On the Value of In-class Lecture: Evidence From Introductory Corporate Finance Classes

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This study examines whether the availability of in-class lectures can lead to difference in student performance between face-to-face and online introductory corporate finance classes. The ordinary least squares regression model is employed to analyze a sample of 284 students at a four-year state university in the Appalachian region. The results show that when assessed online, students receiving in-class lectures in face-to-face classes perform significantly better than those receiving narrated PowerPoint slides on study aids in online classes. In addition, the results show that student's major and educational experience are significant determinants of student performance.

Keywords: online learning, lecture, student performance

INTRODUCTION

The advancement of information technology has helped colleges and universities to create different mixtures of teaching frameworks to accommodate various students' learning styles, particularly in business programs (Wright, 2014). Students who enjoy in-class interactions with instructors would like to see their instructors use technology to enrich their learning experience in face-to-face courses. In contrast, students who cannot physically attend classes due to personal commitments would also like to see their instructors to use technology to help them learn effectively in online courses. Administrators regularly assess programs to maintain the quality standards imposed by accrediting organizations. In addition, to survive in a competitive market for students, instructors must constantly adopt best teaching practices discovered from research studies to improve the attractiveness of courses. While some research studies have found no distinguishable differences in learning outcomes between face-to-face and online classes (e.g., McLaren (2004)), results from other research studies have shown variations based on course delivery type (e.g., Faux and Black-Hughes (2000), Shoenfeld-Tacher, McConnel, and Graham (2001)) and discipline (e.g., Smith, Heindel, and Torres-Ayala (2008)). Moreover, several studies suggest that face-to-face classes in management and marketing may be more effective than online course delivery in achieving successful learning outcomes than those in economics and finance (e.g., Arbaugh (2010), Arbaugh, Bangert, and Cleveland-Innes (2010), Ivancevich, Gilbert, and Konopaske (2009), Peltier, Schibrowsky, and Drago (2007), and Weber and Lennon (2007)).

Research studies, which compare student performance between face-to-face and online classes in quantitative subjects, have produced mixed results perhaps because the availability of lectures and the format of assessments are not consistent for both course delivery types. For example, Trawick et al. (2010) found that students in the online principles of macroeconomics classes performed worse than those in the

face-to-face classes when online students were required to come to campus and take the same test on the same day as students in the face-to-face classes. The in-class lectures in this study were not recorded; in turn, not available for online students. Dendir (2016) found students in the online principles of microeconomics classes performed better than those in the face-to-face classes when students in face-to-face sections received live lectures and took the tests in class, whereas students in online sections had access to topic-specific audio lectures edited from in-class lectures and took tests online. Spivey and McMillan (2014) found no significant difference in student performance between face-to-face and online upper level finance classes when students in face-to-face sections received live lectures and took traditional paper-and-pencil closed-book exams proctored in the classroom whereas students in online sections had access to recorded lectures and took online exams that are not proctored.

A reasonable research question that can be derived from the line of research described above is whether there is a difference in performance between students who receive in-class lectures in face-to-face classes and students who receive recorded lectures in online classes when all students are assessed online. One might hypothesize that students who receive face-to-face instructions from in-class lectures would have a better understanding of course content and therefore, perform better than students who access recorded lectures. Alternatively, it could be hypothesized that students who are self-selected to online classes tend to be more self-motivated and experienced in online learning and testing and therefore, perform better than students in face-to-face classes. Accordingly, the major purpose of this study is to investigate whether student performance can be affected by the availability of in-class lectures.

The significance of this study is to provide a bridge between research studies examining the relationship between in-class lectures and student performance (e.g., Chan, Shum, and Wright (1997), Chiu, Gershberg, Sannella, and Vasarhelyi (2014), and Andrietti and Velasco (2015)) and research studies examining the relationship between recorded lectures and student performance (Sloan and Lewis (2014), Aldamen, Al-Esmail, and Hollindale (2015), and Lancellotti, Thomas, and Kohli (2016)). This study also relates to financial education research studies comparing the student difference between face-to-face and online classes (e.g., Shum and Chan (2000), Van Ness, Van Ness, and Adkins (2000), Farinella (2007), Chang, Lawrence, and Prakash (2012), and Cox (2018)). The following sections describe the data and research method, report the results, and provide concluding remarks.

DATA AND RESEARCH METHOD

This study was conducted at a four-year state university in the Appalachian region. The School of Business Administration, accredited by the AACSB International (Association to Advance Collegiate Schools of Business), has two departments: the Department of Accounting, Finance and Information Systems, and the Department of Management and Marketing. The introductory corporate finance class is a required core course for all business majors. Before taking Introductory Corporate Finance, students are required to complete the prerequisite courses in Principles of Managerial Accounting, Introduction to Economics, and College Algebra. The introductory corporate finance class covers such topics as financial statements and analysis, time value of money, bond and stock valuations, capital budgeting, risk and return, cost of capital, working capital management, and international financial management.

Two hundred and eighty-four students in twelve sections of introductory corporate finance classes in 2009, 2010, 2011, 2015, and 2017 are the subjects in this empirical study. In any given semester, the instructor was assigned to teach one section of face-to-face and one section of online introductory corporate finance classes concurrently. Since the students in the sample are taught by only one instructor, this study avoids the confounding effects of different instructors and different teaching methods.

Out of twelve sections of introductory corporate finance classes, six sections were taught face-to-face. The classes met two or three times weekly, each time for a 75-minute or 50-minute lecture, in sixteen-week semesters. In-class lectures were delivered in chalk and talk with assistance of multimedia technology for showing lecture notes. The Blackboard course management system was used to post the course syllabus, lecture notes, and solutions to end-of-chapter problems in the textbook. In addition, students were required to complete all assessments in the Blackboard course management system.

The six sections of introductory corporate finance online classes were conducted in the Blackboard course management system. They were asynchronous, meaning students did not have to log into the course at a specific time. Discussion board and e-mail were primary communication methods. The classes proceeded on a fixed schedule that was specified on the course syllabus, which was available at the beginning of the semester. Lecture notes, narrated PowerPoint slides on study aids, and answers to end-of-chapter problems in the textbook were posted to facilitate student learning. All assessments were also done online.

The instructor used the same textbook, covered the same chapters, and proceeded at the same speed for both face-to-face and online classes. As mentioned, both face-to-face and online students, who could access lecture notes and solutions to end of chapter problems, were required to complete all assessments including homework assignments, quizzes, and exams on the Blackboard course management system. The primary difference between face-to-face and online classes was the availability of in-class lectures. Students in face-to-face classes received in-class lectures whereas students in online classes could only access narrated PowerPoint slides on study aids posted on the Blackboard course management system.

Assuming that in-class lectures can facilitate student learning more effectively, thereby increasing student performance, I hypothesize that the students in face-to-face classes perform better than those in online classes when all students are assessed on the Blackboard course management system. To examine the relationship between availability of in-class lectures and student performance, I consider the following empirical model:

$$GRADE = \alpha + \beta_1 GENDER + \beta_2 FROM + \beta_3 AF + \beta_4 BD + \beta_5 LEC + \varepsilon \quad (1)$$

where, GRADE is a continuous variable showing students' course grades. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. 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. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise. LEC is a dummy variable where the course that was taught with in-class lectures in face-to-face delivery is equal to 1 and 0 for the course taught without in-class lecture in online delivery.

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, major, and educational experience were collected through the faculty advising system at the university. These variables have been examined in studies such as Didia and Hasnat (1998), Borde, et al. (1998), and Terry (2002). The course delivery method can also affect student performance. Shum and Chan (2000) find that remote-site interactive television students have statistically significant poorer performance relative to regular students while Van Ness, et al. (2000) find that students who take introductory corporate finance online receive lower grades than those who take the class in a traditional classroom setting. In the context of this study, the availability of in-class lectures reflects course delivery methods.

DESCRIPTIVE STATISTICS AND REGRESSION ANALYSIS

Table 1 reports the descriptive statistics for my sample. The mean course percentage in Introductory Corporate Finance is 73.1 or a low "C". The sample shows that there are more females than males. Almost eighty percent of the students are in-state students. Out of the sample, thirty-seven percent of the students are majoring in accounting and finance. Almost six percent of the students who take the Introductory Corporate Finance as one of the foundation courses in the MBA program have a bachelor degree. There are more students taking Introductory Corporate Finance online than in a face-to-face setting. Forty-eight percent of the students take Introductory Corporate Finance and receive in-class lectures in a face-to-face setting.

TABLE 1
DESCRIPTIVE STATISTICS

Variable	# of Obs.	Mean	Std. Dev.	Min	Max
GRADE	284	0.731	0.140	0.154	0.996
GENDER	284	0.468	0.500	0	1
FROM	284	0.796	0.404	0	1
AF	284	0.366	0.483	0	1
BD	284	0.060	0.238	0	1
LEC	284	0.475	0.500	0	1

Note: GRADE is a continuous variable showing students' course grades. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. 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. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise. LEC is a dummy variable where the course that was taught with in-class lectures in face-to-face delivery is equal to 1 and 0 for the course taught without in-class lecture in online delivery.

Table 2 reports the descriptive statistics for my sample divided by course delivery method and the t-test results in mean difference in student performance and student characteristics. The mean course grade for those receiving in-class lectures in the face-to-face sections was 77.4% and the mean for those receiving narrated PowerPoint slides on study aids in online sections was 69.2%. The face-to-face students scored 8.2% higher than those in the online sections, and the difference is statistically significant at the 1% level. The online sections have higher percentage of in-state students than the face-to-face sections, and the difference is statistically significant at 1% level. The online sections have higher percentage of students with a bachelor degree than the face-to-face sections, and the difference is statistically significant at 1% level. Comparison of gender and in-state/out-of-state status across the two group yield insignificant differences.

TABLE 2
DESCRIPTIVE STATISTICS BY COURSE TYPE AND WITH TEST OF EQUALITY OF MEANS

	Face-to-face			Online				
	# of Obs.	Mean	Std. Dev.	# of Obs.	Mean	Std. Dev.	t statistic	p-value
GRADE	135	0.774	0.119	149	0.692	0.146	-5.107	0.000
GENDER	135	0.489	0.502	149	0.450	0.499	-0.660	0.510
FROM	135	0.719	0.451	149	0.866	0.342	3.116	0.002
AF	135	0.356	0.480	149	0.376	0.486	0.353	0.724
BD	135	0.007	0.086	149	0.107	0.311	3.615	0.000

Note: GRADE is a continuous variable showing students' course grades. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. 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. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise.

The relationship between student performance and the availability of in-class lectures is estimated by using ordinary least squares (OLS) regression with a sample size of 284 students. Results are reported in Table 3. Student motivation proxied by student major (AF) has a positive coefficient with significance at the 1% level, suggesting that accounting and finance students perform better than students with other

majors. Educational experience proxied by student bachelor degree completion (BD) has a positive coefficient with significance at the 1% level, suggesting that students with a bachelor degree perform better than students without a bachelor degree. Consistent with the previous studies, course delivery methods affect student performance significantly. The OLS estimate for LEC confirms the result from the bivariate analysis of higher performance in the face-to-face environment where in-class lectures are available. There is a statistically significant, 9.2% difference in score between the face-to-face and online students, after accounting for student characteristics that potentially impact performance. The difference can be viewed as the value for in-class lectures.

TABLE 3
REGRESSION RESULTS

	Full Sample		Face-to-face Subsample		Online Subsample	
	Coefficient	t-stat	Coefficient	t-stat	coefficient	t-stat
Intercept	0.679***	34.03	0.767***	36.73	0.684***	21.88
GENDER	-0.005	-0.30	-0.001	-0.07	-0.011	-0.48
FROM	-0.021	-1.13	-0.014	-0.60	-0.025	-0.85
AF	0.053***	3.31	0.054**	2.52	0.052**	2.15
BD	0.119***	3.55	-0.153***	-7.50	0.137***	4.49
LEC	0.092***	5.64				
# of obs.	284		135		149	
F Statistic	9.13***		2.28*		5.61***	
R-squared	15.33%		6.56%		10.64%	

Note: GRADE is the dependent variable in the regression. GENDER is a dummy variable where a male student is equal to 1 and 0 otherwise. 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. BD is a dummy variable where a student with a bachelor degree is equal to 1 and 0 otherwise. LEC is a dummy variable where the course that was taught with in-class lectures in face-to-face delivery is equal to 1 and 0 for the course taught without in-class lecture in online delivery. *** shows coefficients significant at the 1% level, ** significant at the 5% level, and * significant at the 10% level.

Additional OLS regressions are involved with disaggregating the sample by course delivery method and estimating the relationship between student performance and student characteristics. The results are also presented in Table 3. There are 135 students enrolled in face-to-face classes and 149 students enrolled in online classes. In subsample regressions, the results show that accounting and finance students perform better than students with other majors in both face-to-face and online classes. As to educational experience, the results show that students with a bachelor degree perform better than students without a bachelor degree in both face-to-face and online classes.

CONCLUSION

This research study investigates the relationship between the availability of in-class lectures and student performance in introductory corporate finance classes. Research studies that compare student performance between face-to-face and online classes in quantitative subjects have produced mixed results perhaps because the availability of lectures and the format of assessments were not consistent for both course delivery types. This study examines whether the availability of in-class lectures can affect student performance when students are assessed online on the Blackboard course management system. Based on a sample of 284 students, a nonparametric test of mean difference across course delivery methods indicates that student performance in face-to-face classes is significantly better than that in online classes. The result

is confirmed by ordinary least squares regressions. There is a statistically significant, 9.2% difference in score between the face-to-face and online students. The difference can be viewed as the value for in-class lectures. Regression results also indicate that student major and educational experience are significant determinants of student performance. Accounting and finance students perform better than students with other majors regardless of course delivery methods. Students with a bachelor degree perform better than students without a bachelor degree in both face-to-face and online introductory corporate finance classes.

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 the 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 relationship between the availability of in-class lectures and student performance.

REFERENCES

Aldamen, H., Al-Esmail, R., & Hollindale, J. (2015). Does lecture capturing impact student performance and attendance in an introductory accounting course? *Accounting Education*, *24*(4), 291–317.

Andrietti, V., & Velasco, C. (2015). Lecture attendance, study time, and academic performance: A panel data study. *Journal of Economic Education*, *46*(3), 239–259.

Arbaugh, J.B. (2010). Do undergraduates and MBAs differ online? Initial conclusions from the literature. *Journal of Leadership and Organizational Studies*, *17*, 129–142.

Arbaugh, J.B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the community of inquiry framework: An exploratory study. *Internet and Higher Education*, *13*, 36–44.

Borde, S.F., Byrd, A.K., & Modani, N.K. (1998). Determinants of student performance in introductory corporate finance courses. *Journal of Financial Education*, *24*, 23–30.

Chan, K.C., Shum, C., & Wright, D.J. (1997, Fall/Winter). Class attendance and student performance in principles of finance. *Financial Practice and Education*, pp. 58–65.

Chang, C., Lawrence, E., & Prakash, A. (2012). Face-to-face and online finance courses: An assessment. *International Journal of Finance*, *24*, 7209–7218.

Chiu, V., Gershberg, T., Sannella, A.J. & Vasarhelyi, M.A. (2014). Does a live instructor matter? *Journal of Emerging Technologies in Accounting*, *11*, 1–25.

Cox, V. (2018). Face-to-face versus online: A comparison of student performance in introduction to finance courses. *Journal of Economics and Finance Education*, *17*(1), 10–19.

Didia, D., & Hasnat, B. (1998). The determinants of performance in the university introductory finance course. *Financial Practice and Education*, *8*(1), 102–107.

Farinella, J. (2007). Professor and student performance in online versus traditional introductory finance courses. *Journal of Economics and Finance Education*, *6*(1), 40–47.

Faux, T.L., & Black-Hughes, C. (2000). A comparison of using the internet versus lectures to teach social work history. *Research on Social Work*, *10*(4), 454–466.

Ivancevich, J.M., Gilbert, J.A., & Konopaske, R. (2009). Studying and facilitating dialogue in select online management courses. *Journal of Management Education*, *33*, 196–218.

Lancellotti, M., Thomas, S., & Kohli, C. (2016). Online video modules for improvement in student learning. *Journal of Education for Business*, *91*(1), 19–22.

McLaren, C.H. (2004). A comparison of student persistence and performance in online and classroom business statistics experiences. *Decisions Sciences Journal of Innovative Education*, *2*(1), 1–10.

Peltier, J.W., Schibrowsky, J.A., & Drago, W. (2007). The interdependence of the factors influencing the perceived quality of the online learning experience: A causal model. *Journal of Marketing Education*, *29*, 140–153.

Schoenfeld-Tacher, R., McConnel, S., & Graham, M. (2001). Do no harm—A comparison of the effects of on-line vs. traditional delivery media on a science course. *Journal of Science Education and Technology*, *10*(3), 257–265.

Shum, C., & Chan, K.C. (2000). The effectiveness of interactive television distance learning in principles of finance. *Financial Practice and Education*, *10*(1), 175–183.
Sloan, T.W., & Lewis, D.A. (2014). Lecture capture technology and student performance in an operations management course. *Decision Sciences Journal of Innovative Education*, *12*(4), 339-355.
Smith, G.G., Heindel, A.J., & Torres-Ayala, A.T. (2008). E-learning commodity or community: Disciplinary differences between online courses. *Internet and Higher Education*, *11*, 152–159.
Terry, A. (2002). Student performance in the introductory corporate finance course. *Journal of Financial Education*, *28*, 28–41.
Van Ness, B.F., Van Ness, R.A., & Adkins, R.L. (2000). Student performance in principles of finance: difference between traditional and internet settings. *Financial Practice and Education*, *10*(2), 160–166.
Weber, A., & Lennon, R. (2007). Multi-course comparison of traditional versus web-based course delivery systems. *The Journal of Educators Online*, *4*(2), 1–19.
Wright, M.K. (2014). The trouble with online undergraduate business degrees in traditional regional universities. *Journal of College Teaching & Learning*, *11*(1), 13-24.