21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
21º USP International Conference in Accounting
São Paulo 28 a 30 de julho 2021.

Instructional Delivery Mode, Response Format, and Student Performance in Accounting Education: A National Examination

VITOR HIDEO NASU
Universidade de São Paulo

Resumo

This study investigates how instructional delivery modes (i.e., face-to-face vs. distance education) are associated with student performance while also accounting for question/response formats (i.e., multiple-choice and open-ended questions) and course content (accounting vs. non-accounting) in a national-wide examination. Using a dataset with more than 52,000 unique observations and employing regressions models, the results indicated that, in general, students enrolled in face-to-face education outperformed their distance education counterparts, even after controlling for student's age, sex, civil status, ethnicity, family income, work status, scholarship, and hours of study. This evidence supports that the face-to-face mode is more effective than the distance one, especially on accounting exams. On non-accounting open-ended questions, however, distance education students performed significantly better. A potential explanation for this result is that students in distance education have easier access to general knowledge since they are studying in front of a computer with access to the internet and are remotely monitored if monitored at all in some cases. While the online environment can be a distraction factor, it also seems to contribute to students' general knowledge. The results of this study raise some considerable concerns. First, although face-to-face education has been found to be more effective than distance education, students in both delivery modes presented poor performance. Second, the response format on which exams are built did matter for student performance. Accounting faculty must design grading policies based on this evidence. And third, students did better at non-accounting questions than accounting ones. It suggests that the students are studying more general topics or that accounting programs are becoming more generalists.

Keywords: Response; Delivery mode; Assessment; Academic performance; Accounting education.

1. INTRODUCTION

Learning effectiveness is a major concern in the accounting education field. Prior research discusses how to improve it from five categories in a dynamic, changing educational setting: content and curriculum, content delivery methods, classroom environments, student demographics, and measures of learning and performance (Jordan & Samuels, 2020). While all these five perspectives are essential to provide better accounting courses, this study focuses on the second, third, and fifth ones. It is not an easy task for accounting professors to design academic exams at the same time they must consider the course level. The exam design alone takes time and effort from them but thinking of how exams will be administered becomes equally important when students take distinct education models, such as face-to-face (FFE) or distance (DTE) education.

Previous literature has examined whether the response/exam formats influence student performance (Arthur & Everaert, 2012; Jonick, Schneider, & Boylan, 2017; Massoudi, Koh, Hancock, & Fung, 2017; Nsor-Ambala, 2020; Phillips, Lobdell, & Neigum, 2020). For instance, Nsor-Ambala (2020) conducted a study to test how exam type – namely closed-book, open-book, and cheat-sheet – was associated with student performance. Based on a sample of 198 students, the author found that the cheat-sheet type yielded the best results. Accounting faculty who want to increase student performance should then be advised to use it. On the other hand, closed-book and open-book types were shown to be challenging for students as they did not get more than half of the exam correctly.

Research also suggests that the content delivery mode is associated with student performance (Chen, Jones, & Moreland, 2013; McCarthy, Kusaila, & Grasso, 2019). Using students from intermediate accounting and auditing courses, McCarthy et al. (2019) examined whether delivery modes affected academic performance. They found that it did. More specifically, intermediate accounting students who have taken the online and hybrid modes outperformed those in the face-to-face one. Similarly, auditing students who have taken the online mode outperformed those in the hybrid and face-to-face ones. Chen et al. (2013) obtained different findings. For advanced cost/managerial and financial accounting courses, students enrolled in in-person classes outperformed their online peers. There was no significant effect on accounting principles courses, though.

These findings show that both the delivery mode and exam format have valuable power to explain student performance. Despite that, they have been examined separately from each other. This study aims to fill this gap by examining how the delivery mode is associated with student performance by response format. Using a national database, this study assesses whether delivery mode (FFE vs. DTE) influences students' performance on multiple-choice (MCQ) and open-ended (OEQ) questions. Likewise, it investigates how students perform on accounting and non-accounting (i.e., general topics) exams.

The contributions are four-fold. First, it accounts for delivery mode and response format concomitantly. Analysis of these two variables is relatively unusual in accounting and management areas. Daymont and Blau (2008) and Jonick et al. (2017) studies are two of a few. Second, unlike prior literature (e.g., Arthur & Everaert, 2012; Chen et al., 2013; McCarthy et al., 2019; Nsor-Ambala, 2020), it utilizes a large, national database to provide evidence on the relationship between delivery mode and student performance analyzed by response format and course content. Third, this study utilizes multiple measures for student performance, as well as accounting-related and non-accounting questions. And fourth, the findings can support policymakers' and accounting professors' decisions when designing exams that effectively measure student performance.

The remainder of this study proceeds as follows. Section 2 discusses the association between delivery modes and exam format. Section 3 explains the data collection and analysis

2

procedures. Section 4 shows the results and section 5 concludes and sheds light on some key implications.

2. BACKGROUND
2.1. Student assessment

There is much debate on how students should be tested at the university level. It is not different for accounting education. Easier said than done, academic exams must include a group of characteristics that is aligned with the course content and educational objectives. Exams cannot be too short nor too long since there is a time limit. They also cannot be too easy nor too difficult. They must be fair, free of errors, and comprise key points of the subject matter. Oftentimes, accounting faculty might find it hard to design.

For this reason, even though more is needed, some prior studies examined the impact of grading policies on student performance within the scope of accounting education (Elikai & Schuhmann, 2010; Ravenscroft & Buckless, 1992). According to Ravenscroft and Buckless (1992), instructor grading policies are "defined as the weight given to tests, quizzes, homework, and so on in determining course grades" (p. 163). The purpose of a grading system is to make students be hard-working and good performers (Elikai & Schuhmann, 2010). Instructors can then use grading policies to encourage the study of a certain topic or model student behavior. As students want to pass the course exam, they are more inclined to study the topics that the instructor thinks are more valuable.

Using data from introductory accounting courses at three state institutions, Ravenscroft and Buckless (1992) found that female students outperformed their male peers when homework represented 11% of the final course grade. However, when no weight was attributed to homework, male students had better performances vis-a-vis their female counterparts. In another study, Elikai and Schuhmann (2010) conducted an experiment to examine the impact of grading policies (strict vs lenient) on student performance. The results showed that a shift from a lenient to a strict grading policy has a positive effect on academic performance. Grading policies are not easy to determine and sometimes accounting professors do not have the autonomy to grade activities as they please because of pre-established institutional limits for each activity (homework, class participation, mid-term exam, final exam, and so on).

The way students are assessed is crucial because it selects who will progress or retake a course. It can influence students' achievement in graduate school (Buckless & Krawczyk, 2016) and their entrance to the job market. Based on an experimental approach, Arthur and Everaert (2012) found that while male students got better grades in MCQs, female ones outperformed their male counterparts in OEQs. Depending on how question formats and weights are established in accounting exams, student's sex may influence academic performance. Although MCQs take less time to correct and might generate fewer questioning from students, OEQs capture deeper and more detailed students' understanding.

In another study, Jonick et al. (2017) analyzed 1,104 responses for introductory accounting quantitative questions. Multiple-choice and fill-in were the two types of questions. The results indicated that students' performance was higher when MCQs were utilized. The analysis of fill-in questions revealed that students provided a wide range of incorrect answers, many of which would not have even been offered as an option.

Question presentation also seems to affect student performance. Many technologies allow students to opt whether they want to answer questions interspersed within a reading or as a block after the reading (Phillips et al., 2020). Based on three studies, Phillips et al. (2020) have concluded that the type of questioning (interspersed or blocked) did affect the academic performance of different readers. In study one, they found a positive relationship between

3

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
São Paulo 28 a 30 de julho 2021.

interspersed (blocked) questioning and student performance if students read before (after) class. In study two, the authors obtained evidence that associated stronger readers with a greater delayed recall when answering interspersed questions and weaker readers with a greater delayed recall for blocked questions. And in study three, while students who were not induced to mind-wander obtained higher performance when responding to interspersed questions, students induced to mind-wander did better when presented to blocked questioning.

Other aspects of accounting exams have also been investigated and linked to learning outcomes. In a Ghanaian university, Nsor-Ambala (2020) explored how exam types associate with knowledge retention and exam score in a cost and management accounting course. More specifically, the author tested three exam types, namely closed-book, open-book, and cheat-sheet. For both knowledge retention and exam score, the results indicated that students obtained better performances when taking the cheat-sheet format in comparison to the others. When the accounting professor allows students to bring a piece of paper with their annotations (cheat-sheet), they are more prone to get better grades than when they are only allowed to access textbooks and teacher-prepared notes (open-book) or not allowed to check any material at all (closed-book).

The order of the questions of a given exam also might influence student achievement (Bline, Perreault, & Zheng, 2016). Using data from more than 120,000 certified public accountants (CPA) candidates over the 2005-2013 period, Bline et al. (2016) found that those who solved the financial accounting and reporting questions first were more likely to pass all four parts of the CPA exam faster, as opposed to those who first took the business environment and concepts questions. Because accounting exams have time limits, time management is crucial and can determine whether students will pass them.

As new forms of synchronous and asynchronous learning are developed, especially with the use of technology supporting resources, MCQs, OEQs, and other forms of testing student knowledge have become easier to implement. There has been some positive evidence in the use of these resources. Massoudi et al. (2017), for example, found a positive association between online MCQs and formative assessment. Additionally, teacher-less introductory accounting classes seem to be as effective as conventional ones with respect to student performance (Chiu, Gershberg, Sannella, & Vasarhelyi, 2014). However, some traditional learning techniques are still important for academic performance, such as reading texts instead of watching videos (Stice, Stice, & Albrecht, 2020).

Student assessment belongs to a wide range of an accounting instructor's academic duties. It requires attention and commitment to fairly measure student performance using the best resources available. While grading policies vary across education institutions, accounting professors can choose the types of questions to include in exams and other grading assignments. The proportion between MCQs and OEQs, for example, has not been determined and depends on specific factors of the context in which the exam is taken.

2.2. Delivery mode: FFE and DTE

The last decades of the education field have been marked by the provision of the online delivery mode. Also, the new developments in mobile devices and apps allowed students to learn from everywhere. Some apps even work without an internet connection. It cannot be denied that technology enabled multiple forms of content delivery. What must be reflected on, however, is whether it is as effective as (or better than) traditional education. With a particular look at FFE and DTE, this paper discusses the relationship between delivery mode and student performance while also considering the response format.

Since the beginning of the 2000s, there has been a considerable increase in the DTE offerings (Bryant, Schafer, & Kahle, 2005). Many business schools and accounting programs

4

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"

São Paulo 28 a 30 de julho 2021.

had intended to offer this type of content delivery mode (Bryant et al., 2005). The easier access to desktops and laptops has driven the growth of DTE, where students could take formal classes from their homes. DTE is no longer a new delivery mode and other formal and informal education models have also emerged (e.g., hybrid and mobile-learning). Despite that, DTE did raise and has been raising some suspicion regarding its effectiveness since its formalization as an education model, perhaps because its quality has not accompanied its popularization.

Employers' perception was arguably one of the first perceptions affected by how students take their formal classes because they are among the main stakeholders of the universities. There has been some evidence that employers prefer to hire FFE students (Braun, Boldt, Mauldin, & Viosca, 2020; Grossman & Johnson, 2016), even when themselves had taken DTE (Grossman & Johnson, 2017). The suspicion raised toward the effectiveness of DTE appears to be primarily associated with student performance, which in turn is related to performance measurement in accounting exams.

In accordance with Chen et al.'s (2013) results, while students preferred the FFE model for advanced cost/managerial accounting and advanced financial accounting courses, there was no preference for any delivery mode for accounting principles courses (a lower course level). It suggests that course level impacts the way students prefer to learn. Prior research has also analyzed blended learning formats (Fortin, Viger, Deslandes, Callimaci, & Desforges, 2019). Accounting students enrolled in the blended model in which face-to-face classes were predominant (F2F+) performed similarly to those in which online classes were predominant (Online+). Their satisfaction level was similar too. Also, the main significant factors for on to register for an Online+ mode are retaking the course and the belief that this delivery mode facilitates learning (Fortin et al., 2019).

While student performance appears to be sensitive to response formats (Arthur & Everaert, 2012; Daymont & Blau, 2008; Jonick et al., 2017) and delivery modes (Chen et al., 2013; McCarthy et al., 2019), only a few studies have concomitantly considered them in their analyses. In an organization and management course, Daymont and Blau (2008) found that DTE students obtained lower grades in relation to FFE ones, after controlling for class, major, and grade point average (GPA). Despite that, DTE students were as good as FFE ones in objective performance measures (i.e., MCQs).

Prior research has been examining delivery modes from multiple perspectives. Chen et al. (2013) and McCarthy et al. (2019), for example, have studied delivery modes and student performance with a focus on the course level. They found that course level did matter for student performance. Chiu et al. (2014) have also investigated different types to deliver content – based on teaching approaches – and academic performance. They gathered evidence to support that the teacher-less approach is as effective as the traditional one regarding student performance. Besides, Braun et al. (2020) and Grossman and Johnson (2016, 2017) analyzed the delivery modes from the employers' perspective, finding evidence in favor of the in-person mode. While employers might prefer FFE students, DTE also provides benefits.

When assessing students, the DTE model has facilitated the professor's work in some significant ways. For instance, according to Jonick et al. (2017), MCQs are compatible with "web-based course management systems, automatic question pooling from online test banks, and online proctoring systems. This format can help preserve academic integrity with randomized question selection and algorithmically generated data sets" (p. 4). Consistently with this vision, Golden and Kohlbeck (2020) used test bank questions to reduce student cheating in online instruction. They paraphrased the statements of the questions and found that it was negatively associated with student performance. Consequently, they concluded it

21º *USP International Conference in Accounting*
"*Accounting and Actuarial Sciences improving economic and social development*"
São Paulo 28 a 30 de julho 2021.

was harder for students to find the answer on the internet for the paraphrased statements of the questions in comparison to the original (verbatim) statements.

In recent times, most universities have gone virtual due to the COVID-19 pandemic and their professors had to teach remotely, which is a type of DTE model. Zoom, Google Meet, and Microsoft Teams are among the most usual technology tools employed in remote teaching. DTE moved from a trend to a necessity (Pasewark & Kremin, 2020). Recent accounting educational case papers have tested and implemented it in both FFE and DTE (e.g., Long & Nothhelfer, 2020). COVID-19 has brought changes to accounting education, but efforts are being made specially by professors and students to better accommodate learning. And the delivery method plays a key role in this regard.

3. METHOD
3.1. Context and data collection

To examine the relationship between delivery mode and student performance while also accounting for response formats, data were collected from the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira's (INEP) website (https://www.gov.br/inep/pt-br). INEP is a well-known Brazilian institute that is responsible for external academic exams and assessment, educational statistics and indicators, and knowledge management and educational studies. Data at distinct education levels (e.g., high school and undergraduate) are publicly available on its website. INEP is responsible to administer the Exame Nacional de Desempenho dos Estudantes (ENADE), which is a national-level exam that aims to evaluate the quality of higher education in Brazil.

ENADE has been conducted since 2004. Every year, ENADE tests students from a group of undergraduate programs. In the case of accounting students, they took this exam in 2006, 2009, 2012, 2015, and 2018. This study utilizes the data from the 2018 ENADE edition once it is the most recent (https://www.gov.br/inep/pt-br/areas-de-atuacao/avaliacao-e-exames-educacionais/enade). Besides the exam, students are also asked to provide their demographic, education institution, and dozens of other academic variables through an online survey before taking the exam. ENADE is mandatory for one to get graduated, but there is no minimum score. Only students who are near to graduate (last semester or year) take ENADE. Its data are usually made available from one to two years after its administration and not all accounting undergraduate students are tested since it is taken every three years.

Table 1 shows the original sample and excluding procedures. A total of 62,475 students were selected to take 2018 ENADE, however, there were 9,619 who did not show up or had administrative problems with their performance on the exam. In addition, 223 students did not respond to the online survey and had their data excluded. Despite that, the final sample consists of 52,633 students (84.2% of the original sample) and still represents a significant number of observations that previous studies have not reached.

Table 1 - Sample procedures

Procedures	Frequency	%
Original sample	62,475	100.0
Missing values/Not applicable – Performance variables	9,619	15.4
Missing values/Not applicable – Demographic information	223	0.4
Final sample	**52,633**	**84.2**

In the database that can be downloaded from the INEP's website, there are dozens of student's demographic and performance information. For this reason, only the relevant

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"

São Paulo 28 a 30 de julho 2021.

variables to predict student performance remained in the final dataset. More details are provided in the next subsection.

3.2. Variables of the study

ENADE is a four-hour long exam and is taken in-person. It includes a total of 40 questions, of which five are OEQs and 35 are MCQs. Student's final grade is obtained by calculating the weighted average of their performance on the accounting (75%) and non-accounting (25%) exam (INEP, 2015). The accounting exam comprises questions specifically related to the accounting curriculum, which are accounting theory, financial accounting, managerial and cost accounting, public sector accounting, auditing and forensic accounting, analysis of financial statements, regulation, quantitative methods, and professional ethics (INEP, 2015). On the other hand, some of the topics in the non-accounting exam (i.e., general topics) are globalization, social responsibility, biodiversity, technology advancement, arts, and culture (INEP, 2015). Table 2 provides the structure of the ENADE.

Table 2 - ENADE: parts, weights, and types of questions

ENADE	Weight (1)	Parts of ENADE	Weight (2)	Type question	# of questions
Overall performance	75%	Accounting exam	85%	MCQ	27
			15%	OEQ	3
	25%	Non-accounting exam	60%	MCQ	8
			40%	OEQ	2
				Total # of questions	40

The 27 accounting MCQs account for 85% of the performance on the accounting part of the ENADE and the three accounting OEQs account for 15%. The eight non-accounting MCQs account for 60% of the performance on the non-accounting exam and the two non-accounting OEQs account for 40%. All parts of the 2018 ENADE could vary from zero to 100 points.

In addition to the performance variables, student's age (AGE), sex (SEX), delivery mode (DMODE), civil status (CIVIL), ethnicity (ETNT), family income per month (INCOM), work status (WORKS), scholarship (SCHOL), and hours of study per week (STUDY) were also available and collected. Data were analyzed using Stata version 15.1. Table 3 shows the description of the variables.

Table 3 - Variables of the study

Variable	Description	Measurement
AGE	Student's age	In years
SEX	Student's sex	1 = male; 0 = female
DMODE	Delivery mode	1 = DTE; 0 = FFE
CIVIL	Student's civil status*	2 = married; 1 = single; 0 = other
ETNT	Student's ethnicity	1 = white; 0 = non-white
INCOM	Student's family income per month	1 = more than 6 minimum salaries; 0 = up to 6 minimum salaries
WORKS	Student's work status	1 = working; 0 = not working
SCHOL	Did/Does the student receive a scholarship?	1 = yes; 0 = no
STUDY	Hours of study per week*	2 = more than 7 hours; 1 = 1 to 7 hours; 0 = 0 hour
OVPER	Overall performance	0 to 100 points
AE	Performance on the accounting exam	0 to 100 points
AMCQ	Performance on accounting MCQs	0 to 100 points
AOEQ	Performance on accounting OEQs	0 to 100 points

7

21º *USP International Conference in Accounting*
"Accounting and Actuarial Sciences improving economic and social development"

2 1º USP International Conference in Accounting

São Paulo 28 a 30 de julho 2021.

NAE	Performance on the non-accounting exam	0 to 100 points
NAMCQ	Performance on non-accounting MCQs	0 to 100 points
NAOEQ	Performance on non-accounting OEQs	0 to 100 points

Note. *Each category of these variables was transformed into dummy variables, as suggests prior literature (Fávero & Belfiore, 2019). See subsection 13.2.6 of Fávero and Belfiore's (2019) work.

4. RESULTS

Regarding participants' demographic and academic information (n = 52,633), 59.17% were female, 50.26% were white, 67.22% were single and 25.75% were married, 85.08% had a family income up to six Brazilian minimum salaries, and 81.06% were working. The average age was 28.84 years (standard deviation = 7.36 years). Also, 75.75% were enrolled in the FFE mode, 90.57% did not receive any scholarship throughout their academic trajectories, 77.09% studied from one to seven hours per week and 13.65% studied more than seven hours per week. Next, Table 4 shows the descriptive statistics of the performance variables.

Table 4 - Descriptive statistics of the performance variables

Panel A: All	Observations	Mean	Standard deviation	Minimum	Maximum
OVPER	52,633	36.70	12.45	0.00	90.10
AE	52,633	35.14	13.77	0.00	94.20
AMCQ	52,633	38.76	14.67	0.00	93.80
AOEQ	52,633	14.63	18.10	0.00	100.00
NAE	52,633	41.33	16.50	0.00	94.40
NAMCQ	52,633	45.86	22.10	0.00	100.00
NAOEQ	52,633	34.54	19.03	0.00	95.00
Panel B: DTE	**Observations**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
OVPER	12,766	34.20***	11.80	0.00	88.20
AE	12,766	32.05***	12.88	0.00	88.10
AMCQ	12,766	35.95***	14.03	0.00	93.80
AOEQ	12,766	9.90***	14.99	0.00	100.00
NAE	12,766	40.60***	16.32	0.00	94.40
NAMCQ	12,766	44.83***	22.19	0.00	100.00
NAOEQ	12,766	34.27*	18.21	0.00	95.00
Panel C: FFE	**Observations**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
OVPER	39,867	37.50***	12.55	0.00	90.10
AE	39,867	36.14***	13.89	0.00	94.20
AMCQ	39,867	39.65***	14.75	0.00	93.80
AOEQ	39,867	16.15***	18.74	0.00	100.00
NAE	39,867	41.56***	16.54	0.00	93.20
NAMCQ	39,867	46.19***	22.06	0.00	100.00
NAOEQ	39,867	34.63*	19.28	0.00	94.50

Note. ***$p < .01$, *$p < .10$.

As Panel A indicates, students did not get high grades since their overall performance was 36.70 points (standard deviation = 12.45). It suggests that both accounting professors and students need to make additional efforts to make a better learning process happen. Assessment is a key step of the learning process and, in the case of ENADE, is an indicator of the quality of the accounting undergraduate programs in Brazil. The maximum indicates that the best student obtained 90.10 points on 2018 ENADE. On the other hand, at least one student got zero. These findings support that there is room for improvement when it comes to student performance.

8

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"

São Paulo 28 a 30 de julho 2021.

Students, on average, got 35.14 points on the AE. They were better at answering multiple-choice (AMCQ) than open-ended (AOEQ) questions. It is congruent with Jonick et al.'s (2017) findings. Accounting faculty can then employ teaching strategies to enhance students' written skills. Writing assignments can be a useful strategy to encourage students to provide open-ended responses. Recent research supports that both companies and accounting graduates value communication skills, especially those related to oral and written ones (Dolce, Emanuel, Cisi, & Ghislieri, 2020; Jordan & Samuels, 2020). Jordan and Samuels (2020) note that part of the learning process should make students write from a "business voice" perspective. Accounting educators might want to introduce more practical examples and show financial statements to students in order to make them feel how business writing is achieved. Additionally, there is also evidence that written skills are demanded in the accounting workplace and that employers expect students to already be trained in formal writing when they enter the job market (Siriwardane, Low, & Blietz, 2015). While students need crucial improvements regarding accounting open-ended questions, they did not get good grades when answering multiple-choice questions as well.

On the NAE, students got, on average, 41.33 points. It means that students obtained better performance on general questions than they did on accounting ones. This is a surprising finding as one could anticipate that students would be better at their specialization area (i.e., accounting). In a constantly changing environment, accounting undergraduate programs and students might be prioritizing generic skills − aka soft skills. There is debate on whether accounting technical procedures will be, partially or totally, replaced by machines (Al-Htaybat, von Alberti-Alhtaybat, & Alhatabat, 2018), and then technical skills would have their value decreased. According to prior research (Al-Htaybat et al., 2018; Warren, Moffitt, & Byrnes, 2015), big data, 3D printing, artificial intelligence, blockchain technology, cloud technology, and the internet of things are among the newest technology that can revolutionize the field of accounting. Technology skills, as well as other soft skills, are and will continue to be important for accountants.

Students were also better at responding to NAMCQ than NAOEQ questions. This result reinforces the need for good written communication skills. Together with the company's management, accountants can write the management's discussion and analysis (MD&A) and other reports that may comprise general topics. For this reason, accountants' general knowledge, such as biodiversity and environmental responsibility, must be kept updated and reported appropriately. The descriptive statistics of the NAMCQ and NAOEQ variables show that students have relatively low knowledge since they could not get 50% of the 2018 ENADE correctly. More efforts concerning students' general knowledge and skills are employable.

When analyzing by DMODE (Panels B and C), the results indicated that students enrolled in both delivery modes got better performance on non-accounting questions in relation to accounting ones. One could anticipate the opposite. Students are supposed to perform better in their specialization area. These results suggest that they are more interested in general topics or that the accounting programs are becoming more generalists. Also, DTE students performed particularly poorer in AOEQ. As previously discussed, DTE accounting professors can use written assignments to make students better at answering open-ended questions. The results found in this study do not seem to fulfill the need for written-ready accounting professionals expected by employers (Siriwardane et al., 2015). In any case, students' accounting knowledge still needs improvements and accounting instructors must concentrate on enhancing it. Two-tailed Welch's (1947) t-tests were additionally conducted to observe potential differences between DTE and FFE students' performances. In general, FFE students outperformed their DTE peers at the usual significant levels. This preliminary

9

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
São Paulo 28 a 30 de julho 2021.

evidence then supports that FFE is more effective than DTE for student performance purposes. It helps in explaining why employers still prefer to hire FFE students (Braun et al., 2020; Grossman & Johnson, 2016, 2017). Subsequently, this study discusses the correlation analysis between DMODE and student performance variables. Table 5 shows the results.

Table 5 - Correlation analysis

DMODE	OVPER	AE	AMCQ	AOEQ	NAE	NAMCQ	NAOEQ
Pearson	-0.114***	-0.127***	-0.108***	-0.148***	-0.025***	-0.026***	-0.008***
Spearman	-0.116***	-0.129***	-0.109***	-0.155***	-0.027***	-0.028***	-0.017***

Note. ***$p < .01$.

Both Pearson's and Spearman's correlation coefficients are significant at the .01 level, even though they can be considered low. Student performance is negatively correlated with delivery mode. These results support that FFE students outperformed their DTE colleagues. The highest correlation is between DMODE and AOEQ, meaning that DTE students obtained lower grades than FFE students. The delivery mode seems to affect student performance as prior research supports (Jordan & Samuels, 2020), but there is conflicting recent evidence as to whether DTE or FFE is best for student performance purposes. While these results are consistent with Chen et al.'s (2013) findings, they are opposed to Massoudi et al.'s (2017) and McCarthy et al.'s (2019).

Two main points are highlighted. First, Massoudi et al. (2017) found that there is a positive association between multiple-choice questions and student performance. However, the current study found what can be considered a poor student performance on the accounting and non-accounting multiple-choice questions. Second, as opposed to the present study, McCarthy et al. (2019) obtained evidence that DTE students outperformed FFE students and argue in favor of the legitimacy of online mode. Likewise, there is also evidence that students performed similarly in blended learning courses where either the in-person or online part was predominant (Fortin et al., 2019). Despite that, prior research indicates that employers are more inclined to hire students who took FFE or hybrid modes than DTE (Braun et al., 2020; Grossman & Johnson, 2016, 2017). Based on McCarthy et al.'s (2019) findings and the COVID-19 context, employers may want to reconsider their perspectives on online mode, though. To further explore the association between delivery mode and academic performance by exam/response format, data were analyzed through multiple regression models. Table 6 reports the results.

Table 6 - Regression results

Response variable	OVPER	AE	AMCQ	AOEQ	NAE	NAMCQ	NAOEQ
	Coefficient (Std. error)	Coefficient (Std. error)	Coefficient (Std. error)	Coefficient (Std. error)	Coefficient (Std. error)	Coefficient (Std. error)	Coefficient (Std. error)
Constant	35.40 (0.40)	33.81 (0.44)	36.44 (0.48)	18.90 (0.57)	40.11 (0.54)	42.50 (0.71)	36.52 (0.63)
DMODE	-3.12*** (0.13)	-3.94*** (0.15)	-3.78*** (0.16)	-4.86*** (0.19)	-0.64*** (0.18)	-1.45*** (0.24)	0.59*** (0.21)
Controls?[A]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	52,633	52,633	52,633	52,633	52,633	52,633	52,633
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. R2	0.066	0.057	0.041	0.087	0.037	0.052	0.014

Note. Each model was also executed accounting for robust standard errors. The results were similar to those reported here.
[A]For conciseness purposes, control variables were omitted. For the full table, please see Appendix A.
***$p < .01$.

10

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
São Paulo 28 a 30 de julho 2021.

DMODE is significantly correlated with student performance ($p < .01$). Except for NAOEQ, DTE students obtained poorer performance than their FFE counterparts. For AE, DTE students were more prone to have, on average, 3.94 points less than FFE students. For non-accounting questions, DTE students' performance was .64 point lesser than FFE students'. Overall, students enrolled in DTE obtained 3.12 points less than their FFE colleagues. These findings support the preference of employers for students who took, at least partially, face-to-face classes (Braun et al., 2020; Grossman & Johnson, 2016, 2017).

With regard to NAOEQ, an interesting finding emerged. DTE students obtained higher performance than their FFE colleagues (coeff. = .59; $p < .01$). On NAMCQ, however, DTE students got lower performances. This finding shows that the delivery mode does matter for student learning when the response format is considered. The use of an online environment can be beneficial to students' general knowledge as they have instant access to information through the internet. In FFE, this access is more restricted since the professor is monitoring students in a closer, visual way. Although some monitoring technology resources are available to track students' activities, such as ProctorU (https://www.proctoru.com/), they are not always utilized by accounting educators. Braun et al. (2020) indicate that taking accounting courses online has a negative impact on recruiting evaluations by CPAs but taking non-accounting business courses or non-business courses online does not result in negative effects. Thus, the internet can be a useful tool for students to learn about non-accounting-related topics within an acceptable risk level of having negative impacts on employers' perception. The relationship between delivery mode and accounting students' general knowledge deserves further investigation.

5. CONCLUDING REMARKS

Based on a national database, this study provided evidence that delivery mode affects student performance when it is analyzed by exam/response formats and course content. While FFE students obtained higher performance than DTE ones, there was evidence that DTE outperformed their FFE colleagues on non-accounting open-ended questions (NAOEQ). Another key finding is that accounting students lack writing skills. The current study found that students were better at responding to multiple-choice than open-ended questions. In the accounting workplace, however, many solutions for problems are not related to the multiple-choice format and thus students must know how to answer distinct types of questions.

Even though there is some recent evidence that employers think online accounting courses negatively affect their perception when hiring (Braun et al., 2020; Grossman & Johnson, 2017), other studies defend the legitimization of the online mode (Fortin et al., 2019; McCarthy et al., 2019). Based on the evidence of this study, there is still a gap between FFE and DTE students' performance, at least in Brazil, with results favorable to the former ones. However, many adaptations have been made in the education models due to recent changes in the health circumstances.

In the COVID-19 era, employers and accounting professors might want to reconsider their perceptions once remote teaching and other forms of DTE are the primary modes to deliver course content. In communities where they were used to an in-person education tradition, significant adjustments were demanded from both professors and students to move to remote education to keep teaching and studying during the social distancing rule (Sangster, Stoner, & Flood, 2020). While remote learning and distance education last as the main delivery modes, this is an opportunity for the stakeholders of accounting students – especially professors and employers – to reflect upon their hiring process and candidates. This

11

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
São Paulo 28 a 30 de julho 2021.

study found that FFE students outperformed DTE ones. But would FFE students perform better than DTE ones when they mandatorily moved to remote education? Has the quality of accounting education declined with the adoption of remote education? Many accounting professors have moved from FFE to remote teaching without appropriate training and thus the question as to whether the quality of accounting education has changed is legitimate and must be reexamined in the face of the recent circumstances.

Finally, the present study has some limitations. First, some control variables, such as prior performance (Massoudi et al., 2017; Nsor-Ambala, 2020), were not included in the data analysis because the 2018 ENADE did not provide them. Second, a significant part of the students did not show up to take the exam (see Table 1). However, the final sample was still composed of a high number of participants. And third, the minimum values (zero) of the performance variables (see Table 4) suggest that some students were not interested in taking the exam. Because 2018 ENADE was mandatory to get graduated but there was no minimum grade to be achieved by the students. They could have well fulfilled their names and answered the questions randomly. It would then be advisable to interpret the results under these limitations.

REFERENCES

Al-Htaybat, K., von Alberti-Alhtaybat, L., & Alhatabat, Z. (2018). Educating digital natives for the future: accounting educators' evaluation of the accounting curriculum. *Accounting Education*, *27*(4), 333–357. https://doi.org/10.1080/09639284.2018.1437758

Arthur, N., & Everaert, P. (2012). Gender and Performance in Accounting Examinations: Exploring the Impact of Examination Format. *Accounting Education*, *21*(5), 471–487. https://doi.org/10.1080/09639284.2011.650447

Bline, D., Perreault, S., & Zheng, X. (2016). An exploratory examination of order effects on CPA exam passage timeliness. *Journal of Accounting Education*, *36*, 65–74. https://doi.org/10.1016/j.jaccedu.2016.05.003

Braun, R. L., Boldt, M. N., Mauldin, S., & Viosca, C. (2020). Accounting graduates with both online and traditional coursework: impact on hiring decisions. *Accounting Education*, *29*(4), 340–355. https://doi.org/10.1080/09639284.2020.1788613

Bryant, S. M., Schafer, B. A., & Kahle, J. B. (2005). Distance Education: A Review of the Contemporary Literature. *Issues in Accounting Education*, *20*(3), 255–272. https://doi.org/10.2308/iace.2005.20.3.255

Buckless, F., & Krawczyk, K. (2016). The relation of student engagement and other admission metrics to Master of Accounting student performance. *Accounting Education*, *25*(6), 519–533. https://doi.org/10.1080/09639284.2016.1218778

Chen, C. C., Jones, K. T., & Moreland, K. A. (2013). Online Accounting Education versus In-Class Delivery: Does Course Level Matter? *Issues in Accounting Education*, *28*(1), 1–16. https://doi.org/10.2308/iace-50303

Chiu, V., Gershberg, T., Sannella, A. J., & Vasarhelyi, M. A. (2014). Does a Live Instructor Matter? *Journal of Emerging Technologies in Accounting*, *11*(1), 1–25. https://doi.org/10.2308/jeta-51058

Daymont, T., & Blau, G. (2008). Student Performance in Online and Traditional Sections of an Undergraduate Management Course. *Journal of Behavioral and Applied Management*, *9*(3), 275–294.

Dolce, V., Emanuel, F., Cisi, M., & Ghislieri, C. (2020). The soft skills of accounting graduates: perceptions versus expectations. *Accounting Education*, *29*(1), 57–76. https://doi.org/10.1080/09639284.2019.1697937

21º USP International Conference in Accounting
"Accounting and Actuarial Sciences improving economic and social development"
São Paulo 28 a 30 de julho 2021.

Elikai, F., & Schuhmann, P. W. (2010). An Examination of the Impact of Grading Policies on Students' Achievement. *Issues in Accounting Education*, *25*(4), 677–693. https://doi.org/10.2308/iace.2010.25.4.677

Fávero, L. P., & Belfiore, P. (2019). *Data Science for Business and Decision Making*. https://doi.org/10.1016/C2016-0-01101-4

Fortin, A., Viger, C., Deslandes, M., Callimaci, A., & Desforges, P. (2019). Accounting students' choice of blended learning format and its impact on performance and satisfaction. *Accounting Education*, *28*(4), 353–383. https://doi.org/10.1080/09639284.2019.1586553

Golden, J., & Kohlbeck, M. (2020). Addressing cheating when using test bank questions in online classes. *Journal of Accounting Education*, *52*, 100671. https://doi.org/10.1016/j.jaccedu.2020.100671

Grossman, A. M., & Johnson, L. R. (2016). Employer Perceptions of Online Accounting Degrees. *Issues in Accounting Education*, *31*(1), 91–109. https://doi.org/10.2308/iace-51229

Grossman, A. M., & Johnson, L. R. (2017). How employers perceive online accounting education: Evidence from Kentucky. *Journal of Accounting Education*, *40*, 19–31. https://doi.org/10.1016/j.jaccedu.2017.06.002

Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP). (2015). *Portaria Inep nº220, de 10 de junho de 2015*. Retrieved from http://download.inep.gov.br/educacao_superior/enade/legislacao/2015/ciencias_contabeis_portaria_inep_n220_10062015.pdf

Jonick, C., Schneider, J., & Boylan, D. (2017). The effect of accounting question response formats on student performance. *Accounting Education*, *26*(4), 291–315. https://doi.org/10.1080/09639284.2017.1292464

Jordan, E., & Samuels, J. (2020). Improving Learning Effectiveness. *Issues in Accounting Education*. https://doi.org/10.2308/ISSUES-2020-019

Long, J. H., & Nothhelfer, R. (2020). Chemotech International, Inc.: Accounting for International Differences in the Measurement of Raw Material and Work-in-Process Inventories. *Issues in Accounting Education*, *35*(3), 57–67. https://doi.org/10.2308/issues-19-020

Massoudi, D., Koh, S., Hancock, P. J., & Fung, L. (2017). The Effectiveness of Usage of Online Multiple Choice Questions on Student Performance in Introductory Accounting. *Issues in Accounting Education*, *32*(4), 1–17. https://doi.org/10.2308/iace-51722

McCarthy, M., Kusaila, M., & Grasso, L. (2019). Intermediate accounting and auditing: Does course delivery mode impact student performance? *Journal of Accounting Education*, *46*, 26–42. https://doi.org/10.1016/j.jaccedu.2018.12.001

Nsor-Ambala, R. (2020). Impact of exam type on exam scores, anxiety, and knowledge retention in a cost and management accounting course. *Accounting Education*, *29*(1), 32–56. https://doi.org/10.1080/09639284.2019.1683871

Pasewark, W., & Kremin, J. (2020). Providing access to education and obtaining credentials. *Issues in Accounting Education*. https://doi.org/10.2308/ISSUES-2020-014

Phillips, F., Lobdell, B., & Neigum, J. (2020). Does the Effectiveness of Interspersed and Blocked Questions Vary across Readers? *Issues in Accounting Education*, *35*(1), 1–12. https://doi.org/10.2308/iace-52630

Ravenscroft, S. P., & Buckless, F. A. (1992). The effect of grading policies and student gender on academic performance. *Journal of Accounting Education*, *10*(1), 163–179. https://doi.org/10.1016/0748-5751(92)90023-X

Sangster, A., Stoner, G., & Flood, B. (2020). Insights into accounting education in a COVID-

21º *USP International Conference in Accounting*
"Accounting and Actuarial Sciences improving economic and social development"

São Paulo 28 a 30 de julho 2021.

19 world. *Accounting Education*, *29*(5), 431–562.
https://doi.org/10.1080/09639284.2020.1808487

Siriwardane, H. P., Low, K.-Y., & Blietz, D. (2015). Making entry-level accountants better communicators: A Singapore-based study of communication tasks, skills, and attributes. *Journal of Accounting Education*, *33*(4), 332–347. https://doi.org/10.1016/j.jaccedu.2015.08.001

Stice, E. K., Stice, J. D., & Albrecht, C. (2020). Study Choices by Introductory Accounting Students: Those Who Study More Do Better and Text Readers Outperform Video Watchers. In *Advances in Accounting Education: Teaching and Curriculum Innovations* (Vol. 24, pp. 3–29). https://doi.org/10.1108/S1085-462220200000024007

Warren, J. D., Moffitt, K. C., & Byrnes, P. (2015). How Big Data Will Change Accounting. *Accounting Horizons*, *29*(2), 397–407. https://doi.org/10.2308/acch-51069

Welch, B. L. (1947). The generalization of students' problem when several different population variances are involved. *Biometrika*, *34*(1/2), 28–35. Retrieved from http://www.jstor.org/stable/2332510

21º *USP International Conference in Accounting*
"Accounting and Actuarial Sciences improving economic and social development"

São Paulo 28 a 30 de julho 2021.

Appendix A

Regression results (full table)

Response variable	OVPER Coefficient (Std. error)	AE Coefficient (Std. error)	AMCQ Coefficient (Std. error)	AOEQ Coefficient (Std. error)	NAE Coefficient (Std. error)	NAMCQ Coefficient (Std. error)	NAOEQ Coefficient (Std. error)
Constant	35.40	33.81	36.44	18.90	40.11	42.50	36.52
	0.40	(0.44)	(0.48)	(0.57)	(0.54)	(0.71)	(0.63)
DMODE	-3.12***	-3.94***	-3.78***	-4.86***	-0.64***	-1.45***	0.59***
	(0.13)	(0.15)	(0.16)	(0.19)	(0.18)	(0.24)	(0.21)
AGE	-0.08***	-0.07***	-0.03***	-0.31***	-0.09***	-0.03*	-0.19***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
SEX	3.03***	2.94***	2.77***	3.93***	3.30***	6.80***	-1.95***
	(0.11)	(0.12)	(0.13)	(0.16)	(0.15)	(0.19)	(0.17)
CIVIL[A] (single)	-0.11	-0.09	-0.13	0.09	-0.17	-0.47	0.28
	(0.22)	(0.24)	(0.26)	(0.32)	(0.30)	(0.39)	(0.35)
CIVIL[A] (married)	0.00	-0.05	0.01	0.23	-0.14	-0.27	0.06
	(0.22)	(0.25)	(0.27)	(0.32)	(0.30)	(0.40)	(0.35)
ETNT	1.53***	1.62***	1.49***	2.39***	1.25***	1.40***	1.04***
	(0.11)	(0.12)	(0.13)	(0.15)	(0.14)	(0.19)	(0.17)
INCOM	5.35***	5.00***	4.44***	8.18***	6.40***	8.96***	2.56***
	(0.15)	(0.17)	(0.18)	(0.22)	(0.20)	(0.27)	(0.24)
WORKS	-0.06	0.15	0.24	-0.34*	-0.70	-1.17***	0.00
	(0.14)	(0.15)	(0.16)	(0.20)	(0.18)	(0.24)	(0.21)
SCHOL	0.77***	0.72***	0.43**	2.33***	0.93***	0.95***	0.89***
	(0.18)	(0.20)	(0.22)	(0.26)	(0.24)	(0.32)	(0.28)
STUDY[B] (up to 7)	1.38***	1.30***	1.32***	1.21***	1.63***	0.75**	2.95***
	(0.18)	(0.20)	(0.22)	(0.27)	(0.25)	(0.33)	(0.29)
STUDY[B] (above 7)	3.51***	3.52***	3.23***	5.16***	3.48***	2.75***	4.57***
	(0.22)	(0.25)	(0.27)	(0.32)	(0.30)	(0.40)	(0.35)
N	52,633	52,633	52,633	52,633	52,633	52,633	52,633
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. R2	0.066	0.057	0.041	0.087	0.037	0.052	0.014

Note. ***$p < .01$; **$p < .05$; *$p < .10$.
[A]Omitted category: other (includes divorced, widowed, and other civil statuses).
[B]Omitted category: zero hours.
In general, younger students outperformed older students (AGE).
In general, male students outperformed female students (SEX).
In general, civil status was not associated with student performance (CIVIL).
In general, white students outperformed non-white students (ETNT).
In general, family income was positively associated with student performance (INCOM).
In general, work status was not associated with student performance (WORKS).
In general, scholarship students outperformed non-scholarship students (SCHOL).
In general, study time was positively associated with student performance (STUDY).