed, a vast majority (94%) indicate that they find learning more effective using printed texts in accounting classes. This leads to rejection of the null for Hypothesis 1 and acceptance of the alternative that students self-report greater learning using printed texts. Gender, major, class delivery method, university attended, concern for costs, and graduate versus undergraduate level had no statistically significant p-values to suggest that these variables help explain the choice. There was slight significance in age as a factor in the student decision ($p = < .09$).

Insert Table 1 here.

An analysis of the open-ended questions reveals what students like and dislike about e-texts. Most (78%) indicate that they dislike the digital text because they cannot write extensive notes by hand. The need to write notes by hand as an aid to learning makes sense based on research on the brain. When we write something down by hand, we put an extra degree of thought into what we are recording, "evaluating and ordering the information that we are recording," literally having to explain it to ourselves to

record it (Wax, 2007). In essence, when we write things down by hand, our minds tend to do a mini-rehearsal or review of the material; it is as if we are doing that thing in our minds. This is very different from typing things on computers or typing notes from another source, which can become mindless—especially for good typists. We learn and remember things better when we write them out by hand (Wax, 2007).

Table 1
Regression Results for Hypothesis 1

Parameter	Estimate	95% CI	SE	t-stat	p-value
R²	.041				
R² adjusted	.017				
RMSE	.33				
Constant	.3316	.1466 to .5167	.094020	3.53	.0005
AGE	-.005412	-.01166 to 8.341E-04	3.1731E-03	-1.71	.0892
GENDER	.01830	-.05991 to .09652	.039732	.46	.6454
MAJOR	-.03147	-.1586 to .09567	.064586	-0.49	.6265
DELIV	-.03513	-.09142 to .02116	.028595	-1.23	.2203
UNIV	-.05330	-.1370 to .03043	.042532	-1.25	.2112
COSTS	-.01303	-.09477 to .06871	.041526	-0.31	.7539
LEVEL	-.05531	-.1616 to .05100	.054009	-1.02	.3067

Other open-ended responses (19%) indicate that the students dislike purchasing access to an accounting text that will only be available for a limited period. Many students in accounting classes – particularly upper-level accounting classes – are planning to sit for the C. P. A. exam. Therefore, they plan to keep their books for future study. This supports Buntrock's (2011) notion that limited-time access is a deterrent to purchasing.

Most students surveyed (72%) report that the use of e-books causes additional eyestrain over in-print texts. Various studies confirm that eyestrain is more pronounced with digital monitors over traditional books (Eisenbaum, 1996). Per their reports, this eyestrain manifests itself in the form of dizziness, blurred vision, headaches, and, in some cases, nausea. To minimize this problem, reading done via screen should always have proper lighting and position for reading. Moreover, when reading via computers or mobile readers, one should take breaks every 30 to 45 minutes, looking away from the monitor and resting the eyes, back, and neck (Eichenbaum, 1996).

On the positive side of the e-text discussion, some students (22%) report appreciating the reduction of costs with e-books over traditional printed texts. However, most students (64%) indicate that they can usually purchase printed textbooks in a used, loose-leaf, or international format at the same cost or less than an e-book or printed text rental prices. Several students indicated that if they are given the text information early enough, they can often purchase the text for a significantly lower cost.

Most students (81%) report finding e-books acceptable for use in temporary research projects and casual reading. They do not mind using digital sources in writing papers or providing additional data for course projects. Therefore, the e-book seems a logical choice for libraries in the minds of these accounting students.

4.2. Hypothesis 2

Respondents answered questions about preference for rented textbooks or purchased textbooks. Results indicate that, of the 288 students surveyed, 207 students (72%) report a preference for buying accounting texts. Therefore, we reject the null of

Hypothesis 2 in favor of the alternative, which suggests the students prefer purchasing hardcopy accounting texts over renting them.

Table 2
Regression Results for Hypothesis 2

Parameter	Estimate	95% CI	SE	t-stat	p-value
R²	.013				
R² adjusted	-.115				
RMSE	.33				
Constant	.150196	.1466 to .5167	.0951157	1.57909	.11545
AGE	-.0005	-.01166 to 8.341E-04	.0031678	-.1575	.87493
GENDER	-.0351	-.05991 to .09652	.039463	-.8894	.37454
MAJOR	.036761	-.1586 to .09567	.0640976	.57351	.56676
DELIV	-.02848	-.09142 to .02116	.0283415	-1.0048	.31584
UNIV	-.01092	-.1370 to .03043	.0423019	-.2581	.79652
COSTS	.000986	-.09477 to .06871	.0411741	.02394	.98091
LEVEL	-.02722	-.1616 to .05100	.0533367	-.5103	.61025

Student open-ended responses indicate that, while some students show an appreciation for the reduced cost of textbook rentals (12%), several students indicate having difficulties with book rentals. Notably, students dislike not being allowed to make notes in their rented textbooks (71%). Five students reported having bad experiences with returning their rented textbooks. One was charged the full purchase price of the text because the book was deemed to have arrived after the return due date. One student, who used a rented version in an A. P. Accounting classes in high school, found that the due date for return (mid-May) arrived before the end of their A.P. Accounting classes (early June). Others were charged the full price of the text upon returning it with highlighting that was considered “excessive” by the text rental companies.

Course level appears to be a significant factor in the decision ($p < .05$), as graduate students preferred purchasing books over renting them in greater numbers than undergraduate students. This may be because many graduate students are working and have their books purchased by their employers. Many students discussed their plan to keep their accounting textbooks. Therefore, they will not consider any form of a book except a hardcopy, printed text. This may be common for all students who are accounting majors and plan to sit for the C. P. A. exam eventually. Their texts become sources of study for the exam with which they already have comfort and familiarity, making it easier to look up items.

V. CONCLUSION, LIMITATIONS AND SUGGESTIONS

5.1. Conclusion

Accountants need and use technology freely on a daily basis. Therefore, the use of technology is and should continue to be an essential part of college accounting classes. Students complete problems using Excel, must learn the use of accounting software packages, and often are assigned homework on homework software packages accessed online. However, when learning accounting, it may be that new technology is not necessarily the best choice. E-books may not be as helpful to students of accounting as are the traditional printed texts. A significant majority of the accounting students surveyed suggest this, preferring to purchase a printed version in which they can take notes that they can keep permanently.

Indeed, the increasing cost of college is an ongoing concern, one smaller part of which is the cost of textbooks. One study suggests that college students are paying 864

percent more for the newest version of hardcopy, printed textbooks than their parents did in 1978, as compared to the 588 percent increase in medical care and 375 percent increase in home purchase costs during that same period (Perry, 2009). This is likely because of the new markets for texts, making it impossible for publishers and bookstores to control the sale of texts. Amazon.com, Half.com, and other online purchase sites are stealing the market for used texts, and publishers have raised prices in an attempt to maintain profits. However, students have access to markets for used books, loose-leaf versions, and rentals like never before, and their actual costs for books are not nearly as the hardcopy costs comparisons imply. Savvy students find ways to save money on their texts on these sites and with other methods, such as sharing books with students taking the same class and using books reserved by professors in the library.

Unfortunately, money is, although arguably inappropriate, too often a measure of what is good in college classrooms. If it saves money, it must be better. This study and other studies thus far performed do not support that premise when it comes to savings from the use of e-books in accounting classrooms. What educators and legislators must emphasize as most important is providing students with the best learning tools available—the ones that do the most to help students understand, retain, and evaluate the data they are learning. This study suggests that e-books, in their current form, may not be the best choice for students in accounting classes, regardless of possible cost savings.

Perhaps the next significant change will be eliminating books as we know them. Instead, professors may create their materials or form online modules to convey the content. Some schools are already opting to use free, open-sourced materials (McMurtrie, 2017). Whatever decision is made, those genuinely interested in real education will do so with the goal of choosing the best sources to aid real learning.

5.2. Limitations of the Study

This research aims to discover what students believe about using e-books, purchased printed texts, or rented printed texts in better learning accounting. The sample is a convenience sample of only 288 students, and the results cannot be generalized to the entire population of accounting students. Moreover, this study queried students in accounting classes about accounting texts. Its results cannot be extended to any other learning discipline. While the results are overwhelmingly opposed to the e-book format, more work should be done to determine if e-books are considered helpful in student learning in accounting classes and classes covering other disciplines.

5.3. Suggestions for Future Research

Research on the use of e-books in the college classroom is new. Therefore, much inquiry is needed to determine where e-books are the most useful in college classrooms. Future studies might examine the use of e-books in classes comparing undergraduate accounting students with graduate accounting students, between students who are accounting majors and students who are not accounting majors, between accounting students in online courses versus students in face-to-face classes, and between accounting students who do and do not plan to take the C. P. A. exam. It appears to be an assumption that printed texts are always more expensive; however, many respondents in this study report being able to get printed texts at far lower costs. A study to determine the actual costs of books should be done, considering inflation-adjusted costs with all options now available for purchase.

Rodrigues (2004) reports that learning accounting may be better served with different activities and tools than those used in other kinds of classes. Future research may determine that students learning other disciplines find e-books to be useful in their learning processes. New technology may improve e-texts access and optimize student user experience (DeAngelis, 2020). Finally, researchers should investigate the costs and efficacy of using printable e-texts.

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Appendix 1

Class Exercise Survey

1. For best learning in accounting classes, I prefer to use: (check one)
 - a) eTexts _____
 - b) Printed texts _____
 2. For casual reading, I prefer to use: (check one)
 - a) Online books/book readers _____
 - b) Printed books _____
 3. When using printed texts in accounting classes, I prefer to: (check one)
 - a) Purchase my printed texts _____
 - b) Rent my printed texts _____
 4. Overall, I believe that I my learning in accounting classes is best enhanced by using: (check one)
 - a) Printed texts _____
 - b) eTexts _____
 5. I find it easier to read with overall comprehension when I read: (check one)
 - a) Printed data _____
 - b) Online data _____
 6. For research purposes, I prefer to use: (check one)
 - a) Online database sources _____
 - b) Hardcopy sources _____
 7. True or false. I always read the chapters as assigned for my accounting classes
 - a) True _____
 - b) False _____
 8. I understand the material that I read for my accounting classes better if I read: (check one)
 - a) All material before class discussions _____
 - b) All material after class discussions _____
 9. Check one:
 - a) Female _____
 - b) Male _____
-

To be continued Appendix 1.

10. Check one:
 - a) Undergraduate student _____
 - b) Graduate student _____
 11. Check one: the class that I am taking right now with this survey is an
 - a) 100% Online class _____
 - b) Hybrid class (part online and part in the classroom) _____
 - c) 100% face-to-face class _____
 12. Check one to indicate your major:
 - a) Accounting _____
 - b) Other _____
 13. Check one:
 - a) Cost of tests is a major concern in choosing my texts _____
 - b) Cost of texts is not a major concern when choosing my texts _____
 14. Check one for university you are attending:
 - a) College 1 _____
 - b) College 2 _____
 - c) College 3 _____
 15. Choose one to indicate your age:
 - a) Age 18 to 22 _____
 - b) Age 23 to 28 _____
 - c) Age 29 to 35 _____
 - d) Age 35 to 49 _____
 - e) Age 50 to 60 _____
 - f) Over 60 _____
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