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Procrastination and Online Exam Proctoring: Exam Anxiety and Exam Performance

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Abstract: This study investigates academic procrastination in online exam proctoring environments, drawing on responses from 321 undergraduate students. It focuses on three key constructs: (1) the role of procrastination in online exam proctoring; (2) the impact of procrastination on performance in online proctored exams; and (3) the relationship between exam anxiety, procrastination, and online proctoring. The findings reveal: (1) a strong link between academic procrastination and poor performance in online proctored exams; (2) a significant correlation between procrastination and increased exam anxiety in online proctoring environments; and (3) that students who procrastinate have less favorable attitudes toward online exam proctoring.

Keywords: *procrastination, online proctoring, exam anxiety, exam performance*

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Procrastination et surveillance des examens en ligne : anxiété et performance relatives aux examens

Résumé : Cette étude explore la procrastination académique dans les contextes de surveillance d'examens en ligne, à partir des réponses de 321 étudiants de premier cycle. Elle se concentre sur trois axes principaux : 1) le rôle de la procrastination dans la surveillance des examens en ligne ; 2) l'impact de la procrastination sur la performance aux examens surveillés en ligne ; 3) le lien entre l'anxiété liée aux examens, la procrastination et la surveillance en ligne. Les résultats montrent : 1) une forte corrélation entre procrastination et faibles performances dans le cadre des examens en ligne surveillés; 2) une association significative entre procrastination et hausse de l'anxiété en contexte de surveillance en ligne ; 3) une attitude plus négative envers la surveillance numérique chez les étudiants procrastinateurs.

Mots-clés : procrastination, surveillance en ligne, anxiété aux examens, performance aux examens

Introduction

Task-related procrastination is as old as tasks themselves. However, our understanding of procrastination's role in online exam proctoring, and its impact on students' exam anxiety and performance, is relatively new. A survey by Grajek (2020) from Educause revealed that soon after the stay-at-home directives, about 54% of higher education institutions in the United States started using online proctoring services, with another 23% considering their use. At the height of the pandemic, 75% of higher education institutions were conducting some or all of their exam proctoring online. This shift led to numerous studies from various disciplines examining online proctored exam experiences (Kharbat & Abu Daabes, 2021).

The mass migration by higher education institutions in the United States to online exam proctoring prompted numerous media reports about students being mistreated by online proctoring providers, including reports of students being wrongly flagged for academic misconduct. This surge of media attention spurred a wave of empirical studies examining various aspects of students' experiences with online exam proctoring. However, these studies typically overlooked the role of procrastination in online exam proctoring, exam anxiety, and exam performance, focusing instead on media-reported issues. Therefore, using responses from 321 undergraduate students enrolled in an online psychology

course, this study investigated the possible impact of procrastination on online exam proctoring, as well as its implications for exam anxiety and performance.

Literature Review on Academic Procrastination

Academic Procrastination and the Impact on Academic Performance

Procrastination is regarded as one of the most complex human phenomenon and a common behavior in many areas of life, making it one of the most extensively researched issues. Therefore, aside from the substantial scientific body of knowledge studying various facets of this issue, as of 2010, there were more than 600 books providing individuals advice on how to overcome procrastination (Ferrari, 2010). Certainly, procrastination is a multifaceted habit that is influenced by cognitive processes, contextual factors, and personal traits. As such, it has a significant negative influence on one's well-being on a personal and professional level (Steel, 2007; Steel et al., 2001; Steel et al., 2018; Senécal et al., 1997; Tuckman, 1991).

As researchers investigated different aspects of this phenomenon, numerous definitions evolved to address its diverse facets. In its broadest term, academic procrastination is defined "as intentionally deferring or delaying work that must be completed" (Schraw et al., 2007, p. 12). On his part, Steel (2007) defined procrastination as a voluntary but unreasonable delay in a planned

action that has no beneficial consequences. Likewise, according to Ahmed et al. (2023), "procrastination arises when a person is passive in completing academically related tasks such as studying for an examination" (p. 364). In general, researchers agree that procrastination is an adaptive activity with negative consequences, such as anxiety, failure to regulate, and low self-efficacy (Mann, 2016). That being said, not every delay is a sign of procrastination (Knaus, 2000).

Aside from the numerous definitions, most academics agree that procrastination is far more complex than the definitions offered above. As a result, most academics believe that this issue is better evaluated via the lens of individual characteristic variations; in other words, by examining the issue through trait (or general) and state (or situational) procrastination and categorizing distinct types of procrastination. State procrastination refers to circumstances that cause or contribute to procrastination, whereas trait procrastination refers to a propensity to put off actions that are required in order to achieve certain goals (Lay, 1986). Studies on procrastination have looked at the relationship between personality qualities and procrastination, as reported by Johnson and Bloom (1995). According to McGeown et al. (2014), "personality refers to a set of underlying traits that determine how an individual typically behaves, thinks and feels" (p. 279). For example, the Big Five personality framework is the most widely used, despite the existence of several others. As a result, a number of research papers have looked at procrastination

using the Big Five framework, as was initially proposed by Costa and McCrae (1992).

Therefore, procrastination in relation to academic work in general and exam taking in particular is not new. It "is a common problem affecting learning and achievement of university students and may have an effect on students' personality traits and their learning because it affects the self-efficacy, self-control, and organizational behavior of the students" (Karatas, 2015, p. 243). Furthermore, the complex behavior of procrastination is impacted by personal characteristics, environmental circumstances, and cognitive functions. Student procrastination is a well-researched phenomena that affects both academic achievement and psychological health (Klingsieck, 2013).

While people of all ages have been observed to engage in this behavior (Ahmed et al., 2023), according to Ragusa et al. (2023), "One of the biggest challenges facing students today is procrastination, which is closely related to stress, anxiety and, in the most severe cases, depression" (p. 1). In fact, some studies estimate between 80% and 95% of college students procrastinate to some extent, meaning they delay a task or studying for an exam (Steel, 2007; O'Brien, 2000; Chehrzad et al., 2017). Other studies indicate that half of college students procrastinate with their academic work regularly and problematically (Solomon & Rothblum, 1984; Day et al., 2000; Onwuegbuzie, 2000).

A meta-analysis of 33 relevant studies conducted by Kim and Seo (2015) has shown that procrastination has a negative correlation with academic

performance. According to Steel (2007), the perceived importance of the work, the likelihood of success, the amount of time left to finish it, and the person's sensitivity to delay all have an impact on procrastination. Additional elements that have been identified as prevalent psychological traits that impact academic procrastination include perfectionism, low self-efficacy, fear of failure, impulsivity, and task aversion (Steel, 2007; Schraw et al., 2007; Sirois et al., 2003; Senécal et al., 1997; Sirois & Pychyl, 2013; Ferrari et al., 1995; Pychyl et al., 2000). Furthermore, procrastination frequently results in elevated tension, anxiety, and inadequacy or guilt sentiments (Sirois & Pychyl, 2013). In the long run, persistent procrastination may lead to decreases in self-esteem and overall happiness in life (Ferrari et al., 1995). Overall, Steel (2007) found that while there are a number of reasons that lead to academic procrastination, inadequate time management skills continue to be the most important cause.

The body of research examining the relationship between procrastination and poor academic accomplishment is extensive. Indeed, multiple studies show that students who delay get lower grades, submit tasks late, and have higher levels of academic stress (Tuckman, 1991). Furthermore, academic procrastination can lead to a loss of desire and participation in educational activities, impeding students' overall academic success (Klassen et al., 2008). Furthermore, Tuckman's (1991) research found that academic procrastination was associated with lower final test grades, and claims that students who procrastinate regularly end up cramming or studying hastily at the last minute, which may result in insufficient

knowledge and memory recall. Similar to this, a meta-analysis undertaken by Steel (2007) discovered a modestly negative relationship between academic procrastination and exam performance, among other academic tasks. In fact, having students turn in their assignment on time is one of the main challenges educators face and the main cause for this is academic procrastination (Asarta & Schmidt, 2013; Klingsieck et al., 2012; Perrin et al., 2011).

Furthermore, the results of the meta-analysis conducted by Kooren et al. (2024), which looked at the difference between active and passive procrastination, indicate that the effects on academic performance are negatively influenced by both proactive and inactive pause. According to Kooren et al., active procrastination involves actively delaying things until the last minute, while passive procrastination involves delaying tasks due to hesitation or avoidance. If participants are inactive in completing the task and experience adverse emotions when they do complete it, this is considered passive procrastination, which is the typical type of procrastination. Active procrastination, on the other hand, is when a person delays their task, but this does not necessarily have a negative effect on their performance (Chun Chu & Choi, 2005). Likewise, the study of Ahmed et al. (2023), which looked into undergraduate medical students, found that "students nearly always procrastinated on tasks such as studying for examinations and keeping up with assignments" (p. 363).

Procrastination and Online Exam Proctoring

As previously stated, online proctoring is a recent phenomenon. Our exhaustive search for scientific evidence on "procrastination and online exam proctoring" proved fruitless. However, below we present a brief review of the literature on procrastination and online courses. It should be noted that these studies, among other approaches, utilized various online learning management systems to administer their exams, rather than online proctoring services to deliver their tests.

In this regard, Jones and Blankenship (2021) investigated the influence of procrastination on academic achievement in an undergraduate online course. The authors examined the association between academic assignment submission timeframes and the grades received before, during, and after the submission deadline. Their findings indicate that the earlier assignments are submitted, the higher the grades are likely to be. Likewise, Levy and Ramim's (2012) study, which used findings from records of online tests taken by undergraduate students over the course of five terms, revealed that the majority of students (58%) postpone taking exams online and appear to perform significantly worse. An early study of Elvers et al. (2003), which looked at the relationship between dilatory behavior and performance in students randomly assigned to an online or traditional lecture introductory psychology class, found no statistically significant differences between the two sections of the class in terms of procrastination measures, exam performance, and class attitudes for the online

students. However, the researchers found that procrastination for the online students was negatively correlated with exam scores and class attitudes.

Considering the above research findings, we propose that academic procrastination is best explained by the temporal motivation theory put forward by Steel and König (2006). This comprehensive framework explains procrastination and motivation through the interaction of a number of important psychological variables. Among other important aspects, this theory helps us understand why individuals put off tasks despite the disadvantages this could lead to, or even the fact that this might work against their best interests. A simplified interpretation of the theory explaining the relationship between motivation and task completion is represented by the following equation:

$$\text{Motivation} = \frac{\text{Impulsiveness} \times \text{Delay}}{\text{Expectancy} \times \text{Value}}$$

Breaking down the above equation, Steel and König (2006) identify four key variables strongly related to procrastination. The first key variable is *expectancy* (or self-efficacy), which can be defined as an individual's confidence in being able to succeed at a task. Those who believe that they are likely to fail at a given task are more likely to procrastinate, and this means that the lower the expectancy, the less motivation one experiences. The second key variable is *value* (or task value), which refers to how rewarding, enjoyable, or important a task is to an individual. Tasks that are perceived as boring or irrelevant feel less

urgent or less worthwhile, and the lower the value an individual assigns to a task, the less motivated they are to initiate the task. The third key variable is *impulsiveness*, which explains one's sensitivity to distractions and fondness for immediate gratification. The more impulsive individuals are, the more likely they are to prefer short-term gratification over working for long-term goals, which leads to higher procrastination. The fourth key variable is *delay*, which can be defined as the time until the person will receive the task's reward (e.g., a good grade) or consequence (e.g., failing an exam). According to Steel (2007), many failures including loss of academic performance can be attributed to procrastination. The temporal motivation theory was found to be reliable in predicting procrastination in many academic settings (Steel et al., 2018; Steel et al., 2022; Wieland et al., 2021; Janson et al., 2024; Yao et al., 2021).

Literature Review on Pedagogy and Technology

Since its debut on the broader public stage in the 1990s, the internet has transformed education in general and higher education in particular, in a profound way (Woldeab et al., 2020). It did not take long for institutions, students, and faculty alike to start exploring what this new discovery had to offer. Libraries went online. This opened the door for higher education institutions to access and share scholarly contents virtually. People started to see the world as a flat landscape, and differences in time and geography became irrelevant.

Information Technology Infrastructure and Online Offerings

Those knowledgeable about the history of distance education have long predicted that distance education would be a big part of higher education (Harting & Erthal, 2005). Today, the evaluation of information technology (IT) can be seen as a moving target. Human desire to do more with technologies has continued to expand the virtual world. This has put considerable strain on higher education institutions, and more so for those with limited resources. Having an IT infrastructure that can respond to a constantly changing IT ecosystem is expensive. At the same time, a meaningful online education offering requires a robust IT infrastructure that is capable of handling considerable users, is sustainable and scalable, and is at the same time fast and secure (Carolan et al., 2020; Pardeshi, 2014).

Therefore, it is only natural that higher education institutions that invested adequately, and had robust and mature online offerings prior to the stay-at-home directives fared better than those who did not. The COVID-19 pandemic provided a challenge and an opportunity to higher education institutions: they could evaluate and restructure their online educational offerings not only to meet the challenges of today, but also to transform their online presence with a vision to the future (Carolan et al., 2020). It is also safe to argue that during the COVID-19 pandemic, technology came to the aid of education in general and higher education in particular. Looking at 897 faculty and administrators from 672 United States higher education institutions, Johnson et al. (2020) concluded

that those who never taught online before were learning online teaching, often while engaging in it for the first time.

In short, many courses were not designed to fit the online teaching and learning environment. Most faculty basically transferred their usual practice to remote teaching by repurposing what they were doing in the classroom, asking less of students especially in terms of assignments, and opting for paper assignments over exams. Even before the COVID-19 pandemic, most faculty who had taught online for many years relied on papers and projects for assessment, and those who used exams to assess learning, utilized exam features built within course management systems (CMS) to administrate their courses exams. Oftentimes, exams administered in online courses were not high-stake exams. And, faculty who utilized online proctoring services prior to the pandemic, faced fewer challenges in terms of assessment. This is because they had considerable experience with an exam proctoring environment prior to the pandemic.

Exam Proctoring During the COVID-19 Pandemic

If the landscape of online course assessments was so quiet before the pandemic, where did the much-publicized emphasis around online proctoring and students being wrongly flagged for cheating come from? For the most part, we addressed this question in our previous study (see Woldeab & Brothen, 2021). Even though that study was conducted using Proctorio, an algorithm-based proctoring software, which was used for years before the pandemic by

the institution we surveyed, our findings revealed that "as is widely reported by the media—that students are experiencing anxiety and fear of being wrongly flagged during online proctoring" (p. 1).

We think this is in large part the result of faculty who have not utilized online proctoring before, did not have adequate training on these systems, or may have inflated the level of monitoring appropriate for their particular exams. As the stay-at-home directives continued from the first to a second semester and with no end in sight, it was only natural for faculty who relied on classrooms for their high-stake exams to venture into the world of online exam proctoring.

Second, as the online proctoring industry substantially grew overnight, these vendors saw new market opportunities. The number of these vendors was somewhere around 38 globally in 2020 (Morgan, 2020). In a non-exhaustive search conducted in February 2021, we found over 60 vendors who were providing online exam proctoring. Additionally, these vendors provide multiple levels of service (e.g., passive monitoring of software on students' computers, active restriction of software on students' computers, passive video surveillance of students, and active video surveillance of students). These are the most often used categories of proctoring and most institutions who utilize online proctoring use more than one of these categories (Grajek, 2020).

To a great extent, "these different services are often not clearly understood by users, and many companies do not provide information about their products and processes on their websites" (Woldeab & Brothen, 2021, p.

22). If faculty do not have the necessary training "about what level of monitoring is appropriate for high versus low stakes exams and choose accordingly" (Woldeab & Brothen, 2021, p. 22), they can unintentionally end up subjecting their students to undue burden. And we think that what has been described above has played a major role in the negative experiences students reported having with their online exam proctoring and the subsequent wave of reports mostly by the popular media claiming that students across the United States are in fear of been wrongly flagged by online proctoring services.

The primary goal of this study is to determine what role, if any, academic procrastination plays in online exam proctoring. The objectives of this study are threefold:

(1) To investigate the role of procrastination in online exam proctoring;

(2) To determine whether procrastinating students perform worse on online proctored exams; and

(3) To investigate the potential links between exam anxiety, procrastination, and online exam proctoring.

To address these overarching questions, the following three hypotheses were carefully considered to guide the investigation:

H_1: Students who procrastinate with proctored online exams perform lower than those who do not.

H_2: Students who procrastinate with proctored online exams are more anxious than those who do not procrastinate.

H_3: Students who procrastinate with proctored online exams are less positive about online exam proctoring.

Participants

To address the three hypotheses noted above, we utilized survey responses from undergraduate students enrolled in a 400-students course in the psychology of learning and behavior taught online in a public land-grant research university in the upper Midwest region of the United States. The course utilized the Canvas course management system to also deliver exams monitored by Proctorio, a webcam-based online proctoring service (https://proctorio.com/). During the semester, students completed three quizzes and short writing assignments for each of 12 textbook chapters that had to be done consecutively. They also took three mid-semester exams, each consisting of 20 multiple-choice questions and a 65-question final exam, all monitored via Proctorio. Before the final exam, students were required to take a practice final exam at least once and as many times thereafter as they wished to gauge their level of preparation and to study for the actual final exam. After completing the final exam, a survey automatically opened that students could complete for extra credit; and 321 students (90% of the students) finishing the course did that.

Measures

In the final survey, participants completed an eight-item questionnaire developed by the researchers to assess the hypotheses proposed in this study. In addition to these eight items, participants completed an additional 11 questions about online proctoring, bringing the total number of items developed for this study to 19. We administered these 19 items with a Likert scale with options ranging from 1 (strongly disagree) to 5 (strongly agree). In addition to these 19 items, participants completed the Westside Test Anxiety Scale (Westside) developed by Driscoll (2007). We have utilized this scale in several of our previous studies as a measure of trait anxiety. The Westside Test Anxiety Scale consists of ten items rated on a five-point scale from 5 (extremely or always true) to 1 (not at all or never true) to evaluate students with anxiety impairment. Six items of the scale measure *performance impairments* related to anxiety, such as poor memory, worry, and lack of attentiveness, while the remaining four items measure dread and worry. The Westside Test is considered a highly relevant, reliable, and valid measure of test-anxiety impairment. According to Driscoll (2007), the scale has high face validity, as it incorporates significant cognitive and disability variables, while excluding marginally relevant over-arousal elements.

The Proctorio-monitored Canvas mid-semester exams were each available to students over four-day periods. The final exam was open to students who

had finished their coursework for three days prior to the seven-day final exam period and to all students during the regular exam week. Students were expected to have finished their coursework before exam week but were allowed to finish their chapter work during that week before taking their final exam. The date and time when students took their final exam during the 10-day exam period served as our measure of procrastination. We considered this justified because students could take the exam at any time instead of the last few hours of the period (as many did). While there are several possible reasons for delay, we argue that procrastination is a significant one of them. We then calculated the relationships between this procrastination measure and the variables related to our hypotheses.

Results and Discussion

We collected and analyzed our data for six variables related to our hypotheses. They were (1) total points in the course, (2) final exam score, (3) time at which students took the final exam, (4) Westside Anxiety Scale score, (5) whether they agreed that online proctoring leads to a fair assessment of their course material knowledge, and (6) whether they agreed they would prefer courses that used online proctoring (variables 5 and 6 are on 5-point scales). The first two were measures of course performance, the third a measure of procrastination, the fourth a measure of their anxiety level, and the last two a measure of the positivity of their view of online proctoring. The descriptive

statistics for the above six variables are as follows: (1) Mean = 218.39, s.d. = 24.71; (2) Mean = 49.80, s.d. = 9.84; (3) Mean = 218.39, s.d. = 24.71; (4) Mean = 32.93, s.d. = 8.87; (5) Mean = 3.70, s.d. = 1.04; and (6) Mean = 3.09, s.d. = 1.23.

Hypothesis one asserts, "Students who procrastinate with proctored online exams perform lower than those who do not." To address this hypothesis, we assessed the time at which students took the final exam (FinExFini), their final exam score (FinEx), and their total course points (TotPts), which included chapter work and all four exams. As shown in Table 1 below, students procrastinating in completing their course obligations performed less well in the course than other students. The average student finished early on the last day of finals. Final exam finish time negatively correlated with both the final exam score ($r = -.261$, $p < .01$) and the total course points ($r = -.312$, $p < .01$). This is in line with findings in previous research (Steel, 2007; Tuckman, 1991) in which academic procrastination had a modest yet negative impact on exam performance. This finding can also be explained by the temporal motivation theory discussed earlier in this paper (Steel & König, 2006). More importantly, as shown in the literature review section, a meta-analysis of 33 relevant studies conducted by Kim and Seo (2015) demonstrated that procrastination is negatively correlated with academic performance.

The second hypothesis declares that "Students who procrastinate with proctored online exams are more anxious than those who do not procrastinate." To address this hypothesis, we examined the correlation between

procrastination—measured by the timing of students' final exams—and their Westside scores. As shown in Table 1, the correlation between these variables is ($r = .194$, $p < .01$), indicating a modest yet positive association. This finding aligns with numerous studies (Ragusa et al., 2023; Sirois & Pychyl, 2013), which link procrastination to elevated exam anxiety.

The third and final hypothesis states, "Students who procrastinate with proctored online exams are less positive about online exam proctoring." To assess this hypothesis, we examined procrastination (FinExFini) along with the following two items: #5 "The Proctorio exam delivery system is a fair assessment tool for me" (procrastinating students were less likely to agree that it was fair) and #14 "If given the option of taking my exams in the classroom or with online proctoring, I would choose online proctoring" (indicating that procrastinating students were more negative about online proctoring). As shown in Table 1, the correlation between procrastination and item #5 is ($r = -.132$, $p <. .05$), meaning they were less likely to agree that it was fair, and the correlation between item #14 is ($r = -.143$, $p <. .05$), meaning they were less likely to say they would choose a course with online proctoring. In short, these findings show that procrastinating students are less likely to say online proctoring is fair and, if given the option, they are less likely to choose online proctoring. The literature review highlights that previous studies have linked procrastination to online exams. However, based on our existing literature search, this study is the first to establish a connection between procrastination and online exam proctoring.

Table 1: *Correlations of the Items Considered for Predicting Increases in Procrastination*

Variable	FinEx	FinExFini	TotPts	#5	#14	WestS total
Final exam score (FinEx)	1	—	—	—	—	—
Final exam finish time (FinExFini)	-.261**	1	—	—	—	—
Total course points (TotPts)	.881**	-.312**	1	—	—	—
#5 The Proctorio exam delivery system is a fair assessment tool for me.	.169**	-.132*	169**	1	—	—
#14 If given the option of taking my exams in the classroom or with online proctoring, I would choose online proctoring.	.014	-.143*	.017	.331**	1	—
WestS total	-.240**	.194**	-.278**	-.204**	-.167**	1

** p < .01, two-tailed. * p < .05, two-tailed.

As the final step, and to clarify the causal structure of the above correlations, we conducted a stepwise multiple-regression analysis with students' preference for online courses that used online exam proctoring as the dependent variable and our first four variables (final exam finish time which served as our procrastination measure, final exam score, total points, and Westside score) as predictors. Table 2 below represents the model summary from the stepwise multiple-regression analysis and shows that two variables (Westside first and procrastination second) were included in the final regression equation: R = .202, F = 6.753, p < .001.

Table 2: *Results from the Model Summary for Stepwise Multiple-Regression of Preference for Course with Online Exam Proctoring*

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.167a	.028	.025	1.218	.028	9.189	1	319	.003
2	.202b	.041	.035	1.212	.013	4.224	1	318	.041

a. Predictors: (Constant), Westside

b. Predictors: (Constant), Westside, Procrastination

Conclusion, Implications, and Recommendations for Future Studies

Based on our extensive review of the relevant literature, this is the first study of its kind to establish three primary objectives. First and foremost, the study linked academic procrastination to poor performance in online proctored exams. While an extensive body of empirical research has already demonstrated that procrastinating students tend to perform worse in both in-person and online exams, this study is unique in confirming that the negative impact of procrastination extends specifically to proctored online exams. This finding highlights the distinct challenges procrastinating students face in online proctored environments compared to other exam formats.

Second, the study identified a significant correlation between procrastination and increased anxiety in online proctored exam environments.

Students who procrastinate tend to experience higher levels of exam anxiety during proctored online exams compared to their non-procrastinating peers, suggesting that procrastination exacerbates test-related anxiety in these environments.

Finally, the study revealed that students who procrastinate hold less-positive attitudes toward online exam proctoring. This negative perception may be attributed to the heightened anxiety they experience. All in all, the current study provides insights into the intersection of academic procrastination, anxiety, and performance in online proctored exams, offering a new lens for understanding student engagements in an online exam proctoring environment. Further, we suggest that temporal motivation theory would be a fruitful heuristic for researchers exploring procrastination and online proctoring.

One clear implication of this study is that students who procrastinate are more likely to experience heightened exam anxiety in proctored online exam environments, leading to poorer performance. Additionally, these students tend to view online exam proctoring less favorably. Therefore, educators and higher education institutions should be aware of these specific challenges and their impact on students. Further, future research should replicate this study with diverse student populations and explore alternative proctoring environments beyond Proctorio.

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