Textbook Readability and Student Performance in

Online Introductory Corporate Finance Classes

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Abstract

This paper examines whether the choice of a more readable textbook can improve student performance in online introductory corporate finance classes. The ordinary least squares regression model is employed to analyze a sample of 206 students during the period from 2008 to 2012. The results of this study show that the student's age, student's major, student bachelor's degree obtained, and number of hours a student works are significant determinants of student performance. In contrast to my expectation, I find that the choice of a more readable textbook does not improve student performance.

Keywords: Online Learning, Textbook Readability, Student Performance

INTRODUCTION

Selecting a textbook with good content quality for an online course can be one of the critical success factors for online distance learning in higher education. As suggested in Cheawjindakarn, Suwannatthachote, and Theeraroungchaisri (2012), well-designed and well-written textbooks not only help instructors design course content to provide a meaningful educational experience, but help students improve their learning outcomes. While the decision to adopt a textbook depends on the course objective, chapter organization, and online teaching supplements, textbook readability can be an important factor when students express their opinions about the textbook in teaching evaluations. Students complain that the writing style in the textbook is difficult or not clear, and therefore, they cannot grasp concepts effectively or perform well on required assignments and exams.

Students' complaints about the choice of textbook may be valid, especially in online introductory corporate finance classes. Since the introductory corporate finance is a quantitative subject, a poorly written textbook may compound problems for students who have difficulty in dealing with numbers and equations. If instructors adopt a textbook which presents finance theories and applications in a more readable manner, students may learn better and be able to obtain better grades in the course. Therefore, this paper intends to examine the relationship between textbook readability and student performance in online introductory corporate finance classes.

Textbook readability can be valuable information for business faculty since, as indicated in Smith and DeRidder (1997), textbook comprehensibility is weighed as the most important criteria for making textbook adoption decisions. Textbook comprehensibility can be measured, in part, by using readability formulas recognized in Fry (1989, p. 294) for "one of the best

documented educational tools that we have." Motivated by the results associated with readability analysis of introductory corporate finance textbooks in Plucinski and Seyedian (2013), this study attempts to establish the relationship between textbook comprehensibility and student performance by examining whether the difference in readability of two popular textbooks for introductory corporate finance leads to a statistical difference in online student performance. The following sections provide literature review, describe the data and research method, report the results, and provide concluding remarks.

LITERATURE REVIEW

Researchers in finance education have examined the importance of textbooks in students' learning experience in introductory corporate finance. Berry, Cook, and Stevens (2011) explore how and to what extent students use the finance textbook and how it relates to their study process when preparing for class and exams. They assess whether the finance textbook is the main vehicle for the students' learning plan and to what extent they rely on their textbook. They find that students know it is important to read, realize the professor expects them to read, and understand it will impact their grade, yet most students still do not read the textbook. Though many factors can lead students to not read the textbook, one of the endogenous variables that instructors can control is the readability of the textbook.

McLaughlin (1969) defined readability as the degree to which a class of people finds certain reading matter compelling and comprehensible. In other words, readability refers to the general difficulty level of written material which can affect readers' comprehension. The average length of sentences and the average syllables per word are the most important variables to determine readability levels. Many readability indexes or formulas have been developed to measure readability. Examples of readability indexes include the Flesch Reading Ease formula

(Flesch, 1948), the Flesch-Kincaid Grade Level Index (Pearson, 2002), the Gunning-Fog Index (Gunning, 1979), and the SMOG method (McLaughlin, 1969).

Readability analysis of textbooks has been conducted in various business disciplines (e.g., business communication in Razek and Cone (1981), organizational behavior in Villere and Stearns (1976), introductory economics in Gallagher and Thompson (1981), financial accounting principles in Chiang, Englebrecht, Phillips, and Wang (2008), introductory financial and managerial accounting in Plucinski, Olsavsky, and Hall (2009), intermediate accounting in Plucinski (2010), bank management in Weber (2002), and introductory corporate finance in Plucinski and Seyedian (2013)). Plucinski and Seyedian (2013) use the Flesch-Kincaid Grade Level which rates text on a U.S. school grade level to examine the readability of selected chapters in five popular introductory corporate finance textbooks in the market. These chapters on time value of money, risk analysis, valuation and rates of return, working capital management, financial analysis, and financial planning and forecasting are usually covered in any Introductory Corporate Finance classes. They find that Ross, Westerfield, and Jordan's *Fundamentals of Corporate Finance* (2010, 9th Edition) with the Flesch-Kincaid Grade Level 10.1 (i.e., a tenth grader can understand the textbook) is the most readable of all textbooks in the study. Given this finding and assuming that a textbook with low Flesch-Kincaid Grade Level provides good comprehensibility, the natural question that needs to be answered is whether the choice of a more readable introductory corporate finance textbook can improve student learning experience, thereby helping students achieve better grades.

While research studies have not extensively addressed the effects of different introductory corporate finance textbooks on student performance, the relationship between textbook readability and student performance has been examined in other areas. Spinks and

Wells (1993) use the Gunning-Fog Index to compare the readability levels of textbooks used in various business core courses with grades made by students in those courses. They perform correlation analysis on the relationships between textbook readability levels, grades earned by students, and withdrawals of students from courses. They find that the higher the Gunning-Fox Index (difficulty level) of textbooks in business core courses, the lower the grade averages in those courses. Pyne (2007) examines whether students who used different introductory microeconomics textbooks performed differently when they subsequently took Intermediate Microeconomics and Money and Banking. He finds that the choice of an introductory microeconomics textbook has a significant effect on student performance in Money and Banking, but not in Intermediate Microeconomics. He explains that the difference in the effect of an introductory microeconomics textbook is due to course content and student interest; that is, the topics in Money and Banking correspond less closely to those covered in Introduction to Microeconomics, and Intermediate Microeconomics is more likely to attract students with an interest in economics than is Money and Banking. Durwin and Sherman (2008) investigate whether the choice of college textbook for Educational Psychology affects students' comprehension of the materials. They use two education psychology textbooks with comparable readabilities (evaluated by using the Flesch reading ease formula) to examine differences in comprehension between students who are randomly assigned to one of two tests prepared in the textbooks. They find that the two educational psychology textbooks with different authors and publication dates, but comparable readabilities, attribute no significant difference in student comprehension.

According to various studies, students who take introductory corporate finance courses in distance learning formats significantly underperform students in the traditional sections of this

course. Shum and Chan (2000) find that remote-site interactive television students have statistically significant poorer performance relative to regular students, and Van Ness, Van Ness, Adkins (2000) find that students who take introductory corporate finance online receive lower grades than those who take the class in a traditional classroom setting. Students who receive poor grades in online introductory corporate finance classes tend to give their instructors poor teaching evaluations. Farinella (2007) states that a professor who teaches an online section of introductory finance can expect to earn significantly lower student evaluations relative to a traditional section. Chang, Lawrence, and Prakash (2012) also find that the instructors' evaluations are inversely related to the percentage of students expecting poor grades. If choosing a more readable introductory corporate finance textbook can improve online student performance, instructors may obtain better student evaluations.

DATA DESCRIPTION

This study was conducted at a four-year state university in the Appalachian region of the United States. The School of Business Administration, accredited by the AACSB International (Association to Advance Collegiate Schools of Business), has three departments: Department of Accounting, Economics, and Finance, Department of Information Systems, and Department of Management and Marketing. The Introductory Corporate Finance class is a required core course for all undergraduate business majors. Before taking Introductory Corporate Finance, students are required to complete the prerequisite courses in Principles of Financial Accounting, Principles of Managerial Accounting, Principles of Microeconomics, Principles of Macroeconomics, and College Algebra.

Two hundred six students in ten sections of Introductory Corporate Finance online classes from 2008 to 2012 are the participants in this empirical study. The students in the sample

were taught by only one instructor; therefore, this study avoids the confounding effects of different instructors and different teaching methods.

Two different introductory corporate finance textbooks were used in the study. The textbook, *Foundations of Financial Management* (2009, 13th Edition) by Block and Hirt (BH), was used in five sections from the 2008 fall semester to the 2010 spring semester, and *Fundamentals of Corporate Finance* (2010, 9th Edition) by Ross, Westerfield, and Jordan (RWJ) was used in five sections from the 2010 fall semester to the 2012 fall semester. The readability of both textbooks was analyzed in the Plucinski and Seyedian (2013) study, and the results show that RWJ with the Flesch-Kincaid Grade Level 10.1 (compatible to a tenth grade U.S. school level) is relatively more readable than BH with the Flesch-Kincaid Grade Level 12.7 (compatible to a twelfth grade U.S. school level). The introductory corporate finance class covers topics such as financial statements and analysis, time value of money, bond and stock valuations, capital budgeting, cost of capital, working capital management, and international financial management.

The variables used in this study are primarily associated with student effort, student characteristics, and course characteristics. Student effort is measured by the student's course grade, which is based on homework assignments (25%), quizzes (20%), and exams (55%). Student characteristics such as gender, in-state/out-of-state status, and major were collected through the faculty advising system at the university. Additional student characteristics such as age, transfer status, number of degrees earned, and number of working hours were collected through survey conducted in the first week of the semesters. These variables have been examined in studies such as Didia and Hasnat (1998), Borde, Byrd, and Modani (1998), and Terry (2002). The variables used in this study are defined as follows. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. AGE is a continuous variable showing students' ages.

FROM is a dummy variable where an in-state student is equal to 1 and 0 otherwise. AF is a dummy variable where a student, who is an accounting/finance major, is equal to 1 and 0 otherwise. TRANSFER is a dummy variable where a transfer student is equal to 1 and 0 otherwise. BD is a dummy variable where a student with a bachelor's degree is equal to 1 and 0 otherwise. WORKHR is a continuous variable showing the number of hours that students work. Finally, BOOK is a dummy variable where the class adopting the RWJ textbook is equal to 1 and 0 otherwise.

Table 1 reports the descriptive statistics for the sample. The mean course percentage in Introductory Corporate Finance is 67.7, or a middle to high "D". This score is comparable to the mean course grades in Didia and Hasnat (1998) of 1.853 on a 4-point scale, and Chan, Shum, and Chhachhi (2005) of 69.45. The sample shows that there are more females than males. The average age of online students is 29. Almost eighty-three percent of the students are in-state students. Out of the sample, thirty-six percent of the students are majoring in accounting or finance and fifty-nine percent are transfer students. Twenty-three percent of the students who take undergraduate Introductory Corporate Finance as one of the foundation courses for their MBA program requirements have a bachelor's degree. The average number of students' work hours is 32. The number of students taking Introductory Corporate Finance with the RWJ textbook is almost the same as that with the BH textbook.

Table 1

Descriptive Statistics

Variable	# of Obs.	Mean	Std. Dev.	Min	Max
PERCENT	206	0.677	0.198	0.039	0.985
GENDER	206	0.417	0.494	0	1
AGE	206	29.044	7.951	18	58
FROM	206	0.825	0.381	0	1
AF	206	0.364	0.482	0	1
TRANSFER	206	0.587	0.494	0	1

BD	206	0.228	0.421	0	1
WORKHR	206	32.100	17.830	0	76
BOOK	206	0.495	0.501	0	1

Note: PERCENT is a continuous variable showing students' course grades. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. AGE is a continuous variable showing students' ages. FROM is a dummy variable where an in-state student is equal to 1 and 0 otherwise. AF is a dummy variable where a student with accounting/finance major is equal to 1 and 0 otherwise. TRANSFER is a dummy variable where a transfer student is equal to 1 and 0 otherwise. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise. WORKHR is a continuous variable showing the number of hours students work. BOOK is a dummy variable where the class adopting the RWJ textbook is equal to 1 and 0 otherwise.

EMPIRICAL RESULTS

Assuming that adopting a textbook with better readability can improve student learning, thereby increasing student performance in online introductory corporate finance classes, I hypothesize that students in classes using the RWJ textbook perform better than those in classes using the BH textbook. Table 2 shows the nonparametric test results for the sample. The t-test is used to test the difference in means and the Wilcoxon rank-sum test is utilized to test the difference in medians. The results show that students in classes adopting the BH textbook perform better than those in classes adopting the RWJ textbook, but the difference is not significant.

Table 2

Test of Differences in Mean and Median of Course Grade between Two Textbooks

		Course grade in Introductory Corporate Finance	
	# of obs.	Mean	Median
Classes using BH textbook	104	0.685	0.724
Classes using RWJ textbook	102	0.669	0.714
p-value for difference		0.558	0.395

Existing financial education studies focusing on the determinants of student performance have adopted a model based on the standard production function approach, where output is the grade received and inputs are factors incorporating maturity, background, effort, and course design. To examine the relationship between student performance and the choice of textbook, I consider the following empirical model:

$$PERCENT = \alpha + \beta_1 GENDER + \beta_2 AGE + \beta_3 FROM + \beta_4 AF + \beta_5 TRANSFER + \beta_6 BD +$$

$$\beta_7 WORKHR + \beta_8 BOOK + \varepsilon \tag{1}$$

Table 3 provides the results from the ordinary least squares estimation of Equation (1) with a correction for heteroscedasticity. The coefficient for the age variable (AGE) is negative and significant at the 5% level, indicating that older students tend to perform worse in the online introductory corporate finance course than younger students. This result corroborates those reported by Didia and Hasnat (1998), Shum and Chan (2000), and Chan, Shum, and Chhachhi (2005). Student motivation proxied by student major (AF) has a positive coefficient with significance at the 1% level, suggesting that accounting and finance students tend to perform better than students with other majors. This finding is consistent with those reported by Shum and Chan (2000), Terry (2002), and Chan, Shum, and Chhachhi (2005). Educational experience proxied by student bachelor's degree completion (BD) has a positive coefficient with significance at the 1% level, implying that students with a bachelor's degree tend to perform better than students without a bachelor's degree. The coefficient of WORKHR is negative and significant at the 1% level, indicating that students having long work hours tend to perform worse than students without long work hours. This result is in accordance with the finding in Borde, Byrd, and Modani (1998). Finally, the coefficient of BOOK is negative but insignificant, suggesting that students in classes adopting the RWJ textbook do not perform significantly better

than those in classes adopting the BH textbook. In other words, textbook readability does not

contribute to student performance in the online introductory corporate finance course.

Table 3

Ordinary Least Squares Regression Results

	Coefficient	t-statistic
	Number of obs. = 206	
	R-squared = 0.1452	
GENDER	-0.023	-0.747
AGE	-0.003	-2.202**
FROM	-0.042	-1.349
AF	0.080	2.413***
TRANSFER	-0.020	-0.520
BD	0.146	3.774***
WORKHR	-0.002	-2.731***
BOOK	-0.012	-0.438
Intercept	0.848	16.492***

Note: PERCENT is the dependent variable in the regression. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. AGE is a continuous variable showing students' ages. FROM is a dummy variable where an in-state student is equal to 1 and 0 otherwise. AF is a dummy variable where a student with accounting/finance major is equal to 1 and 0 otherwise. TRANSFER is a dummy variable where a transfer student is equal to 1 and 0 otherwise. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise. WORKHR is a continuous variable showing the number of hours students work. BOOK is a dummy variable where the class adopting the RWJ textbook is equal to 1 and 0 otherwise. *** shows coefficients significant at the 1% level. ** shows coefficients significant at the 5% level.

CONCLUSION

This research study investigates whether adopting a more readable textbook can have a

positive impact on student performance in online introductory corporate finance classes. Given

the fact that researchers have rated the readability of various popular introductory corporate

finance textbooks in the market, I am able to extend the study by examining the impact of a more

readable textbook on student performance. Based on a sample of 206 students, nonparametric

tests of mean and median differences across two textbooks indicate that student performance in

classes using the less readable textbook is higher than student performance in classes using the more readable textbook, but the difference is not significant. The result is confirmed by an ordinary least squares regression. Regression results also indicate that student's age, student's major, student bachelor's degree obtained, and number of student work hours appear to significantly affect student performance. Older students perform worse than younger students. Accounting and finance students perform better than students with other majors. Students with a bachelor's degree perform better than students without a bachelor's degree. Students having long work hours perform worse than students without long work hours.

Because the sample used in this study was obtained from students at one university under one instructor, this research represents only a preliminary attempt at this issue. Collecting student data from different institutions to increase the sample size may lead to more robust findings. The research methodology in this study can be used by other disciplines to examine the effect of textbooks with different readability on student performance.

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