" I didn't even want to turn my head because I was so scared of the prof.": Student Perceptions of e-Proctoring Software

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Abstract

The use of e-proctoring software by universities across North America has been highly criticized in popular media due to their intrusive nature, and privacy-compromising features. Through qualitative interviews with 14 university students, we explored perceptions of e-proctoring software through the lens of their personal experiences and concerns. Our preliminary findings showed that students were most concerned with misflagging or other technical issues. Privacy was less of a concern, however, this seemed to be connected to their limited awareness of how online proctoring systems are collecting and storing their data rather than acceptance of the practices. Overall, our results establish a link between student system perceptions, stress, technological concerns, and privacy.

1 Introduction

Due to the COVID-19 pandemic, many academic institutions quickly adapted and converted all in-person offerings online. "E-proctoring" software [10] emerged as a fairly popular solution, allowing for test-takers to complete an assessment or exam in a remote location while monitoring their workspace and computer desktop. These tools typically require access to a webcam, browser screen, and/or taskbar and may have video and audio recording functionality. They may also restrict access to other computer applications [7, 9]. During the COVID-19 lockdowns, the use of e-proctoring among higher education institutions rose by approximately 500% [2].

E-proctoring software has been a topic of contention among students, instructors, and university officials. Major online complaints by students include a fear of being misflagged for suspicious behaviour, added stress, and privacy concerns [5, 6, 10]. Instructors are concerned because these systems display significant amounts of student personal data on the backend and contain exploitable vulnerabilities [4].

We address the following research question: ***RQ***: *What are student perceptions of e-proctoring software in terms of experiences, concerns, and privacy implications?* We conducted qualitative interviews with both undergraduate and graduate students. Our interview questions covered broad experiences, perceptions, concerns, and privacy issues relating to e-proctoring for assessments. Our preliminary contributions include (i) highlighting the potential relationship between technological issues, system perceptions, stress/anxiety, and privacy, and (ii) identifying key student concerns and points of contention that may surface during online proctored exams.

2 Background and Related Works

E-proctoring systems highlight the trade-offs between various institutional actors' priorities when it comes to privacy concerns. Higher education institutions are often more concerned with cost efficiencies, interface usability, and teaching outcomes compared to data safety [4]. Students are often more concerned that their metadata may be shared with advertisers or other third parties. Cohney et al. [4] investigated the privacy policies for 23 online platforms and found that a majority were unclear about sharing practices, and a significant number of companies placed the burden on the user to monitor third parties integrations. Additionally, a common student complaint is the perception that surveillance during assessment seems creepy and invasive because online proctoring software can record a plethora of student data, not limited to IP addresses, names, and email addresses [3].

E-Proctoring Tools and Capabilities: Approximately 2000 schools have adopted an e-proctoring tool for the purposes of maintaining academic integrity during the pandemic [8]. E-proctoring systems vary in features and capabilities. At our institution, two proctoring systems have been

approved for use in exams: CoMaS, and Big Blue Button. *CoMaS* is an automated proctoring tool that requires access to one's screen and camera feed. The locally-installed application requires user authentication and the user's taskbar to be visible at all times. CoMaS does not collect any information from a test taker's browser history, cache, cookies, or unopened files. *Big Blue Button* is a web-conferencing tool that allows for live proctoring through visual and auditory surveillance, using a webcam and microphone. The proctor has multiple viewpoints on the student including their mobile phone, open applications, and workspace. Test takers are required to verify their student identification and to maintain an audio and visual connection with their proctor throughout the exam. Few research studies (e.g., [1]) have explored first-hand student experiences with e-proctoring. Our study builds on the aforementioned work by gaining a foundational understanding of experiences and concerns regarding e-proctoring.

3 Methods

Our protocol was reviewed by our IRB. We recruited using an online pre-screener questionnaire based on the following criteria: involvement in a course using e-proctoring, role at the university, affiliated program/department, gender, and a brief (optional) open-ended question for describing participants' involvement with e-proctoring. A link to the pre-screener was emailed to university departmental and student mailing lists.

We conducted 60-minute, semi-structured interviews with 14 participants (6 men, 8 women, 1 non-binary) selected from the pre-screener to cover different demographics. We had 13 undergraduates and one graduate student. Interviews were completed remotely using Zoom. Participants were asked to elaborate on their existing knowledge of e-proctoring software, followed by in-depth questions on their experiences, perceptions, concerns, and understanding of any privacy implications. Participants received $20 CAD remuneration. Interviews were fully transcribed. Transcripts were analyzed using inductive thematic analysis through open coding by two members of the research team. A codebook was established by the researchers independently coding two transcripts then collaboratively reviewing and discussing each code until mutual understanding and agreement was established. Both researchers then independently coded the remaining transcript using the final set of established codes. We identified interrelated themes that emerged from the interview data relevant to key aspects of the research question. We focus on four main interrelated coding themes identified: (i) e-proctoring-related technological issues, (ii) e-proctoring system perceptions, (iii) stress and anxiety, and (iv) privacy.

4 Results

Students' perceptions of e-proctoring were found to be shaped by their first- or second-hand experiences with the software. These experiences overwhelmingly included issues with technological difficulties during e-proctored assessments. These technological concerns largely influenced students' overall perceptions, emotional responses, and privacy attitudes.

4.1 Technological Issues

Almost all participants described either first-hand or second-hand experiences (or both) with technological issues that arose during e-proctored assessments. These technological issues were described on a spectrum of mild "frustrations" to larger incidents of being "locked out" of exams with little immediate guidance on how to proceed, or systemic issues of internet access, especially for international students.

Preparations: Some participants detailed cumbersome preparations for their e-proctored assessments. These might involve trial runs of the e-proctoring system 2-3 days prior to the assessment, or completing a mandatory pre-quiz on basic understanding of the e-proctoring system. Preparations included ensuring that household members limit potential distractions during the assessment, closing background applications, and preemptively informing instructors of any anticipated challenges. At the extreme, one participant described setting up a computer with a fresh operating system, which would then be wiped clean following the assessment.

ID verification: ID verification was commonly reported as a recurring issue. Participants reported having to scan their student cards multiple times prior to their assessments, with some reaching the maximum of 10 attempts because the system appeared unable to match the photo on their card to their live face, *"[...] it keeps telling me that it's incorrect, or like, I think it's my face that doesn't match my ID. [...] So how am I going to feel during the rest of the exam? [...] I don't know if my prof will realize that it is me and that CoMaS is wrong [...]. So that also frightens me."* Poor system feedback meant that users were even unsure of successful verification: *"I've never had it [say that] it was fine."*

Loss of access: A participant recounted being locked out of a midterm for multiple hours due to an accidental mishap (i.e., mistakenly closing the wrong browser tab while trying to ensure no extra prohibited tabs were open during the assessment). During this lockout period, the participant described uncertainty with how to proceed, being referred from one tech support departments to another for assistance. Eventually, the participant was excused from the midterm but this made the final exam count for a disproportionate portion of the final course. The participant also described a second-hand account from a friend who failed a midterm in a similar mishap.

Despite the technological issues faced by participants, many emphasized the importance of maintaining academic integrity and the potential the e-proctoring holds in this regard: *"Academic integrity is not something we can joke about".*

4.2 e-Proctoring System Perceptions

Participants' perceptions of e-proctoring systems and software features were quite varied.

Perceived punitive consequences: Participants conveyed negative perceptions of punitive consequences they anticipated for unintended or accidental mishaps, e.g., momentarily glancing away from the screen during assessment, or any innocent bodily movements such as stretching during an exam. As a result, these participants reported limiting their movements due to fear of being falsely flagged for cheating. For example, one described the following incident during an e-proctored assessment: *"I have a brother who has autism and he doesn't understand instructions not to come in when I'm writing an exam. [...] And my brother came in and he was tapping on my shoulder. I didn't even want to turn my head because I was so scared of the prof."* The participant was unable to attend to her sibling due to fears of "raising suspicions."

Uncertainty: Additionally, participants conveyed uncertainty regarding the e-proctoring system's features and capabilities (e.g., being unaware of video or audio recording capabilities) and made assumptions based on intuition. Importantly, no participant disclosed that they had reviewed the e-proctoring software's official documentation. Despite this, many held beliefs regarding the software's various capabilities. For example, one participant expressed *"I don't think that CoMaS can really go through my computer and look at what I have on it."* When probed about why she held this belief, she responded, *"I'm not sure, I'm kind of just assuming."*

4.3 e-Proctoring Stress and Anxiety

Fear and anxiety: Uncertainty about the system's capabilities manifested as fear of wrongful persecution, and anxiety of being automatically accused of plagiarism without a chance to defend one's case. These participants described a sense of "guilty until proven innocent" in regards to e-proctoring issues that arise during assessments.

Additional stress: Participants detailed added exam stress when completing e-proctored assessments that they would not encounter if doing in-person assessments. One participant explains *"Doing the exams without e-proctoring are always a lot easier and a lot less stressful because the ones with the e-proctoring, I constantly have to check whether like everything is good".* Another participant described stress from having to find and set up an exam space that was ideal for proctoring: *"It causes you a lot more stress and anxiety, and I feel like it kind of decreases your focus a little."*

4.4 Privacy Perceptions

Privacy-related sentiments were not a main issue for participants overall. Some participants acknowledged the privacy concerns highlighted in the news or by other students regarding e-proctoring, but did not necessarily have these concerns.

Privacy unconcerned: When asked about why she did not share these concerns personally, one participant expressed that *"I haven't really thought about it that much. Nothing has happened so far since I've downloaded it and used it, like everything just seemed to be fine."* For such participants, the fact that they did not experience concrete instances of privacy violations/breaches diminished the importance of considering privacy with e-proctoring software.

Privacy invasive: Interestingly, no participant experienced specific instances of privacy invasions, breaches, or issues from using e-proctoring software. However, a minority of participants did express privacy concerns. The perceived invasiveness was worrisome, with one participant describing the sense of invasiveness she experienced being comparable to *"them having access to your computer or phone password".* This participant also expressed vague concerns for her personal safety: *"really raises a lot of question marks about my safety."* Another participant expressed deep privacy concerns: *"The e-proctoring software is essentially spyware just designed to go through everything active on the computer at once, as well as not having any limitations on what it can check, as well as like the constant recording and monitoring. I believe it's very bad for student privacy."*

We contend that participants' overall privacy perceptions and concerns – or lack thereof – are a product of their e-proctoring system perceptions, and their emotional response and experiences with the e-proctoring system. Firstly, the interviews have demonstrated overall that participants struggle with a lack of transparency and uncertainty regarding the e-proctoring software. And secondly, the added technological stress faced by participants in an already stressful situation during the COVID-19 pandemic meant that participants simply did not hold the capacity to consider privacy violations.

5 Relations between main themes

In this section, we explore potential relations between the key themes identified in the interview data: technological issues, system perceptions, stress/anxiety, and privacy.

All participants had first-hand experiences using e-proctoring software, yet expressed general uncertainty regarding the specific functionality of the software. Despite the uncertainty, most participants expressed opinions regarding their sentiments, appraisals, and experiences based on the software's perceived capabilities. These often shaped their overall perceptions of the software.

Participants' first-hand experiences also elicited a range of personal or emotional responses. These ranged feeling stress, anxiety, or fear of wrongful accusation, feeling alone/isolated, feeling emotionally overwhelmed, being mild annoyed, or having a sense of apathy or indifference. The majority of participants, however, described experiencing some level of e-proctoring/technology-related stress and anxiety regardless of their acceptance of e-proctoring.

Overall, participants did not express e-proctoring privacy-related sentiments as a main issue or priority. However, this could be due to the potentially overwhelming situation participants find themselves in: the novelty of the situation, COVID-19 pandemic stress, online/remote/work-from-home formats, perceived lack of social support, uncertainty of how to navigate the new reality, on top of all the regular exam/school stresses. Thus, participants may only able to prioritize and dedicate their attention to more urgent matters, while dismissing others deemed less pertinent. Interestingly, Balash at al., noted a similar "privacy-benefit trade-off" in their study with students using e-proctoring services; many students recognized the safety and convenience of e-proctored assessments amid their pandemic concerns, while also expressing concerns regarding the invasiveness of the software [1].

5.1 Underlying Pervasive Issue: Uncertainty

A key privacy theme emerges from our interview data: uncertainty regarding e-proctoring software's specific functionality and capability. One participant succinctly encapsulates this sentiment. Concern regarding the lack of transparency in e-proctoring impacts his perception of e-proctoring software overall, and specifically his perceptions of:

- **protecting students' privacy** — *"Well, I don't know [how well student privacy is handled in e-proctoring]. That's what I'm saying, we don't know how it works;"*
- **who implements e-proctoring software** — *"Well, it could be from anybody as far as there is... What's the word? As far as there is openness? Yes, it could be from anybody. As far as, we, students, understand how the algorithm works and what's going on behind the scenes, and its capabilities apart from e-proctoring;"*
- **the handling of e-proctoring-related issues** — *"I don't know. We are not in charge of CoMaS, we don't know. We only do what we are told to do as students. And even any of these applications, we are* mandated *to download them. You know, we don't know how they worked. We would just keep using what we were told to do. And if it stops working, I guess the I.T. departments would figure out a different e-proctoring service to have us use;"*

Balash et al. [1], found power imbalances between students and institutions regarding the use of e-proctoring services. Similar to our study, they found that students had little choice and flexibility regarding e-proctoring decisions, with 97% of their participants reporting being required to take e-proctored exams [1].These findings illustrate the stressful environment in which students must operate, facing e-proctoring software uncertainties and little flexibility in the adoption decision.

6 Discussion

Power of the Unknown As seen herein, when software information/transparency is lacking, users form their own software perceptions and evaluations. These may be based on their personal experiences with the software, or shaped by those of their peers. Notably, these perceptions may be erroneous or spurious, with the potential for serious implications. One such implication is that of privacy. Another implication identified herein is the emotional impact on users, which may cause serious distress or mental health impacts.

A notable emotional experience identified in our study is the fear of wrongful persecution, which is closely tied to students' perceptions of the e-proctoring software. A consequential *behaviour* of this link is self-policing and self-monitoring. This included limiting one's bodily movements to uncomfortable degrees for extended periods of time, or using a separate operating system for completing e-proctored assessments in order to protect one's privacy.We contend that this behaviour stems from the e-proctoring software's *power of the unknown*, and the uncertainty faced by the participants. While participants differed in the extent of their self-monitoring behaviours, the emotional impact described by some is significant.

Limitations Our analysis is based on self-reported interview data. We did not ask our participants to compare their pre-pandemic exam experiences to current, which could have better informed our analysis (e.g., stress levels). Due to our limited sample size, we were did not analyze participant experiences based on demographics (e.g., gender).

7 Conclusion

Our interviews helped us explore student perceptions of e-proctoring practices and administered software. Our analysis revealed that e-proctoring caused stress and anxiety for some students due to circumstances they felt were beyond their control. Some of these stress factors comprise technological issues (i.e. system crashes, or lock-outs), and false flagging of academic misconduct. It was generally expressed that students had little privacy concerns or had not considered the privacy risks of their exam proctoring system. We describe potential interconnecting relationship of system perceptions, technological issues, privacy, and stress/anxiety. We hypothesize that some of the heightened stress and anxiety students faced during their e-proctoring experiences could be attributed to the COVID-19 pandemic, software complications, and uncertainty with respect to e-proctoring system capabilities. Students expressed a preference for alternative assessment methods, the need for the ability to skip and revisit questions in e-proctored exams, less intense escalation measures for academic misconduct misflags, and a reappraisal of e-proctored examinations entirely. We encourage decision-makers and course instructors to take into consideration student perspectives when adopting e-proctored assessments.

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