

E-Proctoring Tools: Is It a Necessary Inconvenience

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One of the challenges all institutions faced during the COVID lockdown between March 2020 and 2021 was keeping the academic integrity of online assessment. E-proctoring tools became a convenient option, although their effectiveness and efficiency were uninvestigated. The authors of this study utilized the fraud investigation frameworks and focused on the element of opportunity in the context of E-assessment. The quantitative study on grades and testing times between E-proctored and non-proctored online tests revealed significant differences in both academic performance and testing time. Students performed significantly better and used remarkably more time when proctoring tools were not used. The findings strongly indicated cheating behaviors when students took advantage of not being caught for their misconduct. The drastic variances also indicate the deterrence effects of E-proctoring tools on students' testing behaviors.

Keywords: E-proctoring tools, E-assessment, academic integrity, cheating, academic dishonesty

INTRODUCTION

The sudden switch to E-learning during the COVID-19 lockdown boosted the use of online tests. During the pandemic, 1.5 billion students and 63 million educators had to shift from face-to-face (FTF) classes to online learning (Noorbehbahani et al., 2022). The transition to E-learning because of COVID-19 was on an “untested and unprecedented scale” (Burgess & Sievertsen, 2020). The learning and assessment systems' operation needs to be tested from the perspective of logistics, validity, and reliability of online testing score calculations (Hopfenbeck, 2020). E-learning has been thoroughly studied; however, research on E-assessment with enabled proctoring tools is minimal (Kharbat & Abu Daabes, 2021). Ironsi (2021) stated the level of convenience, credibility, reliability, transparency, and moral/ethical adherence of the E-proctored exams have yet to be studied. Students are challenged with anxiety and possibly the psychological hurdle of testing in front of a camera; in the meantime, universities are concerned about the integrity of the testing results (Kharbat & Abu Daabes, 2021; Milone et al., 2017). Issues, such as academic integrity and effective/efficient ways of administering malpractice-free and anxiety-free examinations in an online testing environment, remain open for exploration (Ironsi, 2021).

Bilen & Matros (2021) asserted cheating should be expected for online testing, and it can never be fully detected; most importantly, cheating will be a widespread phenomenon if no actions are taken. As a result, universities need to implement a standardized online testing policy requiring students to use a camera to capture students' rooms and computer screens (Bilen & Matros, 2021; Juliardi & Sudarto, 2021). To further

explore the effectiveness of E-proctoring tools, the authors aim to evaluate the deterrence effects of these tools by comparing students' grades and testing time when E-proctoring tools are enabled versus when there is no proctoring. The findings and conclusions are based on the quantitative analysis results of data collected from online tests.

PROBLEM STATEMENT AND RESEARCH QUESTIONS

Ironsi (2021) stated although there have been studies supporting the benefits of online proctoring devices, there is still a need to re-evaluate online exam technologies to ensure the credibility of the assessment, especially when proctoring tools are used for emergencies, such as during pandemics. Online exams tempt students to collude and cheat, although detecting such academic misconduct is not easy. Technical breakthroughs in artificial intelligence (AI) made more options available for E-proctoring. "AI-assisted proctoring solutions are in great demand as online proctoring services grow in popularity" (Verma et al., 2023, p. 1). The general problem to be addressed is the increased use of online tests makes E-assessment a necessity when the credibility and academic integrity of online tests are unknown to higher education instructors.

The specific question this study attempts to address is the deterrence effects of E-proctoring tools in E-assessment.

***RQ 1:** What are the differences between students' grades on online tests with and without E-proctoring tools?*

***RQ 2:** What are the differences between the testing time students spend on online tests with and without E-proctoring tools?*

LITERATURE REVIEW

The integrity of online tests has always been a concern for educators. Literature has documented cheating behaviors in online testing. With the development of technology, E-proctoring tools provide convenient monitoring measures. In the meantime, they also sparked debates between convenience and appropriateness among scholars.

Misconduct in Online Exams

The phrase "E-cheating" was first coined by McMurtry in 2001 (Smith et al., 2021). E-cheating refers to academic misconduct in a virtual learning environment (McMurtry, 2001). During the COVID-19 pandemic lockdown, there was an increased number of cheating behaviors due to unprepared online exam administration (Lee & Fanguy, 2022). Academic research has confirmed cheating activities are more prevalent in online learning than in traditional offline learning environments (Chiang et al., 2022). The surges of Google searches on exam-related keywords perfectly correlated with the timing of exams (Bilen & Matros, 2021). Cheating behaviors discovered in a survey of university students include using an open book, personal class notes, and collaborating with other students through the telephone (Ebaid, 2021; Lee & Fanguy, 2022). Various fee-based assignment assistance websites offer students unauthorized access to instructor-generated assignments for specific courses, which technically constitutes academic fraud. One contributing factor to the widespread misconduct in un-proctored online assessment is searching exam questions with solutions is an easy task, especially when the questions are from test banks (Golden & Kohlbeck, 2020). Online tests using essay questions are not immune to cheating behaviors. Cleophas et al. (2023) performed text-mining on 170 undergraduate students in political science and event-mining on 17 graduate students in business administration, and they discovered suspicious patterns of joint working through exams among students.

Google search is only one potential way of cheating without proctoring. Un-proctored online tests allow students to collaborate, access notes and books, or even pay someone to take the exam. Harmon &

Lambrinos (2008) studied the test results of two groups of students taking the principles of macroeconomics online versus in the classroom. They concluded that variables such as age, sophomore/junior/senior, GPA, and economics vs. business majors did not explain the variations in un-proctored and proctored test scores, i.e., students cheated in online format tests (Harmon & Lambrinos, 2008).

In addition, if not all students are taking the online test simultaneously, those who take the test early can disclose test information to other students. When students are allowed more than one attempt due to possible technical issues or internet malfunctions, they know at least part of the questions before retaking the test. Ebaid (2021) surveyed accounting students in Saudi universities and found cheating in online exams was prevalent during the COVID-19 pandemic. The surveyed students admitted online tests gave them a greater chance to cheat than FTF tests (Ebaid, 2021). It is not always easy to detect cheating through collusion when students attempt to share materials and answers (Cleophas et al., 2023).

Increasing Use of E-Proctoring Tools

Seaman et al. (2018) stated there were over one million fewer on-campus students than remote students in 2016 than in 2012 in the United States (US), i.e., 250 more online students for each higher education institution. More than 6 million students took at least one online course in the US (Seaman et al., 2018). The March 2020 lockdown made online distance learning the only available education channel for all students, so online testing became mandatory. Ironsi (2021) stated when most institutions switch to remote online learning, there is an acute need to ensure the quality of online-based assessments.

With the sharp increase in distance learning and testing, higher education institutions have adopted different E-proctoring tools (Kharbat & Abu Daabes, 2021). Harwell (2020) reported online proctoring services experienced an unprecedented surge of new clients during the pandemic. One online proctoring company had 120 leads daily, averaging 100 new higher-ed clients yearly during the pandemic (Harwell, 2020). In addition, various monitoring applications are developed by publishers and education companies to facilitate online assessment. Respondus reported providing technology to create, deliver, proctor, and analyze over 100 million assessments yearly (Respondus, n.d.).

Benefits and Concerns of E-Proctoring Tools

E-proctoring tools include students' identification verification, webcam for facial identification, enabled audio and video devices capturing the 360-degree view of the testing room and sound, students' facial images, AI-assisted functions analyzing student's movement, browser lockdown, and proctor's access to students' screens (Kharbat & Abu Daabes, 2021). Understanding the perception of E-proctoring tools used in online testing is limited (Kharbat & Abu Daabes, 2021). Scholars diverge on the utilization or level of utilization of E-proctoring tools. Bilen and Matros (2021) suggested using cameras and accessing students' computer screens because of widespread cheating in online exams. Ironsi (2021) argued the reliability of artificial intelligence in detecting cheating behaviors, moral concerns, and privacy-related philosophical issues cast doubt on the effectiveness of E-proctoring tools, plus privacy laws related to data collection/storage, images of test-takers and biometric identities had not been sufficiently formulated. The debate boils down to the conflict between safeguarding academic integrity and the legality/effectiveness of using E-proctoring tools.

Although E-proctoring tools do not guarantee online exams are free of cheating or malpractice, they do contribute to online exam monitoring measures (Udechukwu, 2020). Juliardi and Sudarto (2021) emphasized the need to monitor students' activities using cameras and open videos during tests. Hylton et al. (2016) asserted misconduct in online testing is challenging, especially when the absence of proctoring during these tests provides opportunities for misconduct. They further stated proctoring tools could deter deception and misconduct in online tests (Hylton et al., 2016).

E-proctoring tools could eliminate malpractice during online testing, although issues of anxiety, privacy, and ethics remain unexplored (Ironsi, 2021). The ethical creditability of E-proctoring tools/technology and their appropriateness are the focal points of debate over using e-proctoring tools in online exams (Ironsi, 2021). Milone et al. (2017) stated issues, such as technical problems, the overall impact on students' educational experience, excessive technical requirements, and potential additional costs, outweigh the

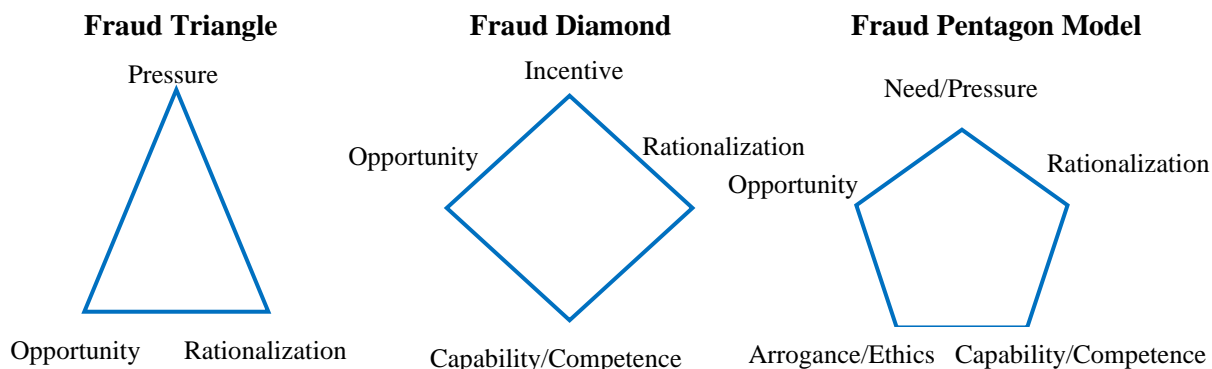
convenience and integrity benefit of low-stake undergraduate courses. Other concerns about E-proctoring include the quality of proctoring tools, the sense of intrusion, and practical difficulties (Milone et al., 2017). Kharbat & Abu Daabes (2021) asserted that E-proctored tests could not replace traditional in-person test experience, and E-proctored online testing should only be used for the short-term or as a supplement. In addition to technical difficulties, privacy concerns, and social, psychological, and cultural concerns, students expressed the feeling that being watched by a camera creates anxiety and nervousness (Kharbat & Abu Daabes, 2021). Ironsi (2021) stated ethical issues and many more have yet to be extensively discovered about E-proctoring tools.

The sudden change in tests from FTF to online format certainly added to the usual test anxiety, and E-proctoring further aggravated the situation; as a result, there was a 14.1% underperformance in online exams (Prakasha et al., 2021). Lee & Fanguy (2022) stated E-proctoring for online testing is deeply rooted in a teacher-centered knowledge transmission pedagogical approach, yet it negatively impacts student subjectivities and educational outcomes. Arnold (2016) suggested cheating in online assessments may not be a big concern as long the weight of online assessment is a small part of the total grades and the final summative test is up to standards. Otherwise, opportunities in online testing raise the issue of fairness (Arnold, 2016).

FRAMEWORKS

Scholars have attempted a variety of fraud-related frameworks to analyze academic integrity. Studies on academic integrity paralleled the evolution of fraud examination frameworks. Figure 1 shows the development of fraud-related frameworks from the Fraud Triangle to the Fraud Pentagon and how researchers have applied these frameworks to academic integrity studies.

FIGURE 1
FRAUD EXAMINING FRAMEWORK APPLIED TO ACADEMIC INTEGRITY STUDIES



- **Incentive/Pressure:** exam too difficult, better grades, financial and time pressure, poor time management, frequency of partying, anxiety, high GPA, desire to meet expectations, students' perception of the course difficulty
- **Opportunity:** lack of proctoring, no plagiarism check, lack of penalties, perception of not being caught
- **Rationalization:** unfair workload, unfair grading, inadequate clarification of cheating behaviors, joint influence of capabilities, opportunity, and motivation, probability of success against cost of failure
- **Capability/Competence:** non-existent preventative control, weakness in control
- **Arrogance:** feel superior, need recognition, ignorance of possible consequences
- **Ethics:** well-founded standards, right/wrong, obligations, and fairness, specific virtues

Cheating is an academic fraud where students violate the test or assessment rules (Djaelani et al., 2022). The fraud triangle has been used and modified by many scholars as an organizing framework to explain academic misconduct (Al Serhan et al., 2022; Becker et al., 2006; Harrison et al., 2018; Smith et al., 2022;

Smith et al., 2021). Lewellyn and Rodriguez (2015) suggested adopting the fraud triangle in more rigorous future studies of academic dishonesty. They mapped academic dishonesty research over the Triangle of Academic Dishonesty (Incentive, Opportunity, and Attitude) and asserted these three elements help frame various research questions (Lewellyn & Rodriguez, 2015).

The foremost fraud-examining model is the fraud triangle developed by Cressey in the 1950s (Harrison et al., 2018; Morales et al., 2014). The fraud triangle identifies three contributors to fraudulent behaviors: pressure, rationalization, and opportunity. Using the fraud triangle framework, Becker et al. (2006) studied students' cheating behavior. They surveyed 476 business majors and concluded each of the three elements in the fraud triangle was a significant determinant of students' cheating behavior (Becker et al., 2006). Cheating behaviors arise with the students' pressure (such as tests too difficult or better grades), level of perceived opportunity (such as when the instructor does not check for plagiarism or deter cheating), and students' rationalization of cheating (such as unfair workload or faculty does not detect cheating) (Becker et al., 2006). Juliardi and Sudarto (2021) confirmed the validity of Cressey's fraud triangle and asserted factors such as pressure, opportunity, rationalization, misuse of information, and students' integrity influence students' academic cheating (fraudulent) behaviors. Students are more likely to cheat when they perceive the incentive, rationalization, and opportunity regardless of students' GPA, gender, hours worked in other jobs, or hours spent on studying (Becker et al., 2006).

Academic dishonesty is like financial fraud detected during financial statement audits (D'Souza & Siegfeldt, 2017). "Fraud Triangle provides a useful theoretical foundation for research in academic dishonesty" (Lewellyn & Rodriguez, 2015, p. 1). Faucher & Caves (2009) asserted motivations for cheating in tests include the reward of better grades, financial and time pressure due to failure, poor time management skills, and the anxiety of the risk of failing. They discovered students use both high and low-level innovative cheating techniques and emphasized the need to prevent and deter academic dishonesty (Faucher & Caves, 2009). Students commonly rationalize their cheating behaviors and understate the importance of plagiarism (Park, 2003). During the pandemic, pressure from the financial crisis due to the loss of employment or part-time jobs increased the potential for cheating behavior (White, 2020). Online tests without proctoring maximize the opportunity for academic misconduct (Chiang et al., 2022).

Wolfe and Hermanson (2004) modified the fraud triangle model and developed a fraud diamond framework by adding "capabilities" and replacing pressure with incentives. They stated a person's capability means the person's ability to create and exploit an opportunity because of the weakness in the control process and the confidence that they will not be detected. The fraud diamond framework is also applied in the study of academic misconduct. Incentives for academic misconduct could be a need to maintain a high GPA or meet expectations, the perceived opportunity arises as a result of poor or non-existent preventative controls, and rationalization means student internally legitimate their deeds in advance of the action (Larkin & Mintu-Wimsatt, 2015; Smith et al., 2021). The primary contribution of the fraud diamond is its explicit and separate consideration of the capability to execute the fraud (Wolfe & Hermanson, 2004). The setting of online exams facilitates a higher level of perceived opportunity and the test-takers' capability to take advantage of the non-existent or limited protecting measures.

Fraud Pentagon Theory, based on Crowe's Fraud Pentagon, was developed by Johnathan Marks, a partner in Crowe Horwath LLP, in 2012 (Achmada et al., 2020; Serhan et al., 2022; Yusof et al., 2015). The Fraud Pentagon Theory added the element of arrogance to the fraud theory (Utami & Purnamasari, 2021). Arrogance is an attitude of entitlement and greed (Marks, 2012). An alternative fraud pentagon theory was developed by Sorunke in 2016. The Fraud Pentagon Theory (FPT) model by Sorunke (2016) incorporated personal ethics into the fraud examination. Personal ethics is the missing link between Cressey's fraud triangle and Wolfe and Hermanson's Fraud Diomon (Sorunke, 2016). An individual's ethics is a critical factor in a fraudster's desire to commit fraud (Sorunke, 2016).

Scholars tested each element in the fraud framework in the context of academic integrity. Utami and Purnamasari (2021) tested both ethics and arrogance in the context of academic misconduct and concluded ethics, pressure, and competence have significant impacts on academic misconduct, while opportunity, rationalization, and arrogance have no significant effect. Achmada et al. (2020) tested the Fraud Pentagon Theory in the context of academic dishonesty and indicated pressure, opportunity, capability, and

rationalization are positively correlated to academic dishonesty; however, arrogance has no significant impact on students' cheating behaviors.

RESEARCH GOALS AND HYPOTHESES

Dorminey et al. (2012) developed the meta-model of fraud, intending to use it in accounting instruction and research. The meta-model evaluates the anti-fraud profession's response and is intended to construct a "cohesive and coordinated anti-fraud environment" (Dorminey et al., 2012, p. 570). The anti-fraud profession's response introduces prevention and deterrence control and the detection procedure. Dorminey et al. (2012) emphasized the need for deterrence. E-proctoring tools leverage the development of technology to address the weakness of non-proctored online tests and are intended to prevent and deter academic misconduct. Using cameras and recorders adds detection features to the control process of test integrity. The most effective way to deter financial fraud is to minimize opportunities (Padgett, 2014; Wolfe & Hermanson, 2004). The most potent way to prevent academic misconduct is to close the opportunity for misconduct by course design and incorporate integrity tools such as remote monitoring, environmental scanning, tracking, and/or blocking (Burke & Sanney, 2018; Smith et al., 2022).

The primary goal of this research is to evaluate the deterrence effects of E-proctoring tools on preventing misconduct in online tests and securing academic honesty. The 2020 spring lockdown provided a specific testing ground to assess the effectiveness of digital interactive technology and online assessment (Belikova & Shkil, 2021). The research questions inquire about students' test performance and testing behavior, i.e., grade and time spent on tests. Two sets of hypotheses are developed to address the research questions.

Hypotheses

H1₀: There is no significant difference between participants' online test scores with and without E-proctoring tools enabled.

H1₁: There is a significant difference between participants' online test scores with and without E-proctoring tools enabled.

H2₀: There is no significant difference between participants' testing time with and without E-proctoring tools enabled.

H2₁: There is a significant difference between participants' testing time with and without E-proctoring tools enabled.

The dependent variables are grades and test time, and the independent variable is the activation of E-proctoring tools. Two groups of students took the two sets of identical online tests when one test group was not proctored while the other group had browser lockdown and camera enabled. Independent t-tests were used to compare the grades and testing times of two groups of students. An independent t-test is appropriate when investigating differences between two unrelated groups on approximately normal dependent variables (Morgan et al., 2019).

RESEARCH METHODOLOGY

This study adopted the quantitative research method and sampled 57 undergraduate students. These students took the Principles of Accounting I course in two semesters and were naturally divided into two groups (36 in Group 1 and 21 in Group 2). The school ran two Principles of Accounting I sessions in Fall 2020 (Group 1) and only one session in Spring 2021 (Group 2), causing the differences in sample sizes between the groups. All the students took the same two tests online. The first is an interim test with 75

minutes allowed, and the second is a summative test with a time limit of 180 minutes. Due to the sudden change to online teaching, free E-proctoring tools were unavailable until Spring 2021. Group 1 took the online tests without E-proctoring tools, while Group 2 took the online tests with browser lockdown and enabled computer cameras.

Principles of Accounting I is the first course in the sequence of accounting classes, and the assumption is students were at the same starting point regarding accounting knowledge. Group 1 students took the accounting class online with one synchronized weekly meeting. Group 2 took the same accounting class, FTF, and met with the instructor twice weekly. Both groups took the course with the same instructor and were given the same tests. Tests were designed with multiple-choice questions and worksheet problems. All problems of a quantitative nature were algorithmically created. Questions were presented to each student in random order. These tests weighted 45% of the students' overall term grades for both groups. The instructor offered tests online to Group 2 students so that quarantined students could test with the rest of the class. The online tests were graded automatically, and the test time for each submission was recorded.

Although each group of students was tested twice, these tests are not considered repeated measures. Repeated measure design refers to the situation when the same participants are assessed on the same measure more than once (Morgan et al., 2019). The difficulty level, contents, and allowed testing time differ for these two tests. This research focused on the variations of testing behaviors between non-proctored and E-proctored examinations, and only between-group comparisons are relevant to the research goal. Testing scores and testing times were put into SPSS to check data assumptions. One student in Group 1 did not participate in the final exam, and the score of zero is excluded from the data; thus, the valid N of Group 1 is 35. The SPSS guideline for approximate normal data is the absolute value of skewness is less than one (Morgan et al., 2019). Table 1 shows the skewness statistics for both groups' scores and testing times are less than 1, meaning variables are considered approximately normal.

**TABLE 1
DATA SKEWNESS**

Group 1 Descriptive Statistics								
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Test1Score	35	68	32	100	68.91	19.742	-0.433	0.398
Test1Time	36	44	30	74	62.43	13.227	-0.982	0.398
Test2Score	35	44	53	97	80.29	13.321	-0.887	0.398
Test2Time	35	119	59	178	131.40	33.979	-0.168	0.398
Valid N (list wise)	35							

Group 1 Descriptive Statistics								
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Test2Score	21	69	9	78	48.10	17.660	-0.115	0.501
Test2Time	21	58	17	75	40.14	12.796	0.919	0.501
Test2Score	21	57	16	73	43.71	16.215	0.410	0.501
Test2Time	21	89	31	1200	80.76	18.759	-0.662	0.501
Valid N (list wise)	21							

Analysis and Findings

Data from both groups' online testing results were analyzed using an independent sample t-test to determine if the two groups had significant differences in testing scores and testing times. The descriptive statistics in Table 2 show Group 1 (non-proctored students) scored 20.81 and 36.58 points higher, respectively. Group 1 also spent 22.29 more minutes on the 75-minute test and 50.64 more on the 180-minute test on average.

The independent t-test results in Table 3 show significant differences between Group 1 and Group 2 regarding test scores and testing time when the p-values are less than 0.05. Please note the Levene's test of equal variance is violated in "Test2Time" data; as a result, the p-value of "equal variance not assumed" is used. The t-test comparison results illustrated students behaved entirely differently when E-proctoring tools were enabled vs. not enabled. The proctored students significantly underperformed compared to Group 1 in both tests and used a considerably shorter amount of the allowed testing time. Both null hypotheses of no differences between Group 1 and Group 2's scores and testing times are rejected.

Contributing factors to the unideal performance in Group 2 could be the Spring semester of 2021 was the first normal term after students resumed classroom learning since the COVID-19 lockdown and they were re-adjusting to the learning environment. Many students had to be quarantined once or more than once throughout the semester due to exposure to or infection with the COVID-19 virus. Classroom interaction was problematic when teachers and students had to wear masks and follow the 6-foot distance rule. As a result, the effectiveness of classroom learning was compromised. In contrast, there were more audio/video interactions in online classes for Group 1. Multiple students in Group 2 also gave feedback to the instructor that they were not used to online testing, and the timer on the screen seemed disturbing. Interestingly, the students expressed their unfamiliarity with online tests at the end of lockdown when E-proctoring tools were utilized, but not a year ago when online tests were not proctored. Group 2 students had two weekly meetings with the instructor for in-person lectures and practices and were expected to perform as well as Group 1, if not better.

Students in Group 1 were subject to the same inconveniences of online testing; however, they seemed more "patient" with the process, while Group 2 students gave up a lot earlier. The significant differences in test time used between the groups are alarming. There was no explanation for the extra patience students in Group 1 had other than the opportunity to seek additional resources without worrying about being caught.

TABLE 2
DESCRIPTIVE STATISTICS OF TESTING PERFORMANCE

	Test 1 (75-minute Interim Test)				Test 2 (180-minute Final)			
	Valid N	Test Score Range	Test Score Mean	Testing Time Range Mean	Test Score Range	Test Score Mean	Testing Time Range Mean	Testing Time Mean
Group 1 Non-Proctored	35	68 (Min. 32 – Max. 100)	68.91	44 (Min. 30 – Max. 74)	44 (Min. 53 – Max. 97)	80.29	119 (Min. 59 – Max. 178)	131.40
Group 1 Proctored	21	69 (Min. 9 – Max. 78)	48.10	58 (Min. 17 – Max. 75)	57 (Min. 16 – Max. 73)	43.71	89 (Min. 31 – Max. 120)	80.76
Differences			20.81			36.58		50.64

TABLE 3
INDEPENDENT GROUPS T-TEST STATISTICS

		Independent Samples Test									
		Levene's Test					t-test for Equality of Means				
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95%	
						One-Sided p	Two-Sided p			Lower	Upper
Test1Scores	Equal variances assumed	1.447	0.234	3.970	54	<0.001	<0.001	20.819	5.244	10306	31.332
	Equal variances not assumed			4.084	46.016	<0.001	<0.001	20.819	5.098	10.58	31.080
Test1Time	Equal variances assumed	0.616	0.436	6.178	54	<0.001	<0.001	22.286	3.607	15.053	29.518
	Equal variances not assumed			6.230	43.378	<0.001	<0.001	22.286	3.577	15.074	29.498
Test2Scores	Equal variances assumed	0.642	0.427	9.163	54	<0.001	<0.001	36.571	3.991	28.569	44.574
	Equal variances not assumed			8.720	36.005	<0.001	<0.001	36.571	4.194	28.066	45.077
Test2Time	Equal variances assumed	15.013	0.000	6.266	54	<0.001	<0.001	50.638	8.082	34.435	66.841
	Equal variances not assumed			7.180	53.741	<0.001	<0.001	50.638	7.053	36.496	64.780

CONCLUSION

With the increasing use of online testing, cheating associated with online exams has become a serious concern because of the negative consequences for the entire accounting and auditing profession (Golden & Kohlbeck, 2020). Financial fraud and academic dishonesty have ripple effects (Burke & Sanney, 2018). Cheating in an online exam is more convenient than in an FTF offline exam; thus, preserving the integrity of online exams is more challenging (Noorbehbahani et al., 2022).

This investigation tested the time used and students' performance to reveal possible cheating behaviors in online exams. The significantly longer testing time and better testing results, when no proctoring tools were used intensely, indicate a high possibility of academic misconduct when students were given the opportunity to cheat. There are no sensible explanations for these differences other than the high possibility of cheating behaviors, especially when students with no FTF lectures outperformed students who met the instructor two times a week. Another implication of the testing results is the deterrence effect of E-proctoring tools. Activating E-proctoring tools changed students' testing behavior, which evidenced the need for further study on online test design and E-proctoring tool investigation. Obviously, academic integrity is compromised in online tests, especially when there is no proctoring mechanism. This is not just a COVID-specific issue. Educational institutions are faced with more challenges than ever, battling technology advances and safeguarding academic integrity.

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