Health Sciences Student Perceptions and Attitudes Regarding Proctorio E-Proctoring Versus Testing Center

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Abstract

During the COVID-19 pandemic, academic institutions were forced to pivot toward online education. With the switch to online learning, e-proctoring became a popular choice to continue proctored exam assessments. Many concerns arose from this technology, including privacy, psychological, and performance concerns. With the resumption of in-person learning, faculty are faced with the question of continuing with e-proctoring alone, switching back to campus testing centers, or utilizing a combination of both modes. This study aims to understand health sciences students' perceptions and attitudes regarding e-proctoring versus testing center use. An 18-question survey was distributed to health sciences students. The survey had 244 respondents. Descriptive statistics and a one-sample t-test and Cohen's d were utilized to analyze the results. The results indicate that students feel less stress and anxiety using e-proctoring compared to testing centers. Participants also reported a perception of improved exam performance and good exam security. This research helps faculty and decision-makers understand student attitudes and perceptions regarding e-proctoring versus testing center use. https://doi.org/10.21692/haps.2023.006

Introduction

As a result of the COVID-19 pandemic, educational institutions were forced to re-evaluate how they assessed student performance since physical testing centers were often closed due to local precautions and policies (Harwell 2020). In a survey of faculty at four-year institutions, 29% responded that giving secure exams was one of their top three challenges during the pandemic (Fox et al. 2020). E-proctoring was an available tool to replace in-person testing centers and allowed faculty to continue to utilize proctored exam assessments. Online proctoring services grew heavily, with companies such as Proctorio seeing a significant increase in volume and revenue with the pandemic (Harwell 2020).

Many concerns arose regarding e-proctoring, such as assessment integrity, student performance, privacy, and psychological considerations (Kharbat and Abu Daabes 2021). Additionally, a study of medical students found concerns about the system wrongfully invalidating their exams, problems with background noise, and webcam issues (Meulmeester et al. 2021). A recent survey found that students were more anxious when taking an online proctored exam and that the heightened anxiety did not correlate with concerns about being flagged for cheating (Woldeab and Brothen 2021).

The impact of e-proctoring on student performance is another concern. A study of medical exams found that the method of testing, whether proctored online or on-site, did not influence exam results (Andreou et al. 2021). However, although the performance didn't change, examinees did report potential privacy issues and increased test anxiety (Andreou et al. 2021). Woldead and Brothen (2021) also reported that increases in anxiety did not impede performance.

A relationship may also exist between course enrollment and the use of e-proctoring. A prior study indicated that students felt that e-proctoring would influence their choice to sign up for a class that utilized that mode of proctoring (Milone et al. 2017). The relationship between enrollment and the type of proctoring used is an essential factor for faculty as they plan their return to campus-based courses. With students returning to campus and with open testing centers, the next decision was whether courses should return to the traditional model of utilizing testing centers only, continue using the e-proctoring services only, or employ a combination of modes where students can choose their preferred proctoring service.

This study aims to describe health sciences students' attitudes and perceptions regarding the use of e-proctoring versus on-site testing centers. The study was geared toward

the factors that motivate students to utilize one mode of testing instead of the other, such as transportation, accessibility, stress, and anxiety. The overarching research theme concerned student attitudes and beliefs about e-proctoring versus testing centers. The primary research question was whether students preferred using e-proctoring or testing centers. Secondary research questions (SQ1-5) were also included to help assess student situations.

PQ: Do students prefer to use e-proctoring or testing centers?

SQ1: Does the use of e-proctoring software impact student enrollment?

SQ2: Do students feel cheating is easier with e-proctoring compared to a testing center?

SQ3: Do students feel that their performance improves or decreases using e-proctoring versus testing centers?

SQ4: Do students report increased stress and anxiety with e-proctoring versus testing centers?

SQ5: Do students face equipment and service barriers to participate in e-proctoring?

Methods

This project was approved by the institutional review board of Weber State University (# IRB-AY21-22-329), and informed consent was obtained from all participants. During the spring of 2022, a confidential online survey of 18 questions related to using e-proctoring services versus testing centers for students enrolled in health sciences courses was distributed for participation. Testing centers in this study are described as campus-based centers with computers for web-based assessment in a secure environment with check-in procedures, proctors, and video monitoring. In essence, the only variation in the exam was the location of proctoring: in a center or at a location of the student's choosing. The survey was conducted through Qualtrics XM (https://www.qualtrics.com). Participation was voluntary, and no identifiable information was obtained. Participant recruitment was mainly in undergraduate anatomy and physiology courses, although students in medical terminology and pathophysiology courses could also complete the survey. In total, 23 course sections, all at the 1000 or 2000 level, were included in the survey distribution. The survey was given between the midterm and final exams in the semester and did not influence course grading. Students did not receive extra credit for survey completion.

Exams within the courses surveyed consisted of multiple-choice questions only and were closed book. The allowed duration of all proctored exams was limited to two hours. However, most students completed the exams in an hour or less. The exams students took through e-proctoring or a campus testing center had the same web-based style with the same interface. The only difference was the proctoring service used by the students, either e-proctoring at a location of their choosing or a campus-based testing center.

Before taking the survey, students were provided with an informed consent page to give consent to participate in the study. For the survey, students compared on-site university testing center use versus Proctorio e-proctoring software, the e-proctoring service already selected for university use (http://www.proctorio.com). Bergmans et al. (2021) found that Proctorio was easy for students to use but had low sensitivity regarding cheating detection. However, students reported the perception that Proctorio prevents cheating (Bergmans et al. 2021). The questions in the survey covered various topics, including the preference for e-proctoring using Proctorio or testing center use, factors influencing their choice of mode, and exam integrity.

The survey was divided into two blocks. The first block (Table 1) consisted of 16 questions that linked to the primary and/or secondary research foci and utilized a five-point Likert scale with agreement options of "strongly agree" (5), "somewhat agree" (4), "neither agree nor disagree" (3), "somewhat disagree" (2), and "strongly disagree" (1). The final two questions (Table 3) allowed students to select any variable that applied to why they would choose to use a particular mode of proctoring. No questions were required on the survey, and participants were allowed to skip any question. Descriptive statistics of mean and standard deviation were utilized to present the results. A one-sample t-test was used to compare the mean of each result to a predetermined mean, which was three, corresponding to "neither agree or disagree" on the Likert scale. Cohen's d was also calculated for the effect size.

Survey Question	Research Question
Q1: Taking an exam in Proctorio is less stressful than at a testing center.	SQ4
Q2: Taking an exam in Proctorio makes me less anxious than in a testing center.	SQ4
Q3: Taking an exam in Proctorio is more convenient than at a testing center.	PQ
Q4: Taking an exam in Proctorio enhances my performance compared to testing in a testing center.	SQ3
Q5: If I only had the option of taking exams in a testing center, my anxiety would have increased.	SQ4
Q6: If I only had the option of taking exams in a testing center, my performance would have increased.	SQ3
Q7: If I only had the option of taking exams at a testing center, I would have had difficulty with transportation to the testing facility.	SQ5
Q8: If I only had the option of taking exams through Proctorio, I would have to buy new technology, such as a computer, webcam, or microphone.	SQ5
Q9: If I only had the option of taking exams through Proctorio, I would have to purchase or upgrade internet service.	SQ5
Q10: Having the choice of testing in Proctorio or at a testing center enhanced my autonomy in the course.	PQ
Q11: If I only had the option of taking exams in a testing center, I would have withdrawn from the course.	SQ1
Q12: If I only had the option of taking exams through Proctorio, I would have withdrawn from the course.	SQ1
Q13: Students should only be given the option to use Proctorio OR a testing center, but not both.	PQ
Q14: It is easier for students to cheat when taking an exam using Proctorio than at a testing center.	SQ2
Q15: I prefer to take exams through Proctorio.	PQ
Q16: I prefer to take exams at a testing center.	PQ

Table 1. *Likert-scale survey questions and their corresponding research question.*

Results

The survey had 244 people consent to participate in the study. Of the 244 participants, 235 answered each question except one, as noted in Table 2 for question 15. The remaining nine participants consented to the study but did not answer any questions. Due to the relatedness of the 16 questions in the first block of the survey, the results should be considered as a whole rather than independent of one another. The statistical analysis of each Likert-scale survey question in the first block is listed in Table 2. The results of the second block, questions 17 and 18, are given in Table 3.

Question	N	Mean	Std Deviation	t	Two-sided p	Cohen's d
Q1	235	4.20	1.16	15.881	<0.001	1.036
Q2	235	4.18	1.18	15.432	<0.001	1.007
Q3	235	4.76	0.74	36.545	<0.001	2.384
Q4	235	3.83	1.16	10.927	<0.001	0.713
Q5	235	4.15	1.23	14.365	<0.001	0.937
Q6	235	2.37	1.03	-9.333	<0.001	-0.609
Q7	235	3.03	1.48	0.265	0.792	0.017
Q8	235	1.44	0.90	-26.498	<0.001	-1.729
Q9	235	1.26	1.03	-21.338	<0.001	-1.392
Q10	235	4.30	0.91	21.899	<0.001	1.429
Q11	235	2.78	1.39	-8.006	<0.001	-0.522
Q12	235	1.41	0.82	-29.805	<0.001	-1.944
Q13	235	1.51	0.99	-23.058	<0.001	-1.504
Q14	235	1.94	1.21	-13.489	<0.001	-0.880
Q15	234	4.32	1.13	17.953	<0.001	1.174
Q16	235	2.03	1.21	-12.253	<0.001	-0.799

Table 2. *Statistical results for each Likert-scale survey question.*

Q1: Taking an exam in Proctorio is less stressful than at a testing center. (SQ4)

The average response was 4.20 (SD = 1.16) that students agree utilizing Proctorio is less stressful than taking their exams in a testing center. This result is statistically significant, t(234) = 15.881, p = <0.001. The frequency of answers showed 135 (57.45%) reporting that they strongly agreed, 52 (22.13%) somewhat agreed, 22 (9.36%) neither agreed nor disagreed, 13 (5.53%) somewhat disagreed, and 13 (5.53%) strongly disagreed with the statement.

Q2: Taking an exam in Proctorio makes me less anxious than in a testing center. (SQ4)

78% of students indicated that they either somewhat agreed or strongly agreed that they are less anxious using Proctorio and a testing center. The average opinion was 4.18 (SD = 1.18) with a significantly significant result, t(234) = 15.432, p = <0.001. Those reporting that they either somewhat disagreed or strongly disagreed made up 11.49% of the responses. Those that neither agreed nor disagreed made up 10.21%.

Q3: Taking an exam in Proctorio is more convenient than at a testing center. (PQ)

Students report a statistically significant opinion that Proctorio is more convenient than examinations at a testing center, t(234) = 36.545, p = <0.001. The average response was 4.76 (SD = 0.74). The frequency of answers showed 203 (86.38%) reporting that they strongly agreed, 19 (22.13%) somewhat agreed, 6 (2.55%) neither agreed nor disagreed, 2 (0.85%) somewhat disagreed, and 5 (2.13%) strongly disagreed with the statement.

Q4: Taking an exam in Proctorio enhances my performance compared to testing in a testing center. (SQ3)

The average response was 3.83 (SD = 1.16), with a statistically significant agreement that participants reported that using Proctorio enhanced their exam performance, t(234) = 10.927, p<0.001. The frequency of answers showed 90 (38.30%) reporting that they strongly agreed, 52 (22.13%) somewhat agreed, 67 (28.51%) neither agreed nor disagreed, 14 (5.96%) somewhat disagreed, and 12 (5.11%) strongly disagreed with the statement.

Q5: If I only had the option of taking exams in a testing center, my anxiety would have increased. (SQ4)

Participants agreed with this statement, with an average response of 4.15 (SD = 1.23). The result was again statistically significant, t(234) = 14.365, p = <0.001. The frequency of answers showed 133 (56.60%) reporting that they strongly agreed, 53 (22.55%) somewhat agreed, 14 (5.96%) neither agreed nor disagreed, 21 (8.94%) somewhat disagreed, and 14 (5.96%) strongly disagreed with the statement.

Q6: If I only had the option of taking exams in a testing center, my performance would have increased. (SQ3)

Participants reported statistically significant disagreement with this statement, t(234) = -9.333, p = <0.001. The average response was 2.37 (SD = 1.03). The frequency of answers showed 7 (2.98%) reporting that they strongly agreed, 17 (7.23%) somewhat agreed, 91 (38.72%) neither agreed nor disagreed, 62 (26.38%) somewhat disagreed, and 58 (24.68%) strongly disagreed with the statement.

Q7: If I only had the option of taking exams at a testing center, I would have had difficulty with transportation to the testing facility (SQ5).

Participants had an average response of 3.03 (SD = 1.48), which is not statistically significant, t(234) = 0.265, p = 0.396. On average, students disagreed that transportation to a testing facility was a barrier to testing at a testing center. The frequency of answers showed 52 (22.13%) reporting that they strongly agreed, 46 (19.57%) somewhat agreed, 50 (21.28%) neither agreed nor disagreed, 30 (12.77%) somewhat disagreed, and 57 (24.26%) strongly disagreed with the statement.

Q8: If I only had the option of taking exams through Proctorio, I would have to buy new technology, such as a computer, webcam, or microphone. (SQ5)

The average response was 1.44 (SD = 0.9), which shows statically significant disagreement with the statement, t(234) = -26.498, p = <0.001. However, it is worth noting that 7% of respondents agreed somewhat or strongly with the statement. The remaining frequency of answers showed that 15 (6.38%) neither agreed nor disagreed, 25 (10.64%) somewhat disagreed, and 179 (76.17%) strongly disagreed with the statement.

Q9: If I only had the option of taking exams through Proctorio, I would have to purchase or upgrade internet service. (SQ5)

Only about 9% of participants responded in some form of agreement with this statement. The average response was 1.56 (SD = 1.03), indicating statistically significant disagreement with the statement, t(234) = -21.338, p = <0.001. The remaining frequency of answers showed 21 (8.94%) reporting that they neither agreed nor disagreed, 25 (10.64%) somewhat disagreed, and 169 (71.91%) strongly disagreed with the statement.

Q10: Having the choice of testing in Proctorio or at a testing center enhanced my autonomy in the course. (PQ)

Participants showed statistically significant agreement with the statement, t(234) = 21.899, p = <0.001. The average response was 4.30 (SD = 0.91). The frequency of answers showed 129 (54.89%) reporting that they strongly agreed, 58 (24.68%) somewhat agreed, 39 (16.60%) neither agreed nor disagreed, 7 (2.98%) somewhat disagreed, and 2 (0.85%) strongly disagreed with the statement.

Q11: If I only had the option of taking exams in a testing center, I would have withdrawn from the course. (SQ1)

Students reported statistically significant disagreement with this statement, t(234) = -8.006, p = <0.001. The average response was 2.28 (SD = 1.39). 20% of participants responded with some type of agreement with the statement. The remaining frequency of answers showed 50 (21.28%) reporting that they neither agreed nor disagreed, 32 (13.62%) somewhat disagreed, and 105 (44.68%) strongly disagreed with the statement.

Q12: If I only had the option of taking exams through Proctorio, I would have withdrawn from the course. (SQ1)

76% of respondents strongly disagreed with the statement posed in the question. The average response was 1.41 (SD = 0.82) with a statistically significant disagreement with the statement, t(234) = -29.805, p = >0.001. Only 2.5% indicated agreement of any kind with the statement. The remaining frequency of answers showed 26 (11.06%) reporting that they neither agreed nor disagreed and 24 (10.21%) somewhat disagreed with the statement.

Q13: Students should only be given the option to use Proctorio OR a testing center, but not both. (PQ)

An average response of 1.51 (SD = 0.99) indicated that respondents were in statistically significant disagreement with the statement, t(234) = -23.085, p = <0.001. The frequency of answers showed 8 (3.40%) reporting that they strongly agreed, 7 (2.98%) somewhat agreed, 17 (7.23%) neither agreed nor disagreed, 32 (13.62%) somewhat disagreed, and 171 (72.77%) strongly disagreed with the statement.

Q14: It is easier for students to cheat when taking an exam using Proctorio than at a testing center. (SQ2)

The average response was 1.94 (SD = 1.21). Participants disagreed with the statement at a statistically significant level, t(234) = -13.489, p = <0.001. The frequency of answers showed 10 (4.26%) reporting that they strongly agreed, 24 (10.21%) somewhat agreed, 32 (13.62%) neither agreed nor disagreed, 44 (18.72%) somewhat disagreed, and 125 (53.19%) strongly disagreed with the statement.

Q15: I prefer to take exams through Proctorio. (PQ)

The participants reported statistically significant agreement with this statement, t(233) = 17.953, p = <0.001. The average response was 4.32 (SD = 1.13). The frequency of answers

showed 151 (64.53%) reporting that they strongly agreed, 42 (17.95%) somewhat agreed, 17 (7.26%) neither agreed nor disagreed, 13 (5.56%) somewhat disagreed, and 11 (4.70%) strongly disagreed with the statement.

Q16: I prefer to take exams at a testing center. (PQ)

The average response was 2.03 (SD = 1.21), indicating that students were in statistically significant disagreement with the statement, t(234) = -12.253, p = <0.001. The frequency of answers showed 14 (5.96%) reporting that they strongly agreed, 19 (8.09%) somewhat agreed, 35 (14.89%) neither agreed nor disagreed, 59 (25.11%) somewhat disagreed, and 108 (45.96%) strongly disagreed with the statement.

Q17: Which of the following are reasons why you would choose to use Proctorio for taking an exam instead of a testing center? (Select all that apply) (PQ, SQ1-5)

The responses most frequently chosen related to exam access with "convenience," "test any time of day (not limited to center hours)," and "easier to fit into schedule" being the options selected most often. The factors that were least often selected were to "avoid disease transmission (i.e., COVID-19)" and "family responsibilities." See Table 3 for full results.

Q18: Which of the following are reasons why you would choose to use a testing center for taking an exam instead of Proctorio? (Select all that apply) (PQ, SQ1-5)

Responses with the highest frequency were related to the home environment and the e-proctoring software. "Other people at home" and "pets at home" were reported as the most frequent reason to use a testing center. The most frequent response was "stress over "flagged" behaviors." "Privacy concerns" were also a concern when using the e-proctoring software and a reason to use a campus testing center. See Table 3 for full results.

Survey Question	Answers	Frequency	Percentage
Q17: Which of the following are reasons why you would choose to use Proctorio for taking an exam instead of a testing center? (Select all that apply)	Avoid disease transmission	92	5.31%
	Convenience	211	12.17%
	Easier to fit into schedule	218	12.57%
	Family responsibilities	104	6.00%
	More comfortable	169	9.75%
	More control of testing environment	134	7.76%
	No transportation needed	156	9.00%
	Test at any location	168	9.69%
	Test at any time of day	221	12.75%
	Test where you study	132	7.61%
	Use personal computer	129	7.44%
	Total Count	**1734**	**100%**
Q18: Which of the following are reasons why you would choose to use a testing center for taking an exam instead of Proctorio? (Select all that apply)	Don't want software on personal computer	27	4.43%
	Incompatibility of personal computer with software	20	3.28%
	Lack of personal internet	30	4.92%
	Lack of personal computer	12	1.97%
	Lack of webcam	17	2.79%
	Lack of microphone	12	1.97%
	Other people at home	129	21.15%
	Pets at home	74	12.13%
	Privacy concerns	47	7.70%
	Recording home environment	35	5.74%
	Stress over "flagged" behaviors	132	21.64%
	Testing center is a controlled environment	75	12.30%
	Total Count	**610**	**100%**

Table 3. *Frequencies of answers to open-ended survey questions.*

Discussion

The survey results relay health sciences students' attitudes and perceptions about using Proctorio e-proctoring versus testing centers and provide a forum of discussion for course and campus decision-makers. Information about the primary and secondary research questions was gained and is presented in this section. In addition, the findings of this study will be compared with other findings for each question, as applicable.

PQ: Do students prefer to use e-proctoring or testing centers?

According to the survey results, health science students preferred using e-proctoring software for exams instead of campus-based testing centers. Although they did not have a direct comparison to testing centers, Meulmeester et al. (2021) reported that most of their respondents either approved or were neutral about using e-proctoring services for examinations. The current finding studies enhance that finding in that most students reported preferring to use e-proctoring compared to a campus testing center. Interestingly, a majority of students reported that both e-proctoring and campus testing center options should be available rather than requiring one or the other.

SQ1: Does the use of e-proctoring software impact student enrollment?

Regarding the first of the secondary research questions, the results show that students would still tend to enroll in classes if either e-proctoring or campus testing centers were used individually. Granted, the courses are required pre-requisite courses for many of our college's professional programs, which may skew their responses as most have to take the courses to meet their career aspirations. However, there is a concern that by limiting the proctoring services available to students, they may decide against enrollment.

SQ2: Do students feel cheating is easier with e-proctoring compared to a testing center?

Previous research has reported that Proctorio has not yielded promising cheating detection results (Bergmans et al. 2021). Yet, students reported at that time that Proctorio e-proctoring is a good tool for detecting cheating (Bergmans et al. 2021). Additionally, webcam-based proctoring was shown to deter cheating in an online testing environment (Hylton et al. 2016). The current survey results indicate that the majority of students (72%) feel e-proctoring does not provide enhanced cheating opportunities compared to testing centers. However, the results cannot be definitive, given that 14% of respondents thought it allowed for possible cheating.

SQ3: Do students feel that their performance improves or decreases using e-proctoring versus testing centers?

Regarding exam performance, the results show that students felt that taking exams in an online environment positively affected their performance compared to testing centers. Many studies have shown that students feel that their exam performance is hindered by e-proctoring, but their actual exam results did not agree with that assertion (Andreou et al. 2021; Kharbat and Abu Daabes 2021; Woldeab and Brothen 2021). These results contradict the findings of a few other studies that have shown a negative impact on scores (Hylton et al. 2016; Milone et al. 2017). The mixed nature of these results makes it difficult to conclude whether e-proctoring has a positive or negative effect on exam performance.

SQ4: Do students report increased stress and anxiety with e-proctoring versus testing centers?

The present survey results indicate that students at our campus did not follow the general theme that e-proctoring increases anxiety for exams. They reported that e-proctoring was their preferred examination method and was less stressful and anxiety-inducing than a testing center. Several studies have indicated the opposite effect – that students reported more anxiety or stress with e-proctoring (Elsalem et al. 2020; Meulmeester et al. 2021; Woldeab and Brothen 2021). However, students with more exposure to e-proctoring seem less likely to experience anxiety (Prakasha et al. 2021). The current study did not account for the past testing experiences of students with regard to e-proctoring. This is an area for further research consideration.

SQ5: Do students face equipment and service barriers to participate in e-proctoring?

Finally, there was a concern that only allowing students to utilize Proctorio may limit course accessibility due to barriers such as computers, webcams, and internet service. Although the survey results indicated that this was not a problem for most students, it is worth noting that 9% of the survey participants reported a barrier with equipment or internet access if they could not utilize campus testing centers. Given the correlation between socioeconomic status and academic achievement, it is crucial to consider these barriers when deciding what mode of proctoring a course will utilize (Broer et al. 2019). If both in-person testing centers and e-proctoring are available, students strongly agree that both should be made available to allow students to select their preferred mode.

Conclusion

This study has provided insight into student attitudes and perceptions concerning e-proctoring versus testing center use. Health sciences students seem to prefer using e-proctoring services with reported perceived performance enhancement and decreased anxiety and stress. Future consideration should be given to confirm exam performance against actual exam scores and confirm preferences with student usage of e-proctoring versus campus testing centers.

About the Author

Justin Burr is an assistant professor of health sciences in the Dr. Ezekiel R. Dumke College of Health Professions at Weber State University. He teaches introductory anatomy and physiology, anatomy and physiology I and II, pathophysiology, and medical terminology.

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