

Hybrid Versus Face-to-Face: Evidence From Introductory Corporate Finance Classes

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This study examines whether there is a difference in student performance between hybrid and face-to-face introductory corporate finance classes. The ordinary least squares regression model is employed to analyze a sample of 194 students at a four-year state university in the Appalachian region. The results show that students who receive in-class lectures and take online exams in hybrid classes perform better than those who take in-class exams in face-to-face classes, but is not statistically significant. The implication is that instructors for face-to-face classes can consider substituting in-class exams with online exams because neither do online exams change the rigor of the course nor harm student performance. The results also show that student's major is a significant determinant of student performance.

Keywords: hybrid learning, blended learning, exam delivery mode, student performance

INTRODUCTION

Instructors in colleges and universities have used information technology to create different mixtures of pedagogical methods to accommodate the balance between various students' learning styles and public health considerations during the COVID-19 pandemic. When being forced to shift course delivery from face-to-face to online during lockdowns, instructors used video conferencing software to hold class meetings or recorded lecture videos to deliver instructions. After lockdown restrictions eased, instructors used course management systems to supplement face-to-face classes with online learning activities in consideration of social distancing. It seems that all teaching practices converged to a hybrid/blended approach (e.g., Hapke, Lee-Post, and Dean (2021)).

Researchers (e.g., Swenson and Evans (2003) and Graham (2006)) have defined a hybrid/blended course as one that uses both face-to-face instructional methods and online learning activities typically using Internet technologies. Arbaugh (2014) estimated that the online component in hybrid classes could vary from 20% to 79% of the total instructions. Reduced face-to-face instructions seem to increase the popularity of hybrid courses for students perceived hybrid courses as being more effective and as supportive to wide range of learning styles and life styles (e.g., Waha and Davis (2014), Marquis and Ghosh (2017), and Peslak, Kovalchick, Wang, and Kovacs (2021)).

Research studies, which compare student performance between hybrid and face-to-face classes in quantitative business subjects, have produced mixed results perhaps because of different combinations of course designs for hybrid classes and assessment delivery modes. For example, Du (2011) found that students who completed online activities for the hybrid introductory principles of accounting classes performed insignificantly better than those in the face-to-face classes when students in hybrid and face-to-

face classes received the same amount of in-class instructions and were required to take in-class exams. Simmons (2014) found no significant difference in student performance between hybrid and face-to-face business statistics classes when the amount of in-class instructions for hybrid classes was 50% of that for face-to-face classes, recorded lecture videos were made available only to hybrid students, and all students were required to take online exams. Haughton and Kelly (2015) also had the same finding in their business statistics classes when all students were required to take in-class exams. Andreychik and Martinez (2019) found that students who had access to recorded video lectures for the hybrid international finance classes had similar performance on quizzes, but superior performance on exams, compared with students in face-to-face classes when students in hybrid and face-to-face classes received the same amount of in-class instructions and were required to take in-class exams. Harjoto (2017) found that students in the hybrid graduate corporate finance classes performed better than students in the face-to-face classes when the number of in-class instructions for hybrid classes was 40% of that for face-to-face classes, recorded lecture videos were made available to all students, and all students were required to take in-class exams.

A reasonable research question that can be derived from the line of research described above is whether there is a difference in performance between face-to-face students who are assessed in a classroom and hybrid students who are assessed online when all students receive the same number of in-class lectures. This study is related to Kim and Krueger (2017) who proposed a research method using a pre-test/post-test method to compare student performance in Business Finance taught in a traditional face-to-face delivery mode with one taught using a hybrid platform. However, their study did not produce any empirical findings. As a result, the major purpose of this study is to provide evidence on whether exam delivery modes can lead to a difference in student performance between hybrid and face-to-face introductory corporate finance classes.

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 exam delivery modes and student performance (Nakos and Whiting (2018), Rane and MacKenzie (2020), and Gomaa, Kang, and Pak (2021)). 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 Financial Accounting, Principles of Managerial Accounting, Principles of Macroeconomics, 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.

One hundred and ninety-four students in nine face-to-face sections of introductory corporate finance classes in 2010, 2011, 2012, 2015, 2017, 2019, and 2020 are the subjects in this empirical study. Since the students in the sample are taught by only one instructor with the same textbook and course requirements, this study avoids the confounding effects of different instructors and different teaching methods.

All students were able to access face-to-face lectures in classes that 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, and keep students' grades. Biktimirov and Klassen (2008) found making course support materials available online can increase student performance in an introductory finance course.

The assessments for student performance included homework assignments, quizzes, two non-cumulative exams, and a comprehensive final exam. All assessments were in multiple choice format. Einig (2013) found a positive relationship between use of multiple-choice questions and student performance in an undergraduate Accounting class. All students were required to complete online homework assignments in the Blackboard course management system. Titard, et al. (2014)) found a positive relationship between use of online homework assignments and student performance in financial accounting and managerial accounting classes.

The format of quizzes and exams was the primary difference between hybrid and face-to-face classes. Out of nine sections of introductory corporate finance classes, students in three face-to-face sections were required to take paper-and-pencil closed-book quizzes and exams in a classroom. In contrast, students in the remaining six hybrid sections took online quizzes and exams that were administered in the Blackboard course management during the class time. As a result, the hybrid classes consisted of approximately 70% face-to-face classes and 30% online classes.

To examine the difference in student performance between hybrid and face-to-face classes, I consider the following empirical model:

$$\text{GRADE} = \alpha + \beta_1\text{GENDER} + \beta_2\text{FROM} + \beta_3\text{AF} + \beta_4\text{HYBRID} + \varepsilon \quad (1)$$

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. HYBRID is a dummy variable where the course that was taught in hybrid delivery is equal to 1 and 0 for the course taught in face-to-face 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, and major 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 exam delivery modes reflect 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 74.5 or a low "C". The sample shows that there are more males than females. Almost seventy percent of the students are in-state students. Out of the sample, thirty-eight percent of the students are majoring in accounting and finance. There are more students taking Introductory Corporate Finance in a hybrid setting than in a face-to-face setting. Sixty-six percent of the students who take Introductory Corporate Finance receive in-class lectures in a classroom and participate in online assessments in the Blackboard course management system.

**TABLE 1
DESCRIPTIVE STATISTICS**

Variable	# of Obs.	Mean	Std. Dev.	Min	Max
GRADE	194	0.745	0.127	0.204	0.979
GENDER	194	0.629	0.484	0	1
FROM	194	0.696	0.461	0	1
AF	194	0.376	0.486	0	1
HYBRID	194	0.660	0.475	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. HYBRID is a dummy variable where the course that was taught in hybrid delivery is equal to 1 and 0 for the course taught in face-to-face 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 the face-to-face sections is 74.3% and the mean for the hybrid sections is 74.6%. The hybrid students score 0.3% higher than those in the face-to-face sections, but the difference is not statistically significant. The hybrid sections have higher percentage of male students than the face-to-face sections, and the difference is statistically significant at 5% level. Comparison of in-state/out-of-state status and accounting/finance major across the two group yield insignificant differences.

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

	Face-to-face			Hybrid			t statistic	p-value
	# of Obs.	Mean	Std. Dev.	# of Obs.	Mean	Std. Dev.		
GRADE	66	0.743	0.117	128	0.746	0.132	-0.167	0.868
GENDER	66	0.515	0.504	128	0.688	0.465	-2.317	0.022
FROM	66	0.636	0.485	128	0.727	0.447	-1.260	0.210
AF	66	0.439	0.500	128	0.344	0.477	1.282	0.202

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.

The relationship between student performance and course delivery methods is estimated by using ordinary least squares (OLS) regression with a sample size of 194 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. Course delivery methods do not affect student performance significantly. The OLS estimate for HYBRID is positive but insignificant, suggesting that students in hybrid classes do not perform significantly better than those in face-to-face classes.

TABLE 3
REGRESSION RESULTS

	Full Sample		Face-to-face Subsample		Hybrid Subsample	
	Coefficient	t-stat	Coefficient	t-stat	coefficient	t-stat
Intercept	0.724***	29.78	0.715***	17.30	0.739***	24.52
GENDER	-0.008	-0.45	-0.002	-0.05	-0.015	-0.58
FROM	0.002	0.08	-0.011	-0.31	0.008	0.24
AF	0.049***	2.70	0.079***	2.92	0.034	1.39
HYBRID	0.009	0.48				
# of obs.	194		66		128	
F Statistic	1.90		2.87**		0.75	
R-squared	3.68%		11.16%		1.82%	

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. HYBRID is a dummy variable where the course that was taught in hybrid delivery is equal to 1 and 0 for the course taught in traditional 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 66 students enrolled in face-to-face classes and 128 students enrolled in hybrid classes. In subsample regressions, the results show that accounting and finance students perform better than students with other majors in face-to-face classes.

CONCLUSION

This research study investigates whether there is a difference in student performance between hybrid and face-to-face introductory corporate finance classes. Research studies that compare student performance between hybrid and face-to-face classes in quantitative business subjects have produced mixed results perhaps because of different combinations of course designs for hybrid classes and assessment delivery modes. In contrast to the existing research studies, this study examines whether the exam delivery modes can affect student performance when both hybrid and face-to-face students receive the same number of in-class lectures.

The result, based on a nonparametric test of mean difference across course delivery methods on a sample of 194 students, indicates that students who receive in-class lectures and take online exams in hybrid classes perform better than those who take in-class exams in face-to-face classes, but is not statistically significant. The result is confirmed by ordinary least squares regressions. The implication is that instructors for face-to-face classes can consider substituting in-class exams with online exams because neither do online exams change the rigor of the course nor harm student performance. In addition, replacing paper exams with online exams can reduce the use of papers and printing, thereby lowering operating cost.

Regression results also indicate that student major is a significant determinant of student performance. Accounting and finance students perform better than students with other majors, particularly in face-to-face 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 exam delivery modes and student performance.

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