

EDUCATION DELIVERY MODES: A POST-COVID STUDY OF TRADITIONAL AND ONLINE CLASSES IN MANAGERIAL ACCOUNTING

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ABSTRACT

In recent years, universities have been forced to adapt to online teaching methods due to the COVID pandemic. As these COVID restrictions were lifted, students taking an accounting-based course were offered the opportunity to continue to attend remotely or to return to a traditional face-to-face setting. In this study, we examined students' feelings of engagement based on both manners of course delivery as well as their expectations of grade for the course. Our results suggest that face-to-face classes provide a better opportunity for following lectures, avoiding distractions, working on group projects, and communicating with instructors and their peers when given the choice between online and face-to-face classes. Students attending class in person also reported a higher expected final grade. However, students attending classes remotely reported appreciating the flexibility of the online format and correspondingly attended a higher percentage of lectures. Overall, these results suggest that students that have now experienced both face-to-face and online course formats may identify and register for course delivery methods with characteristics that more specifically appeal to their desired format regardless of its potential impact on their class performance. To the extent that universities can adopt as many of these characteristics in traditional/fully remote or hybrid type delivery methods, the potential exists for higher student satisfaction levels while taking into consideration student needs.

Keywords: teaching modes, online education, face-to-face education, technology

INTRODUCTION

Prior to Covid-19, many universities were conducting online classes in addition to face-to-face sessions for students across a number of disciplines. However, the recent COVID pandemic created more of a need for online instruction that also resulted in significant investments in technology. As noted by Whiteford (2021), a 2021 survey by the NAICU (National Association of Independent Colleges and Universities) found that over 94 percent of respondents incurred spending for technology in anticipation of the Fall 2020 semester with about a quarter of the institutions indicating it was their largest pandemic-related expense. While online course delivery may not have evolved much through the use of Zoom and other advanced technologies over earlier video conferencing methods, universities have used the pandemic as a rationale for updating the traditional higher education business model through digital deliveries. Some colleges such as Princeton and American University have also begun offering a fully online experience at a substantially discounted tuition cost (Gallagher and Palmer 2020).

This study seeks to both reexamine the traditional face-to-face (F2F) versus online course deliveries for accounting-based classes following the return to the "normal" university setting after the Covid pandemic isolation period. It also acknowledges factors that students identify as being significantly different due to the manner of course delivery. Another aspect of this paper is to augment the post-COVID research on accounting class delivery with an analysis of the differences in student engagement that occurs for online versus F2F classes and perceptions of final course grades.

To examine these issues, a survey was administered to students in two sections of an Introduction to Managerial Accounting course in the Fall 2021 semester at a public university in the Mid-Atlantic. For the Fall 2021 semester, it was decided that rather than have two large face-to-face classes of Managerial Accounting, as was the norm pre-COVID, one would be web-based and the other would be face-to-face. The dean specifically requested this change following the successful online delivery during the COVID semesters. As this was an introductory course required for all business majors, students enrolled in both sections were a mix of accounting majors and other business disciplines. Each class (F2F section and online section) received a survey prior to being administered the final exam with a final sample of 162 observations (105 traditional F2F and 57 online).

Our results confirm that students generally believe that F2F classes provide a better opportunity for being more engaged in the class activities, defined as following lectures, avoiding distractions, working on group projects, and communicating with both the instructor as well as their peers. In addition, students in the traditional F2F section reported a significantly higher anticipated overall grade for the course than their online counterparts. On the other hand, online participants reported attending a higher percentage of course lectures and greatly appreciated the flexibility of the online format. These findings are consistent even after controlling for commonly used control variables such as school level, gender, current GPA, major, and

others (Massoudi et al., 2017; Dendir 2019). Overall, these results suggest that post-COVID, students still feel more comfortable learning in the F2F section, even with the increased flexibility and independence of the online format, which we posit translates to a higher expected final grade. These results are consistent with those found pre-Covid by Sellers, Tietz, and Zhou (2022).

In supplemental analysis, we also investigated other factors related to engagement that may have contributed to an expectation of a higher grade in the F2F section and an additional characteristic, preparedness for the course. As the survey was administered prior to the final exam and both sections received the same last exam and all prior graded materials, student answers on expected performance by delivery type should not have been biased over any specific feelings of uncertainty for the final assessment material itself. However, students in the F2F section reported significantly higher levels of satisfaction for exam preparedness and felt more comfortable understanding the class materials which could be strong indicators of belief of success in the course. Therefore, as suggested by Hornik and Thornburg (2010), the higher perceived level of interaction with the professor in the F2F class may have overshadowed the independence and flexibility for the online participants. We believe this may be due to the return to the classroom following the Covid isolation period where students were excited about attending live classes. Finally, results confirmed no significant difference between groups' satisfaction with attending office hours. Both groups of students were equally likely to seek assistance from the professor if help was needed, albeit the online students met with the professor in a virtual setting. Overall, these findings provide the basis for our findings of higher levels of engagement with the F2F section.

Apostolou et al. (2018) noted that one of the most common areas of accounting education research concerns curriculum and instruction. Our research adds to this literature by investigating post-COVID student engagement levels related to the different course delivery methods and how these modes are impacted by students' perceptions in a class having both a conceptual and problem-based focus. We included the engagement variable based on satisfaction scorings from the student-faced survey as part of the explanatory model and control variables such as GPA, college level, and major. The intent of this study was to determine which factors derived from the survey could be driving the differences in course perceived performance and engagement. It is important to understand that in speaking with students during the term, there was a common belief that a F2F class is more favorable, as was supported by the findings in this study. Further, there was also a sense that, even though students may have felt less oversight and effort was required of them in an online course, there was still more involvement/engagement on the part of students, and indirectly satisfaction derived from a traditional classroom setting. While Allen et al. (2016) offered a theory that suggested that online courses may be better suited for students as these courses provide more resources, Clark (1983, 1994) suggests that student characteristics, along with teaching methods and techniques, influence the learning for a particular course.

We also contribute to the general discussion of post-COVID classes as universities grapple with preparing for any potential future service changes or interruptions. As noted in Lederman (2020), institutions need to prepare for the eventuality of events like the COVID-19 pandemic reoccurring. A deeper analysis of the different course modes post-COVID should enhance the online delivery method for it to be more appealing and a richer learning environment for all types of students. Finally, since this is a core course required of all business undergraduates, these findings may also be appropriate for other courses required in a business or other educational core course.

In the next section, we provide a more thorough explanation of background literature and then introduce our research hypotheses. We then provide our methodology and sample selection process along with some univariate statistics. In the last section, results of our tests are discussed along with supplemental analysis and concluding remarks.

LITERATURE REVIEW

Jordan and Samuels (2020), in a summary of accounting research on learning effectiveness posed the question as to what kinds of learning activities worked best for online and F2F students. As noted in Driscoll et al. (2012), the priority for quality classes should be to adapt the technology to the class rather than the class to the technology. Lederman (2020) noted that educational interruptions may become increasingly prevalent in the future, whether from natural disasters or pandemics. As recent experiences have shown with the COVID-19 pandemic, universities must become more flexible in terms of not only course content but also course delivery methods. Identifying aspects of courses that could provide greater learning in a F2F or in an online format should be an important priority of accounting programs in the future.

Several studies were published pre-Covid that focused on the differences between the F2F and online learning environments. However, many of these studies were more generalized rather than being strictly accounting oriented. Prior research, including the U.S. Department of Education (2009) meta-analysis concluded that instruction through an online approach resulted in better performance, on average, than a traditional F2F approach (Means et al., 2009). Blau et al. (2017) found that

undergraduate business students who chose to take online classes experienced a timelier graduation. However, they also believed that an institutional commitment for this teaching mode was lacking. Arbaugh (2014) concluded that online courses benefited student learning and course satisfaction levels for general management education classes. Turner and Turner (2017) examined knowledge acquisition and subsequent retention in a required master's in business administration (MBA) course and found that online courses fared better with knowledge acquisition, but retention levels were greater in the F2F format. Taplin, Kerr, and Brown (2017) utilized a monetary framework and asked accounting students to purchase their ideal course structure. Results confirmed that while these students preferred F2F classes over online for course delivery, certain aspects of online teaching, such as a desire for less in-person lecture time was noted.

In an economics course, Dendir (2019) also found that online students performed better than the F2F students and offered potential cheating by the online test takers as a suggestion for the difference. Also, as documented by Bennett et al. (2007), Dendir (2019) suggested that his outcome could be due to the less technical aspect of the economics course that served as the basis for his study. Overall, some pre-COVID studies exist that provide support for the benefits of online teaching.

In regard to accounting, Fortin et al. (2019) looked at formats for more advanced accounting classes where students met primarily F2F, but some activities were conducted online (F2F+) or some of the F2F classes were replaced with online sessions (online+). Their findings indicated that students were satisfied with both delivery methods and that the online+ was preferred by women as well as individuals who are older, have children, and work longer hours, a different population than that served by the classes in this current study. The type of class offered in that study could possibly be ideal because students have more variety in the course delivery and limited time or opportunity to become more disenchanted with either form of delivery. Keller et al. (2009) compared academic performance between a F2F course and a hybrid managerial accounting course. In their study, both types of classes were held twice a week. The primary difference was that the hybrid course met live one of the weekdays and the other day's session was conducted through a web-based setting. The F2F class met in person for both weekly settings. They found no difference in academic performance between these two approaches, which they concluded may have been inconsistent with prior research.

While the same concepts should be covered in both types of classes, it is important to understand that there are distinct differences in course delivery for F2F versus online. Like the U.S. Department of Education (2009) study, Chiu et al. (2014) examined student performance in two accounting courses: Introduction to Financial Accounting and Introduction to Managerial Accounting. Using final grades as their measure of performance, similar to Keller et al. (2009) they found no significant difference between the delivery modes outcomes. Sellers, Tietz, and Zhou (2022) studied performance differences for synchronous versus asynchronous introductory accounting classes prior to the pandemic. They found support for synchronous class performance though their synchronous classes included some online meetings. Therefore, pre-Covid findings seem somewhat inconclusive in relation to accounting courses and course delivery method.

Overall, prior studies offer mixed results regarding the differences between F2F and online course deliveries. Some studies examine specific degree levels such as MBA programs (Duncan, Kenworthy, and McNamara, 2012; Turner and Turner, 2017), discuss teaching activities during the Covid period for specific accounting classes such as forensics (Ketz, 2021), focus on non-business school classes such as Economics (Dendir, 2019), include sample periods prior to COVID, or examine more advanced accounting courses which would predominantly include accounting majors only (Fortin et al., 2019). Results of research on introductory accounting courses find mixed results in performance by delivery method (Chiu et al., 2014 and Sellers, Tietz, and Zhou, 2022). As universities, and more specifically accounting programs, increasingly look to adapt in a post-COVID era, it is important to identify class activities that provide engagement and value for both F2F and online delivery modes. Therefore, in the next section we develop our research hypotheses regarding our class delivery modes, student engagement levels and performance as well as other variables that may differ based upon class approach.

HYPOTHESES DEVELOPMENT

To our knowledge, no studies have examined grades post-COVID. This time period should be unique because students should all now have experience and be more comfortable with both online and F2F delivery methods from taking classes before/ during the pandemic¹. Therefore, students were asked their expected grade as of the end of the course because prior literature has found that an expected grade is an acceptable proxy for perceived course effectiveness, and that students view the physical separation of online learning to be less effective due to potential communication gaps (Moore and Kearsley, 1996)². Some studies, such as Dendir (2019) reported higher student performance in their online sections while Keller et al. (2009) found no significant findings. On the other hand, Green (2021), in a more recent Fall 2020 sample period, examined F2F, fully remote,

¹ We define the post-Covid period as the first full semester following the ability for all individuals to receive their Covid vaccination.

² This survey was conducted during the last week of classes and the only remaining grading instrument was the final exam, which was worth 20% of their grade. Therefore, students should have been able to anticipate their actual grade.

and hybrid offerings and did find significantly lower results in the remote classes though no differences in the F2F and hybrid sections. Students in the online section self-reported lower projected grades than the F2F class. Therefore, we propose the following hypothesis to examine whether student self-reported perceptions of performance post-COVID are different by delivery method:

H1: Course delivery method affects student perceived performance.

For the purpose of this study, engagement is meant to capture avenues of communication, distractions, and working with instructors, TA's, and peers. While students have a number of virtual outlets to engage or communicate with their instructor as well as classmates, the ability to interact is different in online versus F2F courses. Cheng and Ding (2021) find that course engagement increased in an introductory Financial Accounting course when students were given online review exercises to complete. However, students may still view online class knowledge development through engagement as more passive and lacking value due to perceived struggles in working with their classmates (Falloon, 2011). Further, Sangster, Stoner, and Flood (2020) noted increased feelings of isolation and lower online attendance as common complaints from both faculty and students surveyed for online classes during COVID. Green (2021) identifies F2F learning as a key component of class success, engagement, and satisfaction though the degree of attendance required was not examined. If this is the case, the online section should be associated with less satisfaction and higher difficulties communicating with their professors as well as more problems completing group assignments such as projects. Therefore, we propose the following hypothesis examining student class engagement:

H2: Course delivery method affects student engagement in class activities.

METHODOLOGY AND SAMPLE SELECTION/UNIVARIATE STATISTICS

Our study focuses on an early undergraduate accounting course required for all business majors (Managerial Accounting) over two sections (one online and one F2F) taken in the Fall 2021 semester at a public university in the Mid-Atlantic area as students were returning from the Covid-isolation online period. Given the fully remote status of the prior semesters, it was assumed that all students had experience with online learning at some grade level before the semester began. Further, the objective was to provide similar instruction quality across both classes through the delivery of lectures, assignments, exams, and group projects while also incorporating other control factors that would maximize course effectiveness based on presentation format. For example, Zoom office hours were added for the online section to help facilitate more direct interaction between the professor and these students.

To investigate our hypotheses, a linear regression model is utilized with delivery method as the main independent variable of interest (METHOD).³ This indicator variable is based upon whether the student took the course in a traditional F2F (=0) or an online (=1) format. For each model, the dependent variable is either student perceived performance (H1), or student engagement (H2), based on the appropriate survey questions. Student perceived performance (GRADE) is self-reported at the end of the semester prior to the final exam being administered and represents letters from "A+" to "Less than a C-." These letter grades were then translated into a numeric variable with higher letter grades ("A's") representing lower numbers (1, 2 etc.) up to the lowest grades reported as a ten.⁴ As not all students enrolled in the two sections completed the survey and the survey itself was anonymous, it was not possible to accurately measure actual performance for each student in the class. However, prior studies have used expected grades as a suitable proxy for performance (Chen, Jones, and Moreland, 2013).

Student engagement (ENGAGEMENT) is defined as the combination of survey results reported for ease in communicating with the instructor (COMMUNICATE), teaching assistant (COMMTA) and peers (COMMPEERS); the comfort in working with study groups (STUDY) and class groups for projects (GROUP), asking questions in lecture classes (ASKQ) and during project classes (ASKQGROUP), and the degree to which students reported feeling distracted during the classroom lectures (DISTRACT). The Engagement variable, like the other individual ones identified above, are all ordinal variables containing seven values from "Extremely Comfortable" to "Extremely Uncomfortable." "Extremely Comfortable" and "Extremely Uncomfortable" were represented by the numbers one and seven, respectively, with the number four being the midpoint of neither comfortable nor uncomfortable. Therefore, these variables attempted to capture how students felt during the semester regarding the managerial class. In other words, while other studies specifically asked students about their degree of engagement (Green, 2021), our engagement variable combines student responses for class communication, working with

³ As students were not randomly assigned to either the online or F2F sections, our results may be biased due to self-selection. While results are provided for linear regression analysis, to provide additional support for our analysis, all models were rerun using a matched pair design with students matched based upon gender and class levels (freshmen, etc.). All results (untabulated) were quantitatively similar.

⁴ This survey question included an answer of eleven for "I am not sure." A half dozen students responded with an eleven and all tests were re-run excluding these students. Results were quantitatively similar in all tests, so these students were kept in the survey.

others, as well as feelings of distraction to attempt to capture a more comprehensive proxy. As increased feelings of isolation were reported by students and faculty as an issue with online learning during the pandemic (Sangster, Stoner, and Flood, 2020), these variables, and the summary variable (ENGAGEMENT), are expected to differ based upon course delivery method.

As noted earlier, the sample data was obtained in the Fall 2021 semester at a public university in the Mid-Atlantic. Two sections of a Managerial Accounting class (traditional F2F and online) taught by the same professor were administered a questionnaire in the last week of the semester prior to the final exam. This course, along with Financial Accounting are required for all business degree seeking students at the university. Similar to McCarthy, Kusaila, and Grasso (2019), all course materials, assignments, exams, and projects were the same. However, the delivery differed between course sections based on what was considered to be optimal for each class type as a result of (1) experience with the FSF class and (2) training for teaching other online courses.

Students in the online section received regular weekly classes of instruction. Of the two scheduled classes for the week, one was asynchronous, and one was synchronous. The asynchronous session was used to focus on the conceptual aspects of the topic for that module. The series of recordings for each topic for the asynchronous session lasted anywhere from 45 minutes to one hour and 15 minutes, with each recording lasting from 8 minutes to 15 minutes to encourage the students to focus on the smaller chunks of information. The synchronous session was used to summarize the concepts and have the students work on topic-specific problems, in groups, and then reviewed and discussed as a class. Potential strategies related to the specific problems were also discussed during the synchronous session. Each synchronous session ran for approximately 1 hour and 15 minutes and meetings were held through a Zoom ID that was specifically created for the online class. The synchronous classes were also recorded for the students to review as needed. Online office hours through Zoom were held on the day scheduled for the asynchronous class. These hours were dedicated to the online class only. All tests were also administered online, and students were required to be on Zoom, with cameras on during the scheduled exam time.

Students in the traditional section attended two classes each week, lasting approximately one hour and 15 minutes. All exams were taken during the scheduled class time and in the classroom. However, these students also took the exam through the online learning management system, rather than with pencil and paper. This provided more opportunity for equilibrium across the two classes, in terms of graded instruments.⁵ Office hours were also in person for the traditional class and held in the professor's office.⁶

In addition to the above, both classes completed projects with assigned group members from their respective classes. The groups were created based on information gleaned from grades following the first exam (homework, quizzes and the exam) and their likes that were learned through discussion board questions posed prior to the start of the semester. The projects were technology-based to provide the students with more background in Excel and Tableau and were the same for both classes. The projects also provided students with the opportunity to draw conclusions and make strategic recommendations based on the findings from the data. As a result of these course modes, student answers on the questionnaire should specifically differ because of the delivery method and not the instructional materials. Finally, students self-enrolled into their preferred delivery method and the final sample included 105 students in-person and 57 students in the online-only section for a total of 162 respondents.⁷

Student univariate data is presented in Table 1. (See Table 1 on next page 7) Results of Pearson Chi-Square tests confirm no significant differences between traditional and online course participants in demographic data for student class level (CLASS), gender of the student (GEND), and race of the student (RACE). Further, no significant differences were also found between sections for whether a student had a prior internship (INTERN), how recently the student completed their introductory Financial Accounting course (FINANCIAL), their self-reported grade point average at the beginning of the semester (GPA), and whether they were Accounting majors or other type of major in the business school (MAJOR).⁸ As this course is required for all business majors, it is not surprising that this course is well populated with both accounting and other majors in both sections. For our main dependent variables, student perceived grade (GRADE) and course engagement (ENGAGEMENT), as well as the eight individual survey questions comprising the summary engagement variable, were all significantly different

⁵ To potentially control for cheating on exams, students in both classes were allowed to use their notes and textbooks. However, given the limited time for each exam, it was very difficult for a student to flip through all of these materials.

⁶ Students in both sections were notified and permitted to attend office hours in person. However, attendance for these in person sessions by online participants was sparse, usually 1 or 2 persons would attend in sessions before an exam.

⁷ As our study, in part, seeks to identify factors in which students choose a course delivery mode, self-selection into F2F or online course delivery occurred. Neither of the sections were closed during registration so all students were able to register for whichever delivery method they preferred. We reran all of our regressions using a matched pair design (referenced in footnote 3 above) and discuss limitations due to any potential self-selection bias in our conclusion section.

⁸ For complete definitions of all variables see Table 1.

TABLE 1
Descriptive Statistics

	In-Person (F2F) <i>Method</i> =0 (N=105 Students)			Online <i>Method</i> =1 (N=57 Students)			Median	Test
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.		
<u>Study Variables</u>								
Grade	3.97	3.00	2.18	5.75	5.00	3.17	-4.26***	2.93***
Communicate	1.64	1.00	1.06	2.32	2.00	1.71	-3.11***	1.28
CommTA	1.62	1.00	1.26	2.64	2.00	1.74	-4.28***	3.67***
CommPeers	1.93	2.00	1.02	3.81	4.00	1.52	-9.35***	6.81***
Study	2.21	2.00	1.21	3.77	4.00	1.57	-7.01***	5.43***
Askq	2.34	2.00	1.32	2.98	3.00	1.59	-2.59**	2.56**
AskqGroup	1.75	1.00	1.09	2.77	2.00	1.55	-4.88***	4.33***
Group	1.86	2.00	1.10	3.04	3.00	1.76	-5.22***	3.91***
Distract	2.62	2.00	1.39	3.61	4.00	1.66	-3.87***	3.61***
Engagement	15.93	15.00	6.19	25.18	24.00	9.99	-7.19***	4.88***
Project	1.86	2.00	1.11	3.04	3.00	1.77	-5.22***	3.90***
<u>Descriptive Variables</u>								
Class	2.68	3.00	0.64	2.81	3.00	0.67	-1.14	1.05
Gend	0.62	1.00	0.49	0.67	1.00	0.48	-0.60	0.60
Race	0.88	1.00	0.33	0.82	1.00	0.38	0.86	-0.90
Intern	1.89	2.00	0.31	1.84	2.00	0.37	0.93	-0.98
Financial	5.35	6.00	1.16	5.04	6.00	1.49	1.50	-1.60
GPA	4.22	4.00	0.93	4.04	4.00	1.29	1.04	-1.18
Major	0.18	0.00	0.39	0.21	0.00	0.41	-0.45	0.46

***, **, * indicates differences of means/medians for the *Method* variable for traditional in-person and online-only method groups are statistically different from each other at significance levels of 1%, 5%, and 10% levels.

TABLE 1 VARIABLE DEFINITIONS

Variable Definitions (in table order): GRADE represents the self-reported student expected grade. It is an increasing scale from 1 (A+) to 11 (I am not sure). All other *Study Variables* are ordinal variables containing 7 values from "Extremely Comfortable" to "Extremely Uncomfortable." "Extremely Comfortable" and "Extremely Uncomfortable" were represented by the numbers one and seven with the number four being the midpoint of neither comfortable nor uncomfortable. These variables represent student ability to communicate with the instructor (Communicate), the teaching assistant (CommTA), and their peers (CommPeers). Study represents comfort working in study groups. Askq (AskqGroup) are student reported values for ease of asking questions during class lectures (Askq) as well as during class projects (AskqGroup). Group represents ease of working in group projects. Distract is the degree to which students felt distractions during class lecture time. Engagement is a summary variable created by summing the answers to (Askq+Askqgroup+Communicate+CommTA+CommPeers+Study+Distract+Sgroup) and represents an overall proxy for student reported "engagement" in the managerial accounting class. Engagement is meant to capture avenues of communication, distractions, and working with their instructors, TA's, and peers. Project is a self-reported assessment on how the students felt overall about completing the three group projects (PROJECT) with their fellow students. *Descriptive Variables* including Class represents a scale from 1 (Freshman) to 5 (Graduate), Gend is ordinal from 0 (female), 1 (male), 3 (Non-binary/third gender), and 4 (Prefer not to say), Race is an indicator variable equal to 1 (White) to 0 (Non-White). Intern is an indicator variable equal to 1 if the students has had an internship and 2 if not. Financial represents a scale of when the students have reported taking their Introduction to Financial Accounting course with 1 representing "Other" to 7 representing "Summer 2021." Therefore, a higher number represents a more recent exposure to the Introduction to Financial Accounting course. GPA is a scale from 1 "Below 2.60" to 5 "3.61-4.0" and is the self-reported grade point average of the student prior to taking this course. Major is an indicator variable equal to 1 if the student is an Accounting major and 0 otherwise.

across delivery method ($p < 0.01$). Therefore, univariate statistics confirm that expected grade and student self-reported feelings of engagement differed between traditional and online formats.

HYPOTHESES TESTING

Hypothesis one examined whether delivery method affected student perceived performance as proxied by expected final grade. In regard to predictions, delivery method (METHOD) is predicted to be positively associated with expected grade (GRADE) as online participants ($n=1$) over F2F students ($n=0$) are expected to believe they will receive lower grades (increasing scale from "A+"=1 to "Less than a C-"=10). The following model was used:

$$\text{GRADE} = \beta_0 + \beta_1\text{CLASS} + \beta_2\text{GPA} + \beta_3\text{GEND} + \beta_4\text{RACE} + \beta_5\text{INTERN} + \beta_6\text{FINANCIAL} + \beta_7\text{MAJOR} + \beta_8\text{METHOD} + \varepsilon \quad (1)$$

Results of model 1 in Table 2 (see Table 2 on page 10) confirm a positive and significant association ($p < 0.01$) between our measure of delivery method (METHOD) and student perceived final grade (GRADE). Therefore, students in the online section ($n=1$) self-reported expecting to receive a lower grade for the course (i.e., higher reported grade scores equate to worse expected final grade for the course). This finding is inconsistent with some prior literature on grades and delivery method for introductory accounting courses (Chiu et al., 2014). However, that study examines *actual* grades while our study polled students on what grade they expected to receive.⁹ This is an important distinction as it provides support for the idea that students in the online section, though given the same materials and exams as the traditional in-person section, felt less confident overall in their performance in the course. Further, as neither class had taken a final exam at the time of the survey and the final exam was the same in both sections, results should not have been biased due to any potential uncertainty surrounding the specific material on the last exam.

Results of demographic and other control variables in Table 2 confirm a number of findings. For one, student class level (CLASS) is positively associated ($p < 0.10$) with expected final grade meaning those students that are approaching graduation expect a lower grade. In other words, more tenured students taking this introductory class seemed to feel less confident in the grade they would receive. While this may seem counter intuitive, this course is required for all business majors. Therefore, lower grade expectations for students approaching graduation could be caused by students who waited until the end of their college career to take a course outside of their major. Further, self-reported beginning of semester grade point average (GPA) is negatively associated ($p < 0.01$) with expected final grade. This result is as predicted as the numeric GPA variable is coded with lower numbers for lower GPAs while the expected grade variable (GRADE) has higher numbers for a worse course grade. Finally, none of the other demographic variables (gender, race) or other control variables (prior internship (INTERN), major (MAJOR), when the Introduction to Financial accounting course (FINANCIAL) was taken) were found to be significant predictors of expected final grade.

⁹ Actual final percentage grades for each class as a whole were 80.6% for the online section and 84.4% for the traditional F2F section. As survey participation rates were not 100% in either class, a direct comparison between our sample and the whole class is not possible. However, in Table 1, mean scores of 3.97 (F2F)/5.75 (online) for expected GRADE translates to approximately a "B+" expected grade for the F2F and a "B/B-" for the online section. Therefore, traditional F2F participants were perhaps a little too optimistic while online students were fairly accurate in their grade prediction.

TABLE 2
Regression Analysis of Expected Grade on Delivery Method

Independent Variables^a	Prediction	Coefficient
METHOD	+	1.54*** (3.84)
CLASS	?	0.59* (1.70)
GEND	?	0.27 (0.51)
RACE	?	-0.07 (-0.13)
INTERN	?	-0.21 (-0.36)
FINANCIAL	?	-0.15 (-0.98)
GPA	-	-0.64*** (-3.30)
MAJOR	?	-0.51 (-1.03)
N		162
F-Value		6.29***
Adjusted R-Squared		0.21

^aSee Table 1 for variable definitions. (*, **, *** represent coefficient significance levels of 10, 5, less than one percent) based upon T-Values reported in parentheses. All results are presented at two-tailed significance levels.

Hypothesis two examined factors by delivery method that would influence student self-reported engagement within the course. As noted in prior literature, increased feelings of isolation and lower online attendance were common complaints from both faculty and students surveyed for online classes held during COVID (Sangster, Stoner, and Flood, 2020). Therefore, the following models examined whether delivery methods affected student ability to engage in class activities.

$$ENGAGEMENT = \beta_0 + \beta_1 CLASS + \beta_2 GPA + \beta_3 GEND + \beta_4 RACE + \beta_5 INTERN + \beta_6 FINANCIAL + \beta_7 MAJOR + \beta_8 METHOD + \varepsilon \quad (2)$$

Results for model 2 in Table 3 indicate a significant and positive association ($p < 0.01$) between our measure of self-reported engagement and delivery method. As our measure of engagement (ENGAGEMENT) is a summary variable numerically increasing as students felt less engaged, this finding implies that students in the in-person section ($n=0$ versus online $n=1$) reported feeling more engaged with the course.¹⁰ This finding is consistent with Green (2021) which reported higher levels of student engagement during the COVID pandemic in the hybrid and in person sections. Therefore, even with the online functions available to chat and ask questions through video conferencing, the lack of a physical presence appears to have influenced student responses on engagement.

¹⁰ As our measure of student engagement (ENGAGEMENT) was a summary variable of eight specific questions pertaining to communication, working with others, and reported distractions during class, it is possible that one or a few of these individual scores could be driving our results. In supplemental testing (untabulated), individual questions as well as three summary measures were examined. All results were quantitatively similar to the ENGAGEMENT summary variable.

For the control variables in model two, gender (GEND) is significant and positively associated ($p < .10$) with feelings of class engagement. As the gender variable is an indicator variable equal to one for male, this finding implies that male students in the class, which comprised approximately sixty-four percent of the total felt more engaged.¹¹ Among other control variables, our measure of when the student reported taking their introductory Financial Accounting class (FINANCIAL), an ordinal variable numerically increasing as the financial class was more recently taken was also found to be significant and negatively associated ($p < .01$) with feelings of engagement. Therefore, students who more recently took another accounting class felt more engaged in this managerial accounting class. This finding is not surprising as even though the subject matter within accounting differs, participants perhaps felt more comfortable or engaged when having some form of more recent accounting experience.¹² In addition, students declared as accounting majors, who should be more engaged, may be more likely to take these courses sequentially within a more recent period of time.

TABLE 3
Regression Analysis of Engagement on Delivery Method

Independent Variables^a	Prediction	Coefficient
METHOD	+	8.54*** (6.66)
CLASS	?	0.40 (0.37)
GEND	?	2.19* (1.71)
RACE	?	-0.13 (-0.07)
INTERN	?	-2.23 (-1.22)
FINANCIAL	?	-1.33*** (-2.72)
GPA	-	0.15 (0.25)
MAJOR	?	-0.73 (-0.46)
N		162
F-Value		8.59***
Adjusted R-Squared		0.28

^aSee Table 1 for variable definitions. (*, **, *** represent coefficient significance levels of 10, 5, less than one percent) based upon T-Values reported in parentheses. All results are presented at two-tailed significance levels.

¹¹ The gender question allowed for four responses – Male, Female, Non-binary/third gender, Prefer not to say. Only four participants in the survey reported responses other than male or female and findings were quantitatively similar including or excluding these participants.

¹² Our survey specifically focused on student perceptions and experiences in the introductory Managerial Accounting class. Therefore, while overall grade point average was asked as a control variable, we did not ask questions regarding grades received in the introductory Financial Accounting course that all students took in a past semester. However, another potential means to have evaluated the impact of recency of the financial accounting course on ease of communicating may have been to inquire about their grade for Financial Accounting.

DISCUSSION AND CONCLUSION

Results from our hypothesis testing confirmed that students taking an introductory Managerial Accounting course post-COVID reported increased course engagement and higher expected performance in a face-to-face setting as opposed to an online delivery method. In the survey, students were also asked other questions about their experiences with their course delivery method. As supplemental analysis, when examining online versus in-person learning, students significantly felt more prepared for exams (p -value < 0.10) and more comfortable in understanding the course materials provided (p -value < 0.01) in F2F over the online format. Green (2021), in his study during COVID, also found a similar significant relation between engagement and exam performance by course delivery method.

In an effort to understand why the F2F students reported higher exam preparedness and comfort with the course materials, additional question responses from the survey were examined. No significant differences between groups were found when students were asked if they attended office hours and formal recitation sessions with the Teaching Assistant. Therefore, satisfaction levels associated with comprehension and preparedness did not seem to be caused specifically by office hours or TA attendance for each section. However, students in the online section did report attending a higher percentage of lectures (p -value < 0.05) and a higher likelihood of rewatching the lectures at a later date (p -value < 0.05). This finding does provide additional support to the notion that the online group had greater difficulties understanding the course materials, expected lower grades for the course, and therefore felt that additional time was needed to originally attend and revisit the lectures.¹³ Future research can perhaps examine specific methods to improve comprehension of materials in online-only formats.

Students in the F2F section also responded that it was easier to follow the lectures (p -value < 0.05). In addition, as one component of our student engagement variable, F2F participants also responded feeling significantly less distracted during lectures than their online counterparts (p -value < 0.01). Online participants appreciated the flexibility of the online format (p -value < 0.10), for better or worse. Therefore, comprehension differences between sections can at least in part be tied to feelings of distraction from the online section. While it's not easy to monitor and enforce specific policies for online lecture participants, professors should certainly remind their online students of the different challenges faced when attending class online versus F2F. At a minimum, professors might want to require live cameras via Zoom or some other format to better limit or identify distracted students when teaching online. Further, professors may consider adding another graded activity for the online class to confirm that students are staying current with the course outline.

Like any other survey, there are potential limitations to our findings. For one, only two sections (one each: F2F and online) of one specific introductory Managerial Accounting course were examined. While a controlling factor of having one instructor in both classes provides some level of stability in this study, our results might not hold for more advanced classes or other degrees. However, as this course is required for all business students at this university and was well-populated with all majors, we do believe it provides a basis for comparison. Future research can incorporate additional sections or other classes to examine whether these findings continue to hold. Further, as this study was undertaken immediately post-COVID, online participants might have been increasingly "burned out" from having been required to take all classes in the last two semesters online. To the extent this is a key potential reason for the outcome, burn out not being measured in our survey is a potential limitation to these findings.¹⁴ It is also possible that some students who wished to take the class in-person were forced to register for the online section due to various reasons such as scheduling conflicts with other courses. There were 105 F2F/57 online students who responded to the survey for a response rate of 98.1%/95%, respectively. As this was an anonymous survey with less than a 100% response rate, it was not possible to identify whether any of these participants responded. However, with the low number of potential students affected in this manner we believe this effect is minimal. Finally, self-selection bias may also have affected our findings as students were not randomly assigned to the online or F2F sections. However, as previously discussed, supplemental analysis was performed using a matched pair design based upon gender and class levels to provide additional support for our findings.

If students are searching for a more convenient way to take a course, then that should also be reflected in their perceptions of the characteristics of the delivery method. Trying to keep our customers satisfied is always a goal but should not overtake learning as the primary outcome for an academic institution. Our study compares these two characteristics since the instructor, course material, and assessments were relatively constant between the two sections while differences, as noted above, were intended to maximize the potential students results for each delivery method. Jordan and Samuels (2020), in a summary of

¹³ This may be because the online recordings of the conceptual aspects of the course did not give a student an opportunity to ask questions immediately as a concept was being taught, a potential weakness of this online course delivery.

¹⁴ As discussed above, student in almost all cases should have self-selected into the section they desired (online or traditional). Therefore, students who may have felt "burn-out" from prior online classes should have had the opportunity to register for the traditional in-person section which should reduce this potential limitation. Further, we believe examining students post-COVID, where viewpoints on online versus traditional may have changed from before the pandemic is an important contribution of this study.

accounting research on learning effectiveness posed the question as to what kinds of learning activities worked best for online and F2F students. This study has attempted to identify post-COVID differences in student perceptions related to F2F versus online courses. Our research examines how these differences may affect student evaluations regarding their expected performance and levels of engagement in the course. As universities continue to evolve and the higher education business model is reevaluated, it is important to understand what factors influence student learning and engagement in all delivery methods.

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