

## The Impact of Online Instruction During the Covid Pandemic on MFTB and CBE Testing Outcomes

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### ABSTRACT

The present study examines how online instruction during the COVID pandemic impacted learning and performs a partial replication of a study by Hahn et al. (2012), which compared students' testing outcomes of the Major Field Test in Business (MFTB) and the Comprehensive Business Exam (CBE). Our results find that online instruction during the 2020-2021 pandemic isolation period had no significant impact on pre- and post-COVID testing outcomes for either exam. It was further found that the question set employed by the CBE exam appears to have changed from the pre- to the post-COVID testing timeframes, making this exam questionable for assurance of learning purposes when comparing to prior year results.

**Keywords:** *MFTB, CBE, assessment, online instruction, COVID*

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## INTRODUCTION

There is a long and rich assurance of learning (AoL) research stream that examines the use of the Major Field Test in Business (MFTB) and the Comprehensive Business Exam (CBE) for assessing AoL outcomes (Allen and Bycio, 1997; Bagamery et al., 2005; Black and Duhon, 2003; Bycio and Allen, 2007; Fairchild and Hahn, 2020; Hahn and Leslie, 2017; Marshall, 2007; Mirchandani et al., 2001; Pringle and Michel, 2007; Suh, 2014). This research has identified SAT or ACT scores, gender, GPA, major, and course concept reviews as factors that impact test results. However, a literature search failed to reveal any studies that investigated the outcomes of these exams on a pre- and post-COVID basis. The present study aims to fill this research void by examining MFTB and the CBE test results for exams conducted before and after the 2020-2021 pandemic isolation period.

The purpose of this study is twofold. First, to extend prior research by examining the impact of online instruction during the pandemic quarantine on both MFTB and CBE scores; and second, to perform a partial replication of the Hahn et al. (2012) study to determine if the MFTB and the CBE exam results continue to be highly correlated in terms of usefulness for assessing student performance outcomes at a non-AACSB accredited, Christian institution. Both exams remain consistent in terms of the percentage of questions allotted to each business core course discipline as existed when the Hahn et al. (2012) study was conducted, thereby facilitating the partial replication component of the present study.

The present study identified a statistically significant decline in student performance on the CBE exam between the pre- and post-COVID testing timeframes but did not find a significant student performance difference for the MFTB between the pre- and post-COVID testing periods. As discussed later in this paper, analysis revealed that the CBE performance decline was primarily attributable to a change in exam question content, with limited impact resulting from online teaching during the COVID pandemic. Further, this study finds that students' post-COVID MFTB and CBE scores are strongly correlated (Pearson correlation coefficient = 0.841). This finding is consistent with the correlation coefficient of 0.701 for scores between these two exams reported by Hahn et al. (2012).

The MFTB and the CBE are standardized exams used to assess business major program learning outcomes at colleges and universities. Each exam measures student learning in business core classes normally taken in the first three years of college. The content coverage for each exam by core course discipline is seen in Table 1.

Table 1. MFTB and CBE Percentage of Questions by Course Content Area

Exam	Percentage of Questions by Business Core Course Discipline*								
	Acct	Econ	Mgt	Bus Quant	Info Systems	Finance	Mktg	Legal & Social	Intl
MFTB	15	13	15	11	10	13	13	10	**
CBE	22	10	17	**	**	14	14	14	9

\* Source ETS (2023) and FBLA (2023)

\*\* Included as questions in other testing categories

The usefulness of the MFTB for AoL purposes is well established in the literature, and this stream of research has identified business core GPA (Allen & Bycio, 1997; Bagamery et al., 2005; Black & Duhon, 2003; Iqbal, 2020; Simmons et al, 2015), SAT or ACT score (Allen & Bycio, 1997; Fairchild & Hahn, 2020; Hahn et al., 2012; Simmons et al., 2015); accounting major (Fairchild & Hahn, 2020; Hahn et al., 2012; Iqbal, 2020; Mason et al., 2011), and gender (Bielinska- Kwapisz, 2012; Black & Duhon, 2003) as the most frequently identified statistically significant independent variables impacting MFTB scores. Similarly, GPA, SAT or ACT score, gender, and accounting major were found to be significant drivers of CBE performance (Fairchild & Hahn, 2020; Hahn et al., 2012;). Recent studies have added membership in a mentoring group

(Simmons et al., 2015), English proficiency (Iqbal, 2020), ethnicity (Messer, 2021), and both persistence and interest in the subject matter (Ketcham et al., 2018) as additional drivers of MFTB performance.

No studies were found that compare MFTB or CBE scores on a pre- and post-COVID basis. However, two studies provide insight into the possible impact of online instruction during the COVID quarantine. In a college physiology class, Varachotisate et al., (2023) found that pre-COVID summative scores were statistically significantly higher than post-COVID scores. Similarly, in K-12 schools, Fisher et al. (2022) report a statistically significant negative impact associated with student performance resulting from online instruction during the COVID pandemic.

Only one study was found that compares student outcomes on the MFTB to outcomes on the CBE (Hahn, et al., 2012). The present study performs a partial replication of the MFTB and CBE component of the Hahn et al. study. A partial replication is defined by the American Psychological Association (n.d.) as, a replication of an empirical study in which only a subset of the study's design and methodology are repeated. Often, a researcher will choose to conduct a partial replication to show that the general findings of a study remain the same, despite the methodological changes. (partial replication section)

Based on the literature review, two research questions are posed:

RQ<sub>1</sub>: Is there a difference in pre- and post-COVID performance outcomes for students who completed the MFTB or the CBE?

RQ<sub>2</sub>: Will the MFTB and the CBE exams produce similar student performance outcomes?

## METHODOLOGY

To explore RQ<sub>1</sub>, exam scores from prior years were obtained from the College's AoL database and were used to compare results of both the MFTB and the CBE on a pre- and post-COVID basis. The MFTB was employed from 2003 to 2010 and the CBE was employed from 2011 to 2022. The CBE exam was not conducted in the Fall 2020 and the Spring 2021 semesters due to COVID restrictions. Both exams were conducted in the Fall 2022 semester, and only the MFTB exam was conducted in the Spring 2023 semester. Descriptive data for each testing period are seen in Table 2. All statistics in the present study were generated using IBM SPSS Statistics (Version 29.0.0.0 (241)).

Table 2: Descriptive Data for MFTB and CBE Testing Groups

Exam Statistics	CBE <sup>a</sup>		MFTB <sup>b</sup>	
	Pre Covid 2011 to 2020	Post Covid 2021 to 2022	Pre Covid 2003 to 2010	Post Covid 2022 to 2023
Mean	66.9	50.4	64.1	68.5
S D	4.8	2.5	13.3	2.1
Variance	22.8	6.3	175.4	4.5
High Score	75.0	53.2	82.0	70.0
Low Score	54.0	48.4	38.0	67.0
Median	67.0	49.5	65.0	68.5
N <sup>c</sup>	17	3	10	2
Tests Taken <sup>d</sup>	525	76	311	39

<sup>a</sup> average percentage of correct responses for all test takers

<sup>b</sup> average scaled score percentile rank for all test takers

<sup>c</sup> number of testing events

<sup>d</sup> total number of students tested in each testing group

To examine RQ<sub>2</sub>, results from both the CBE and the MFTB were examined using a partial replication of Hahn et al. (2012). Specifically, the present study only replicates research question three, which asked: "Will students at a non-AACSB accredited institution achieve different performance results

on the CBE when compared to performance results on the MFTB?" (p. 264). Consistent with the method set forth in the Hahn et al. study, students took each exam as part of a capstone senior business policies class taken in the last semester prior to graduation, and a business core course review was conducted during the five weeks immediately preceding administration of the exams. Both exams were taken online, in a classroom, and proctored by faculty. The exams were taken on the same day, with the CBE taken in the morning and the MFTB in the afternoon. The class was taught by the authors who also administered and proctored the exams.

In the class meeting following the administration of the two exams, an ad hoc focus group was conducted to more fully explore students' reactions and insights into both the testing procedure and the construct and content of each exam's question set.

Aspects of the Hahn et al. (2012) study that were not explored in the present study include an analysis of transfer student performance, accounting and finance major performance, and the impact of business core course grade point average on MFTB and CBE results, as these relationships are well established in the literature. In the present study, both exams were taken online, whereas in the Hahn et al. study the MFTB was conducted in a paper-and-pencil format as an online version of the exam was not available when exam was conducted. In addition, the results of the MFTB and CBE scores were not compared to results from AACSB accredited institutions. Finally, 50 students were tested in the Hahn et al. (2012) study compared to a class of 10 students in the present study.

MFTB percentile rank served as one dependent variables (Messer, 2021) and the CBE percentage of responses answered correctly served as a second dependent variable (Hahn et al., 2012, Hahn & Leslie, 2018). The independent variables employed in the present study are the average class scores for the reported pre- and post-COVID testing periods.

## RESULTS

The data in Table 2 were used to investigate RQ1, and are presented for each exam on both a pre- and post-COVID basis. The mean for the CBE declined by 16.6 percentage points from the historical average of 66.9% correct responses to 50.4% for the testing events following COVID, whereas the mean for the MFTB student percentile rank increased by 4.4 percentage points from 64.1 to 68.5 during the study timeframe. In order to explore the reasons for the test result differences, additional statistical tests were conducted.

To determine if the 16.6 percentage point performance difference for the CBE pre- and post-COVID testing events was significant, an independent-samples Mann-Whitney U Test was selected for hypothesis testing. This nonparametric test was appropriate because the t-test assumptions of normality of means and equality of variances were not met (Laerd Statistics, 2015). Distributions of the CBE scores for pre- and post-COVID scores were not similar, as assessed by visual inspection. CBE scores for pre-COVID (mean rank = 67.00) were statistically significantly higher than for post-COVID (mean rank = 50.00),  $U = .000$ ,  $z = -2.710$ ,  $p = .002$ , using an exact sampling distribution for U.

A Mann-Whitney U Test was also conducted for the MFTB to determine if there were differences between pre-COVID and post-COVID MFTB scores. Distributions of MFTB scores for pre- and post-COVID testing events were not similar, as assessed by visual inspection. MFTB scores for pre-COVID (mean rank = 60.50) were not statistically significantly higher than for post-COVID (mean rank = 68.50),  $U = 10.00$ ,  $z = .524$ ,  $p = .711$ , using an exact sampling distribution for U.

To explore RQ2, a correlation analysis indicated that students performed similarly on both the MFTB and the CBE in the 2007 and the 2022 testing periods. As seen in Table 3, the correlation coefficient in the present study of 0.841 is consistent with the correlation coefficient of 0.702 in the study being partially replicated. In other words, if a student scored high on one exam, he or she also scored high on

the other exam, and vice versa, and that pattern did not change between the Hahn et al. (2012) study and the present study.

Table 3: Correlation of CBE and MFTB Exam Scores

	MFTB <sup>a</sup> 2007	MFTB 2022
CBE	.702	.841
Significance	.000**	.000**
N	49	10

<sup>a</sup> reported by Hahn et al. (2012, p. 266)

\*\* significant at the 0.01 level (2-tailed)

## DISCUSSIONS

The MFTB pre- and post-COVID outcomes are not statistically significantly different, suggesting that this exam remains a viable testing alternative for AoL purposes. Further, since outcomes improved slightly between the two testing periods, it does not appear that online instruction during the pandemic had a noteworthy impact on MFTB testing outcomes.

The CBE, on the other hand, experienced a statistically significant decline in test results. Clearly, something changed between the pre- and the post-COVID testing periods. Following the administration of the Spring 2022 CBE exam, a representative of CBE was contacted and asked if other colleges were showing lower than normal testing outcomes. The response was that “scores are much lower than previous year’s” (S. Kratz, personal communication, March 3, 2022), and that CBE administrators suspected that online instruction during COVID was a factor.

To explore the reasons for the significant change in CBE results, faculty first considered the role that online class delivery during the pandemic might have had on testing outcomes. This review disclosed that students in the Fall 2022 test group took 26.3% of their business core classes online compared to 10.7% for the Spring 2023 test group. Interestingly, the MFTB results were not negatively impacted by classes taken online during the pandemic, whereas the CBE results declined significantly. While online instruction likely had some impact on students’ learning during the pandemic, any such impact appears to have been offset by a review of key business core course concepts conducted as part of the senior business policies class. This core course concept review has been conducted since 2003, and it is performed to refresh students’ understanding of key business core course concepts that are useful both in the workplace and in a simulation, exercise conducted the last eight weeks of the business policies class. Hahn (2019) found that core course concept reviews increased testing outcomes by 16.5%. Thus, it is likely that the concept reviews conducted prior to post-COVID testing offset most, if not all, of any score slippage associated with the online teaching format employed during the pandemic.

In the class meeting following the Fall 2022 MFTB and CBE exam day, an informal focus group was conducted. Students were asked for their reaction to each exam’s question structure and content. Students unanimously concluded that both the MFTB’s question structure and question content were similar to the College’s in-class testing structure and format, whereas the CBE’s question structure and question content was not. Students reported that they had difficulty determining what concepts some CBE questions were exploring. This is an important difference, as Hahn et al, (2012) reported that 74% of the students in their testing pool concluded that the CBE’s questions were “phrased similarly to the way questions are structured on exams in our business core classes” (p. 269).

Based on students’ comments, faculty conducted a review of each exam’s question set. The test providers allowed limited access to their exams and business faculty met as a group and reviewed each exam’s question set on a question-by-question basis. This review revealed a change in the CBE exam’s question structure and content from the pre-COVID to post-COVID testing periods. Specifics cannot be

provided, as there was an agreement with exam providers that exam questions would not be shared outside of the faculty review.

While changes in individual questions within an exam are expected in order to maintain question set currency, faculty determined that there appeared to be a wholesale change in the CBE question set. Specifically, many questions on the post-COVID exam focus on aspects of business core courses that are insignificant, while omitting important concepts normally employed in the workplace that were included in the pre-COVID exam. This change negatively impacted the ability of the College to compare post-COVID exam results with prior year results for trend assessment purposes. Representatives of CBE were provided with a list of test questions that faculty determined had changed during the COVID timeframe and an explanation of specific changes was requested. A response was not received.

## CONCLUSIONS

It does not appear that online instruction during the COVID pandemic had an important impact on student testing outcomes for either the MFTB or the CBE. Indeed, MFTB scores went up in post-COVID testing, and the CBE score decline is primarily attributable to a change in the exam's question structure and content. Relative student performance was consistent between the MFTB and the CBE, which supports a similar finding in the Hahn et al. (2012) study. Thus, results suggest that each study has value from an AoL perspective, if the question structure and content maintain consistency from year to year.

Unfortunately, consistency was not maintained for the CBE in the present study, as there was a statistically significant decline in students' exam scores from the pre- to the post-COVID testing periods. Both faculty and students agreed that the MFTB question structure and content coverage was more like in-class testing instruments, whereas the CBE question structure and content was not. This is a reversal of findings in the study being partially replicated (Hahn et al., 2012), and inhibits the use of this exam's results for assessing student performance trends.

The present study is a first attempt to quantify how student learning was impacted by online instruction during the COVID pandemic by assessing MFTB and CBE performance outcomes; and, like all studies, ours is not without limitations. First, our study was conducted at a medium-size Christian university with demographics that differ from other institutional types. The extent of such demographic variation might limit the generalizability of our results to other educational institutions. Also, as part of a senior business policies capstone course, we conducted reviews of core course concepts in accounting, finance, economics, management, marketing, and law, which may have offset any dilution in learning related to online instruction during the pandemic. If others do not perform such a review, results might not be generalizable. Finally, the sample size is small due to financial constraints related to conducting two exams each semester.

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