"It's been lovely watching you": Institutional Decision-Making on Online Proctoring Software

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Abstract—**Universities have adopted remote proctoring software to maintain academic integrity during invigilated online exams. The use of this software, however, has raised privacy, security, and ethical concerns, including surveillance of students' bedrooms, processing of student data, and racially biased monitoring. Additionally, this software can require substantial local computer permissions. Prior work has explored student and educator perceptions and use of this software, but there remains a gap in understanding how senior administrators decide to adopt (or not adopt) these tools at an institutional level. This paper presents the results of interviews with 20 university administrators from the U.S. and Australia towards understanding how and why their universities decided to centrally adopt (or not adopt) remote proctoring software. We find that academic governance processes included senior administrators, legal, and IT teams, even during the rush at the start of the COVID-19 pandemic, but that students were sometimes structurally excluded from the process of adoption. We explore how administrators weighed the need for academic integrity against competing concerns about privacy, security, ethics, and long-term operational issues like cost. We find that universities adopted remote proctoring *despite* concerns about privacy and security, sometimes attempting to mitigate these concerns. As academia continues to explore hybrid learning, our research can guide institutions in the adoption of Educational Technologies and the assessment of student learning.**

1. Introduction

Many universities have adopted proctoring software to monitor students during online examinations in order to verify the identity of students and to prevent instances of cheating. While these technologies have existed in many forms for decades, they became more prominent during the COVID-19 pandemic where students could not physically attend campus [29]. During the COVID-19 pandemic, these tools entirely replaced in-person invigilation of exams on campus. Following the pandemic, while many universities/faculty have returned to on-campus exams, others have continued to use proctoring software.

Remote proctoring tools are typically either browser extensions or stand-alone executables downloaded and run by the student on their own computer. Commercially available proctoring can take many forms, from human- or AI-based video and audio monitoring [2, 26, 59, 60], to remote identity verification [2], to restricting activity in a browser [38]. While this software can provide a sense of academic security in online exams for universities, they have been known to raise concerns about privacy invasion [7, 57, 67, 71], equity [33, 41, 71], and digital security [7, 73]. Previous research has investigated the privacy and security dimensions of these tools [22] and both student [7, 18] and instructor [6, 18, 22] perceptions. However, prior work leaves a gap regarding the privacy trade-offs made by university administrators when acquiring potentially privacy-invasive technologies. (Not that in this paper, we use *administrator* to refer to senior staff at universities, *not* system administrators or IT staff.)

Given the tension between the potentially privacy-invasive nature of remote proctoring and the need for academic integrity, it is critical to understand how institutional bodies and procedures supported privacy and security during the decision to adopt (or not adopt) remote proctoring tools. Through an interview study with 20 senior university administrators, we address the following research questions:

RQ1: Which administrators and institutional processes are responsible for shaping the acquisition and adoption of remote proctoring technology? (Section 5)

RQ2: What key (a) privacy, (b) operational, and (c) academic considerations drive administrators' decisions to adopt or not adopt remote proctoring technology? (Section 6)

RQ3: How do administrators weigh those considerations against each other to find the best solution for their institution? (Section 7)

We had the opportunity to study this institutional decision-making in both Australia and the U.S., allowing us to understand these decisions across different institutional contexts. We find that academic administrators considered a *variety* of privacy, operational, and academic issues when deciding to institutionally adopt remote proctoring software

(Section 6). Enforcing academic integrity was often a primary reason to adopt, despite concerns about student privacy. In fact, privacy was generally not a key factor in the decision to adopt or not adopt these technologies. However, administrators and instructors attempted to mitigate privacy concerns, for example, by selecting certain proctoring features over others (Section 7). We also find that many institutions had adopted remote proctoring on a small scale *before* the pandemic: while the pandemic changed the timeline and scale of the adoption of the software, institutions were already on the path of digital learning (Section 5). Qualitatively, our data indicates similar considerations regarding the adoption of remote proctoring technology in both Australia and the US, but different institutional processes. This research is particularly critical now: the post-pandemic return to the classroom has left institutions at an inflection point as they make strategic long-term decisions about remote exam proctoring, student privacy, and pedagogy. While our findings are restricted by the geographical limitations of our study (as we only studied Australia and U.S. institutions), we include in Section 8 general recommendations and broader implications for universities and educational technology (EdTech) developers. We hope that our findings prove useful and informative to other institutions that are considering the adoption of proctoring tools.

2. Background

We begin with relevant information about remote proctoring and academic governance in Australia and the U.S.

Remote proctoring functionality and capabilities. Remote proctoring has become a standard feature [29] of assessment, due to the ongoing rise of online education [20, 25, 47], and the abrupt shift to remote classrooms during the COVID-19 pandemic [16]. Online assessments expose a larger attack surface for would-be cheaters than a traditional exam. To reduce opportunities for cheating, educators therefore turn to software with a variety of anti-cheating measures [25]. Many vendors offer remote proctoring tools, including Respondus [63], Proctorio [58], and ProctorU [61]. Each suite varies in functionality [3], broadly including: identity verification, cheating detection (monitoring), and cheating prevention. Identify verification mechanisms include webcam-based verification with official ID documents and facial or voice recognition. Cheating prevention includes the use of "*lockdown browsers*," allowing users to access only particular URLs and preventing copying and pasting. Monitoring capabilities may be algorithmic or provide for a human proctor to observe a test-taker. Institutions can license or activate a subset of features, and are then able to integrate the tool into their policing of academic misconduct [70].

Higher education governance in the United States. Institutions of higher education in the U.S. are diverse on several dimensions, including size, funding, and internal governance. In the U.S., public state university systems are typically governed by a Board of Regents and a Chancellor, with individual institutions having presidents and provosts. Similarly, private non-profit universities routinely have a Board of Trustees/Directors, president, and provost. Operations units report to the office of the president, whereas academic units report to provost. In both public and private non-profit institutions, the principles of shared governance are typically implemented through a faculty senate, operating under democratic principles with representation from each school. The influence of faculty in the daily operational decisions, including those related to the acquisition and implementation of educational technologies, varies substantially between institutions—as highlighted in this study.

One of the most prominent data governance mechanisms for student privacy in the U.S. is the Family Educational Rights and Privacy Act (FERPA) [51], which provides various rights, including access to educational records and consent to disclosure of education records and personally identifiable information (PII) to a third party [52].

Higher education governance in Australia. Academic institutions in Australia are characterized by a high level of central control, handled by professionalized management generally known as 'Chancellery.' Chancellery typically includes the Vice-Chancellor (equivalent to a U.S. university president or a CEO), the Deputy Vice-Chancellors and their deputies (Pro-vice Chancellors), Deans, and supporting administrative staff. Academic governance is relegated to a body known as an 'Academic Board,' largely composed of Professors of the highest regular rank. Academic governance generally fulfills an oversight function along with responsibilities over purely academic matters. Since the 1980s, academic boards have had decreasing power over operational matters but retain soft power through generally collaborative relationships with Chancellery. Of note, Australia has only forty-two universities, of which all but four are public (whose ultimate governance is through Australian Federal/State law). Further, academic units in Australia are structured in a descending hierarchy of *faculties*, *schools*, and *departments*. The definition of 'faculty' thus is different than in the U.S. context where faculty generally refers to the professoriate.

Marginson and Considine [48] categorise Australian universities into five key segments. *Sandstone* universities are the oldest universities in each state, founded before the first world war. *Redbrick* universities were founded in the 1940s-50s and are almost equal to Sandstone universities in size and income, despite less time to accumulate a similar status. *Gumtree* universities (named due to native flora planted at these universities), were founded in the 1960s and 1970s. They are considered more modern and educationally radical. *Unitechs* are two of the former large institutes of technology with a strong vocational- and industry-orientation. Finally, *New* universities are a group of post-1986 universities considered more entrepreneurial and corporate. These universities may be subject to Australian federal and state privacy laws which, in some instances, can require a Privacy Impact Assessment (PIA) to assess potential privacy impacts of a project. Universities can also elect to conduct a PIA regardless of whether it is a legal requirement in order to

"*help facilitate a privacy-by-design approach*" [53].

3. Related work

We draw from literature on student and faculty perspectives on exam proctoring software, as well as work that outlines ethical and efficacy concerns about these tools. Further, we reference literature on institutional decision-making surrounding EdTech.

User perceptions of remote exam proctoring privacy and security. One line of critique addresses how users of proctoring systems experience privacy and security losses. The bulk of this work focuses on empirical evaluations of the impact on student users, including discomfort or anxiety due to being watched [25, 39, 44, 49, 56], "the general creepiness of in-home surveillance and eye movement detection" [70], the nature of data these tools collect and the security thereof, both in transit and at rest [55]. Balash et al. [7] illustrated that students were aware of these privacy issues but recognised the necessity for these tools during the pandemic. They also found that students had a level of trust in university institutions that reduced their willingness to object to proctoring.

Others have explored how instructors perceive remote proctoring software, finding that they harbor substantial concerns about its impact on student privacy [6, 19, 22, 56]. In a survey of 125 university instructors in the U.S. (separate from the above by the same authors), Balash et al. [6] found that instructors were particularly concerned with student data being shared with third-party companies. Researchers have also explored the technical security and privacy properties of proctoring tools. Burgess et al. [15] reverse engineered four of the major proctoring platforms and found that all the proposed anti-cheating measures could be "trivially bypassed and can pose significant user security risks." Our work adds to this literature by studying a previously understudied population: the institutional decision-makers responsible for the adoption of these tools.

Discrimination in remote exam proctoring and advocacy. The use of online proctoring tools is prone to cultural and religious insensitivity [44], advantaging some students over others, creating unequal opportunities for racial, gender, and physical disability features [4, 17, 25, 31]. Swauger [74] suggests that algorithm-based proctoring tools tend to expect bodies and behaviors associated with the "ideal student (cisgender, white, able-bodied, neurotypical, male, non-parent, non-caretaker, etc.)" and flag others as suspicious. The aforementioned study of Burgess et al. [15] also demonstrated significant racial biases in the algorithmic student-monitoring features of one of the major software packages.

At many universities, these issues and other privacy concerns led student bodies to advocate for the discontinuation of digital proctoring solutions [43]. Legal advocacy has also played a prominent role. Six U.S. senators pressed three of the largest remote proctoring companies to address equity, accessibility, and privacy issues faced by students using the platforms [30]. Several lawsuits [13, 54] filed in the U.S.

have led to a variety of outcomes, including ruling students' room scanning during remote tests as constituting unreasonable search under the Fourth Amendment. In contrast, Australia has a seeming paucity of public response. Legal activities sit in parallel to academic work that examines how proctoring sits within the existing nexus of U.S. law [8], and within frameworks for moral reasoning [21, 75].

Efficacy of remote exam proctoring. Online proctoring is acknowledged to offer some benefits both to students and administrators, including spatial and temporal flexibility as well as cost [25, 39, 62]. Students can take online exams from the comfort of their own environments, eliminating the need to travel to a physical location. Students with disabilities who face challenges attending exam venues may benefit from accessibility offered by those tools. Despite this, research has produced mixed findings about the impact of proctoring and its efficacy in preventing academic misconduct. While some studies have found evidence of cheating reduction with remote proctoring tools [24], others [42, 64, 72] have also reported no difference in student performance and level of anxiety [45]. Similar to Hylton et al. [40], Stack [72] found no significant difference in exam scores of students in an in-person proctored exam compared to an online exam using Respondus Lockdown Browser [72]. Dendir and Maxwell [24] argue that it is unclear what impact online invigilation has on academic integrity and cheating. Bergmans et al. [10] experiment showed that the AI-based online proctoring tool did not flag any of the 6 cheating behaviors intentionally demonstrated during the experiment. In a study in 2021, Henderson et al. [36] noted that "cheating occurred regardless of the security measure" and although proctoring "demonstrate[d] reduced frequencies in self-reported cheating, [these solutions] are demonstrably incomplete solutions due to the complexity of other variables."

Institutional decision-making about educational technologies. Institutional decision-making processes play a significant role in the procurement of EdTech, including online proctoring tools. While the COVID-19 pandemic precipitated many of these implementations, Fiebig et al. [28] found that in terms of migration to centralized cloud services, this transition had been occurring well before the pandemic. Ali et al. [1] also recently studied centralized, decentralized and hybrid approaches of EdTech procurement. While a decentralized approach means individuals or departments can make independent decisions, a centralized approach allows institutions to set learning priorities that EdTech must meet to comply with privacy and security, accessibility, and interoperability standards [1]. The authors noted a trend towards centralized approaches for procurement efficiency and effectiveness, but found a preference for hybrid models. Our work finds tensions between centralized and decentralized decision-making, as we explore in Section 5 and Section 8.

With increasing focus on digital learning [29], higher education institutions face the crucial task of prioritizing both efficiency and privacy, security, and ethical concerns. Ali et al. [1] found that compliance with privacy and

security, accessibility, and care of data practices standards plays a large role in EdTech procurement —identifying that in the eight surveyed institutions data security and privacy played a prominent role in decision-making. Hollands and Escueta [37] interviewed 52 EdTech decision-makers and found that 'features and functionality' was the most common decision criterion, followed by the feasibility of implementation, cost/return-of-investment considerations, user experience/usability, and vendor characteristics. We build upon this work by exploring which considerations senior administrators prioritized when considering remote proctoring software.

4. Methodology

We conducted 20 semi-structured interviews with senior administrators in the U.S. and Australia: 13 participants from 9 universities in Australia; and 7 participants from 4 universities in the U.S. Semi-structured interviews are a powerful tool for exploratory research questions like ours [12]. We describe below the development of our interview protocol, participant recruitment, data collection and analysis, ethical considerations, and limitations.

Interview protocol development. Two U.S.-based researchers first iterated on a protocol for the U.S. academic environment, with one round of external feedback from a colleague and one pilot interview with a U.S. senior administrator. Then, two Australia-based researchers adapted the protocol to fit Australian academic and regulatory differences. The protocol, found in Appendix B, consisted of 26 open-ended questions with optional follow-up probing questions. The questions were grouped into four categories: background, pre-Covid, initial-Covid, and going forward. The interview questions focused on decision-making processes and bodies in the university when considering the adoption of remote proctoring tools, key decision-making considerations, and how the COVID-19 pandemic impacted decision-making.

Participant recruitment and characteristics. We aimed to recruit people with purview and power over the entire decision-making process. As part of our work was learning who was responsible for these decisions, we relied on participants to self-describe whether they met this criterion, and to recommend other suitable participants. We began recruitment through our own personal and professional networks as senior academic administrators are otherwise generally a difficult population group to access. To recruit beyond these networks, we applied snowball sampling, a respondent-assisted sampling scheme often used for hard-to-reach populations [23]. At the end of each interview, we asked the participant to nominate others who may also have been involved in the decision-making around proctoring tools, either at the same institution or another institution. To diversify the dataset, the Australian researchers also cold-emailed potential participants. The response rates were low, resulting only in two additional participants.

As summarized in Table 1, the Australian sample included four Pro-Vice Chancellors, six Deputy Vice-chancellors, and three Directors or Associate Directors. The U.S. sample included one Associate Vice President, one Associate Dean, and 5 Directors (Executive/Assistant) within learning and teaching technologies units. Of the total number of participants, half were women. We recruited from a relatively diverse set of universities. Our Australian sample includes nine universities in four of the five diverse categories described by Marginson and Considine [48] (Section 2). Our U.S. sample of four institutions contains two public universities and two private non-profit universities; including one small (∼10,000 students), two medium (∼25,000), and one large (∼40,000). Our recruitment strategy led to one key difference in U.S. and Australian participants, as evident in Table 1: U.S. participants were generally less senior than Australian participants—Directors rather than Chancellors. We consider this an indication of structural decision-making differences between the two countries rather than a methodological limitation, as all participants fit the same inclusion criteria. We use the $U_{Country}^{UniversityID}$ notation to anonymize participants and universities. Where we refer to universities with consecutive IDs, we apply an abbreviated notation of $U_{Country}^{UniversityID-UniversityID}$. For example, when referring to U_{Aus}^{1}, U_{Aus}^{2}, and U_{Aus}^{3}, we abbreviate the notation to U_{Aus}^{1-3}.

Data collection and analysis. We conducted interviews during the U.S. 2022–23 academic year. Two Australian researchers conducted the Australian interviews and two U.S. researchers conducted the U.S. portion. This was so that researchers most familiar with the academic context could conduct the interviews. We stopped interviewing after exhausting our ability to recruit participants. Due to the limited participant pool, we were unable to reach full thematic saturation, defined as when interviews produce no new data [46], yet the team agreed that the data was rich enough to proceed with analysis, given difficulties recruiting more participants. Further, for the Australian dataset, there are only 42 higher education institutions so despite the limited participant pool, we were able to cover roughly 20% of these institutions. Interviews with U.S. participants were on average 54.6 minutes (min 45, max 66). Interviews with Australian participants were on average 35 minutes (min 24, max 50). The difference in interview length is due to the limited time of the more senior Australian participants. The team agrees that the interviews are thematically cohesive despite differences in length.

Once the interview process was concluded, we transcribed all interview recordings and began thematic data analysis. Using thematic analysis to identify similarities and differences in the data helps uncover the degrees to which the themes occur and how they may differ across experiences [11]. Two researchers first coded the transcripts separately to identify a draft coding-frame. Next, they identified themes and conducted structural coding, dividing broader categories into subcategories as well as collating similarly coded segments for more detailed analysis [65]

Country	# Univ.	Participants	# Women	Type of institutions	Roles	# Adopted
Australia	9: U^1_{AUS}-U^9_{AUS}	13	5	Gumtree (3); New (1); Sandstone (3); Redbrick (2)	Pro-Vice Chancellors (4); Deputy Vice-Chancellors (6); Directors/Associate Directors (3)	6 (of 9)
U.S.	4: U^{10}_{USA}-U^{13}_{USA}	7	5	Public (2), Private (2); Large (1), Medium (2), Small (1)	Associate Vice President (1); Associate Dean (1); Director (Executive/Assistant) (5)	4 (of 4)

Table 1: Overview of the institutions in our study. In order to anonymize participants and universities, we do not give characteristics of specific universities. See Section 2 for a brief overview of the terms used to describe types of institutions.

(our codebook is in Appendix Section C). The researchers jointly coded two of the transcripts to ensure consistency before independently coding the remaining transcripts. The researchers then discussed discrepancies and differing interpretations to eventually achieve an overall inter-coder reliability score of 0.87. This coding methodology is summarised in Appendix A.

Limitations. We were unable to reach complete thematic saturation, a standard [34] but disputed [50] criteria for concluding data collection in qualitative studies, due to our extremely limited and hard-to-reach participant pool. It is possible, that if we had been able to conduct more interviews, we could have uncovered new or different themes, and richer data. We could have also cold-emailed potential U.S. participants, however, given the extremely low response rates in Australia, it is unlikely that we would have recruited more participants through this method. Although we strove for institutional diversity, our U.S. sample is somewhat limited as it does not include, for example, teaching-focused liberal arts schools or community colleges catering to working students or students with gaps in education. Institutional decision-making about remote exam proctoring may be different in other institutions, and generalizability to those outside our sample may be limited. Additionally, because of the international nature of our team, interviews were conducted separately between U.S. and Australia. While the interviewers worked off extremely similar protocols (see Section B), the personal style, identity, and personality of the interviewer likely influenced the outcome of the interviews. However, we believe that it was important for U.S. participants to be interviewed by researchers who deeply understood the U.S. academic system, and vice versa for Australia.

There were also some minor irregularities in our dataset. One U.S. interview consisted of *two* interview subjects. While this could have led to the participants sharing information differently than if the interview was conducted separately, it was the only way to interview both participants. Additionally, one Australian participant had recently been at a different institution in our study, and spoke about both. In this case, the participant was asked about each institution separately and clearly stated when they reached the extent of their knowledge for one institution. While these irregularities present minor limitations in terms of consistency in data collection and analysis, we argue it is nonetheless valuable and in line with the other data.

Ethics. Our study was approved by the human ethics assessment units (IRB) of the researchers' respective institutions. We conducted informed consent with all participants, and all interviewees were offered a $25 gift-card to compensate for their time. It is critical that we respect participants' desire for confidentiality, given their high-level positions, and the small and interconnected nature of academia. Thus, we have taken a few measures to support confidentiality: we attribute quotes to participants by *university* rather than by *participant*, not distinguishing between different participants from each university. We also report *overall* characteristics of the study population in Table 1 but, other than country, we do not further describe individual universities. Additionally, when describing participant roles, we have used generalized titles so as not to identify participants with unique titles.

5. Institutional decision-makers and timelines

To fully understand the key decision-making factors in the adoption of proctoring tools, it is important to first understand the timeline of decision-making, the participants involved, and the institutional structures and processes that affected these decisions. Understanding these factors enables us to contextualize key decision-making considerations (Section 6) and make targeted recommendations (Section 8).

5.1. When: Adoption timelines.

Prior to the pandemic, universities were already using or exploring proctoring tools on a small scale, often in individual faculties. The start of the pandemic saw an increase in the scale of adoption and, in many cases, was the first time central departments considered whether they could support these tools on an institutional level.

Small-scale pre-pandemic adoption of remote exam proctoring software. Almost all institutions in our study had piloted or adopted online proctoring tools on a small scale prior to the COVID-19 pandemic. These proctoring tools included ExamSoft, Respondus, Proctorio and HonorLock. Before the pandemic, U^2_{AUS} and U^{10-11}_{USA} had been using remote proctoring in online medical and health programs, and U^1_{AUS} had also piloted a proctoring tool with 10–15 unit subjects. Only U^8_{AUS} had not considered online proctoring tools at all, because they *"didn't have online exams."*

Many of these early initiatives were driven by individual faculties, part of a global trend towards digital education

and assessment [29] (U_{AUS}^{1}, U_{AUS}^{6}, U_{AUS}^{9}, U_{USA}^{10-11}). For example, U_{AUS}^{1} began considering proctoring tools because it was *"known for digital education ... and so everything to do with designing and facilitating learning online was critical ... even before the pandemic, we had an interest in investigating how exams can be done online."* Similarly, a U_{USA}^{11} participant noted, *"in the beginning [the use of proctoring tools] was really more specialized to those types of programs that lent them to real online learning."* The trials gave administrators a path to a centrally-adoptable technology, albeit one that had not been intended for university-wide use.

Pre-pandemic adoption of remote proctoring tools shaped pandemic-era adoption. For the U.S. institutions and some Australian institutions, pre-pandemic pilots and small-scale adoption of remote proctoring software laid the groundwork for wider adoption. For example, U_{USA}^{10} *"had [the proctoring tool] in place, which is why it ended up getting used during the pandemic."* U_{USA}^{10-13}all explained that they increased the number of licenses in order to support wider usage. While the initial adoption of proctoring software lowered the barrier for wider adoption at the start of the pandemic, a U_{USA}^{10} participant noted that the tools *"[weren't] really researched for an expansion. It was targeted to a particular problem that we were trying to solve ... [and then] the pandemic [occurred]."* The implication being that the tool may not be well-suited to all assessments at the university, but was instead adopted because *"once you have something, you end up using it without potentially researching whether it's the appropriate tool for a different situation,"* attributing this to the *"long process"* of institutional review for educational technologies. We observe that the move to at-*home* and online education and assessment fundamentally changed some security and privacy risks—e.g., for some students, being on camera at home is violating, dangerous, embarrassing, or otherwise harmful. The nature of the small trials means these issues may not have been fully explored or resolved before the pandemic.

Wide-scale, centralized remote proctoring software adoption at the start of the pandemic. In early 2020, all institutions were faced with the same problem: ensuring continuity of education and assessment online while maintaining academic integrity. In response, 10 of the 13 universities in our dataset either adopted proctoring tools for the first time or expanded their existing license, in line with global wide-scale adoption of proctoring tools during the pandemic [16, 29]. Universities in our dataset adopted a variety of remote proctoring tools, including ExamSoft, Respondus, ProctorU, Proctorio, and HonorLock. Centralized adoption began in early 2020: U_{AUS}^{3}, U_{AUS}^{9} and U_{USA}^{12} started to offer proctoring tools centrally in 2020, while U_{AUS}^{8} rolled out these tools for approximately 15% of exams in early 2021. U_{AUS}^{6} did not offer their lockdown browser system until late 2022, after experiencding a series of academic integrity issues.

Not all universities adopted remote proctoring software after their initial trial (U_{AUS}^{2}, U_{AUS}^{4-5}). Additionally, U_{AUS}^{6} decided, on the basis of their trials, not to adopt video

monitoring proctoring tools but instead adopted a lockdown browser system in 2022. U_{AUS}^{9} also did not adopt a commercially available proctoring system. Instead, they opted to develop their own custom software. U_{AUS}^{9} initially trialed commercially available software but encountered issues with scalability and a lack of adequate technical support (detailed in Section 6). U_{AUS}^{9} ultimately decided to move forward with an approach that *"involved having students co-design an in-house proctoring tool ... [which] was then used for all faculties."* The custom system was *"tested with well over a hundred students"* and went through a series of adjustments to include requested features. This tool was developed over the course of approximately three months in early 2020 and released for broader use in the latter half of the year.

5.2. Who: Stakeholders and decision-makers.

When adopting proctoring tools, senior administrators frequently worked with legal and IT departments to assess risk and, in some cases, solicited student feedback.

Senior administrators, legal, and IT professionals worked together to make centralized decisions. Most participants mentioned working closely with Information Technology (IT) teams (U_{AUS}^{1-3}, U_{AUS}^{6}, U_{AUS}^{9}, U_{USA}^{10-13}), and many mentioned working with the university's legal team (U_{AUS}^{1}, U_{AUS}^{3}, U_{AUS}^{6}, U_{USA}^{10-11}). A U_{USA}^{10} participant explained, *"we don't adopt anything enterprise-wide without our IT department going through all of the security checks."* A U_{AUS}^{1} also described that *"we obviously can't incorporate or use any new product within our digital learning suite ... without having gone through that process of working with legal [and] working with IT."* U_{AUS}^{1} and U_{AUS}^{6} participants noted that privacy impact assessments are routinely conducted by cybersecurity teams for any new technology. While institutional structures and processes supported both security and regulatory compliance assessments, the inclusion of these teams still enabled the adoption of technologies that are considered to be privacy-invasive.

Faculty and staff were included in the decision-making process. Faculty were often included in the process of deciding whether to adopt remote proctoring tools, commonly through academic board (U_{AUS}^{1}, U_{AUS}^{4}, U_{AUS}^{6}, U_{AUS}^{9}) or academic committees (U_{USA}^{10}, U_{USA}^{12-13}). Additionally, staff from administrative units responsible for educational technologies were also involved (U_{AUS}^{1-3}, U_{AUS}^{6}, U_{AUS}^{8}, U_{USA}^{10-13}). U_{USA}^{11} specifically noted the role of the educational technologies department in ensuring compliance with privacy regulations, noting that they are *"responsible [for ensuring] that FERPA is enforced at all times... We're pretty strict about ensuring student privacy."* The ultimate decision-makers at most institutions were high-level administrators, like the Chief Information Officer (U_{USA}^{13}), Provost (U_{USA}^{10}, U_{USA}^{13}), Vice-Provost (U_{USA}^{11}), Pro-Vice-Chancellor (U_{AUS}^{1}, U_{AUS}^{4}, U_{AUS}^{9}), or Deputy Vice-Chancellor (U_{AUS}^{2-3}, U_{AUS}^{5-8}).

Students were not included at some universities. Some uni-

versities actively consulted students in the decision-making process, while others only reacted to student complaints post-adoption. For the universities that consulted students prior to adoption, participants mentioned approaching student groups at the start of the pandemic to discuss proctoring tools (U_{AUS}^1, U_{AUS}^4). A U_{AUS}^1 participant noted, *"you're not going to please all students … but by taking [a partnership] approach … we're going to [get] that strong sentiment of … [their] major concerns … [and] figure out how we can mitigate those concerns."* A U_{USA}^{10} participant also recalled conducting a feedback survey with students after their pre-pandemic pilot. Other participants noted receiving student input directly or through union representatives at Academic Board meetings (U_{AUS}^6, U_{AUS}^9). At these meetings, the U_{AUS}^9 participant recalled student complaints about commercially available proctoring tools, which led to the university's decision to develop their own proctoring software.

Most U.S. participants discussed reacting to student complaints post-adoption. Complaints were generally raised indirectly through faculty or student newspapers. A U_{USA}^{13} participant stated, *"it wasn't until the scale of [the pandemic]… [that] there was some push-back from students… who objected to the installation of [proctoring tools] on their computers."* Student complaints were often directed to faculty who, *"in an effort to get support … will [then] turn to [the educational technologies department], and that will prompt a sort of exploration of what can the technology afford or allow"* (U_{USA}^{13}). This was also the case for U_{USA}^{10} and U_{USA}^{11}. U_{USA}^{11} participants noted *"complaints from students don't come to [the central department]."* A U_{USA}^{13} participant also explained that previously *"there might have been a student op-ed in the student newspaper about [proctoring tools] and it did not go anywhere … it wasn't escalated to anything."* We observe that the varying levels of student involvement are due to differing institutional structures. We explore recommendations for institutionally supporting student views in Section 8.

5.3. How: Governance mechanisms

While universities generally have established governance mechanisms around educational technologies (such as a process of deliberation with responsible committees and boards), the pandemic led to circumvention of these processes at some universities. Further, even when decisions had been made centrally to adopt this technology, faculties often had autonomy in whether they actually used these tools.

Some Australian universities changed their governance procedures to enable fast acquisition during the pandemic. Before the pandemic, many Australian universities had not started a central process to consider the university-wide use of proctoring tools. As a result, in early 2020, Australian decision-makers had to make fast decisions on the use of these tools. Participants emphasized the urgency of the decision-making at this time (U_{AUS}^{2-4}, U_{AUS}^8). A U_{AUS}^3 participant stated, this period *"caused me enormous sleepless nights, absolutely. It was probably the most horrible thing by*

COVID … there [wasn't] really a viable alternative because we were having to make decisions really, really quickly".

Universities assembled small groups and task-forces to quickly drive this deliberation (U_{AUS}^{2-4}, U_{AUS}^6, U_{AUS}^{8-9}). This group was generally led by the relevant Pro-Vice-Chancellor and/or Deputy Vice-Chancellor in consultation with the academic board and/or associate deans of education (U_{AUS}^{3-4}, U_{AUS}^6, U_{AUS}^9). In some cases, these task-forces appeared to bypass established governance mechanisms such as steering groups or committees responsible for educational technologies (U_{AUS}^6). One U_{AUS}^6 participant commented that in this instance, there was no steering group and instead central departments *"got pulled in … [gave] advice … and the executive called the game"*. U_{AUS}^3 and U_{AUS}^9 also experienced changes to governance structures. The U_{AUS}^9 participant reflected that at the start of the pandemic, *"academic board elected for the Deputy Vice-Chancellor education to take emergency powers to update policies and procedures as they saw fit and obviously under good advice. And then inform the academic board once the decision had been made. Completely different … [the] opposite to what you would normally expect."*

Faculties had discretion in the use of proctoring tools despite central adoption. Notwithstanding the decision to centrally acquire remote proctoring tools, the decision to *use* the tools was made by faculty members. Faculty had varying levels of discretion over the use of the tools, with Australian faculty members having generally less autonomy than U.S. faculty. A U_{AUS}^1 decision-maker noted, *"I can't have each of the … faculties doing things in their own way. Because, one, it's not a consistent student experience. Two, we're probably opening up to all sorts of equity, fairness [issues]."* At U_{AUS}^4, one participant explained: *"So when we made a public announcement that the university would not be doing any proctoring, that sort of overrode any sort of inclination the school might have had to do proctoring. There may have been one or two academics who tried to do it on their own DIY, but if we knew about it, we stopped it."* Other universities (particularly in the U.S.) allowed for more faculty autonomy. As U_{USA}^{10} participants explained, *"there is a lot of independence for faculty to recommend systems, applications … to IT"* and *"it's our job to make sure faculty have the best tools … available to them and to make sure we're looking at security and implication together [with IT]."* These participants noted that central departments often have limited visibility over the systems that faculty choose to use.

A U_{AUS}^6 participant described the process of balancing faculty autonomy regarding assessment methods with central control over the approval of educational technologies: *"you might have faculties doing their own thing in certain areas and we tend to try to allow that where we can."* The participant explained that while this process was generally consultative, central departments could override faculty discretion in some instances: *"[faculty] would probably consult and seek … permission. If it's not centrally supported … in the end we might say alright, well if you really need to do it, they're your students. Here's what we'd be*

worried about, reassure us. So you'd have a discussion. But sometimes you just say no, we're really not going to support it." Other U_{AUS}^6 participants described privacy and security issues arising from faculties independently adopting software unbeknownst to central departments: *"we actually pulled an application last year ... A whole bunch of people installed [it] within their subjects. But because it didn't integrate with the [learning management system], they didn't need us involved. So it bypassed our processes ... it was in complete breach of [state] privacy legislation. It took 30 seconds to pop this thing's security and you got all the student data out of it. It was a nightmare. So we basically said, you can't do this. This is totally in breach of all of our [policies]. And the executive [said] to pull the pin."*

> **Summary of adoption timelines, processes and stakeholders (RQ1):**
>
> - Universities were using or exploring proctoring tools prior to the pandemic
> - The pandemic caused central departments to expand existing licenses or otherwise adopt these tools on a wider scale
> - The process of central consideration was sometimes rushed and did not always fully include students. However, legal and IT teams were generally included.
> - Instructors could opt out of using centrally adopted tools. Some were allowed to use tools other than the centrally-adopted tool; others were not.

6. Key factors towards adoption or non-adoption of remote proctoring software

Having explored the processes, stakeholders, and timelines involved in the adoption of remote proctoring software, we now address the *content* of the decision-making. We find three key types of considerations: (1) academic considerations (Section 6.1); (2) privacy, security and ethical considerations (Section 6.2); and (3) operational considerations (Section 6.3). Administrators generally prioritized academic and operational considerations above privacy concerns; however, there was variance in how each approached this decision-making (discussed in Section 7).

6.1. Academic considerations.

We begin by considering the concerns of administrators related to *assessment and examination*. Broadly, administrators emphasized their institution's need to enforce academic integrity in online exams to satisfy external accreditation bodies, particularly in the case of degrees leading to an accredited profession (such as law or medicine). However, participants were also skeptical of the tool's ability to ensure academic integrity.

Academic integrity and accreditation requirements. Many participants noted that the pandemic led to urgent discussions about ensuring academic integrity during online examinations. Much of this urgency was due to pressure from accreditation bodies that required *"strong validation of*

students' achievement" (U_{AUS}^3). Accreditation bodies, which serve as 'gatekeepers' for entry into certain professions, require students to meet a standard of understanding and competence, demonstrated through assessment. Australian institutions cited pressure from accreditation bodies as a factor in adopting proctoring software (U_{AUS}^1, U_{AUS}^3, U_{AUS}^6, U_{AUS}^8). Some administrators even stated that accreditation requirements were the *only* reason for their adoption of proctoring software (U_{AUS}^1, U_{AUS}^3). Two U.S. participants from U_{USA}^{11} also discussed accreditation requirements (including identity verification): *"it was mostly policy driven when we first started to use it... What are we doing to secure our exams for online students? The question was more about accreditation... how do you verify identity?"* Even institutions that did not adopt proctoring tools referenced pressure from accrediting bodies (U_{AUS}^{4-5}). One U_{AUS}^4 participant stated that they would reconsider proctoring tools if students would prefer to take exams at home, *"particularly if it's an exam that really doesn't actually need invigilation, but we're just doing it because of accrediting authorities."*

(In)Efficacy of proctoring tools at preventing cheating. Administrators expressed doubts as to the software's efficacy in preventing academic misconduct. All of the participants from universities that did not adopt proctoring tools believed they were not effective in preventing cheating. A participant from U_{AUS}^4 described the tools as *"a bit of a fig leaf, and... it is actually pretty easy to get around proctoring if you're smart enough. So, all you're doing really is disadvantaging the overly honest students or the less entrepreneurial students."* Other participants made even stronger remarks: *"I think everyone is well aware that online proctoring doesn't assure academic integrity"* (U_{AUS}^5).

Even participants from universities that adopted proctoring software expressed concerns about its efficacy. Participants from U_{AUS}^6 described an early internal test of the tools' efficacy: *"in 2015 we did a trial of [a video monitoring proctoring system] and... we had our team members... who were learning designers and ed-techs and admin staff sit some mock exams being supervised by these proctoring solutions. We had caucused beforehand some with ideas about how to cheat and various people were tasked with cheating in different ways... but in 50% of the [cases], cheating methodologies were successful and undetected."* U_{AUS}^6 did not adopt the software, but did years later adopt a lockdown browser in response to *"a growth in academic integrity issues"* with online assessment.

The participant from U_{AUS}^7 also described concerns about the reliability of proctoring tools: *"we're still... getting [about] 60,000 reports [of cheating] that all have to be investigated by a human and it's 90% false positive."* The participant continued: *"it's a huge huge resource effort so you either spend it on the live proctoring or you have to spend it on investigating somebody putting their hands over their face or whatever other thing the AI picks up, so I don't think where where we need to be with the online proctored exam yet."*

6.2. Privacy, equity, and ethical considerations.

While academic integrity concerns prompted the consideration of online proctoring tools, administrators also considered the impact of these tools on students. Participants mentioned concerns about surveillance of students at home, systems security, data processing, and racial bias in algorithmic monitoring.

Privacy of student homes and third-party surveillance. Many participants were aware of student concerns around the surveillance of their private home environments (U_{AUS}^{1-4}, U_{AUS}^6, U_{AUS}^{8-9}, U_{USA}^{11}). At U_{AUS}^4, surveillance concerns were a key reason for not proceeding with proctoring tools: *"in terms of the decision to not use proctoring... it was student concerns fundamentally. We just said we have to trust our students. Our students are telling us this is horrific and we don't want this sort of intrusion into our lives."* Another U_{AUS}^4 participant noted *"our students were very clear, particularly our female students... they did not want to be peered upon."*

Others expressed concern about third party proctors. A U_{AUS}^6 participant recalled, *"You ... had students saying, 'hey, I don't like having some non-university person seeing into my bedroom."'* They continued: *"we were also very concerned about [how] they're not our people... you get these weird people [that] would be proctoring... we were thinking of the risk there for the students and we don't like the idea of these people [engaging] with our students. We can't speak to that if anything happens."* A U_{AUS}^3 participant recalled an issue with third-party proctors who *"showed students, fleetingly, the names of other students who might have had extensions for the exam period... [and] we had a proctor saying 'it's been lovely watching you"'*. Despite this, U_{AUS}^3 continued with their proctoring system. In contrast, U_{AUS}^8 and U_{AUS}^9 opted for *'in-house'* university invigilators.

Downloading untrusted software; collecting and processing of student data. Administrators were aware of student concerns about installing proctoring software on personal devices (U_{AUS}^1, U_{AUS}^6, U_{USA}^{13}). At U_{AUS}^1, *"[some students] said, 'I really object to the idea of having to download something onto my own personal computer,' which you think, yeah, okay, fair call. That's why we're looking now at other ways that we can avoid doing that."* Similarly, a U_{AUS}^6 participant explained, *"people don't like a piece of software being required to be installed on their device... nobody likes that."* Another U_{AUS}^6 participant explained the concerns as stemming from video monitoring systems that *"collect a huge amount of data"* and *"really inveigles itself into a computer."* The participant continued, *"that was a reason why I said I recommend against [video proctoring]... knowing our student body was so active in this space, it just wouldn't pass muster with so many of our students."* Prompted by these concerns around the collection and processing of data, administrators considered the privacy properties of different data processing and storage schemes, including questions of data ownership (U_{AUS}^3, U_{AUS}^6), storage (U_{AUS}^2, U_{AUS}^4, U_{AUS}^6, U_{USA}^{10}), breach notification and reporting (U_{AUS}^3), and processing (U_{AUS}^2, U_{AUS}^6).The U_{AUS}^3 partic-

ipant, for example, mentioned data ownership and security procedures as part of their consideration—*"who owns the data? What will be the reporting process for any breaches to the university? What's their quality assurance?"*—and U_{USA}^{10} participants asked similar questions: *"how the data will be stored, and who for how long? And who has access to it? Who can request accessing it?"*

Concerns about equity, bias, and ethics. In addition to privacy and security, some participants also considered equity, bias and ethical concerns around proctoring software. A U_{AUS}^4 participant noted: *"we were also aware of the fact that there were potentially going to be bandwidth issues for students, so there's going to be equity issues for students who didn't have a broadband connection."* U_{AUS}^3 participants also shared concerns about *"offshore populations with internet connections that weren't quite as reliable as ours."* As discussed in   Section 7, these concerns led to various mitigation approaches in the deployment of proctoring tools.

Some participants emphasised the potential for biased proctoring outcomes (U_{AUS}^{4-5}): *"it became very obvious very quickly during the pandemic that there were gendered and racialized effects of online proctoring that I was just not willing to have a progressive university sidle alongside... With the AI-driven online proctoring, there were just too many instances of skin tone being an issue, and that was worrisome and problematic"* (U_{AUS}^4). U_{AUS}^1 and U_{AUS}^6 participants also referenced the need to ensure ethical outcomes for students. For example, one U_{AUS}^6 participant stated *"there's a broader question about using the term duty of care, but it is ultimately a privacy and ethics kind of question about your responsibility to the student."* U_{USA}^{10} participants discussed receiving complaints about the biased effects of the tools *after* the broader roll-out of these tools: *"There were some worse complaints that the tool has equity issues [in] the way it recognizes students of color... [some students would] always get a flag when they did nothing [wrong]."*

6.3. Operational considerations

In addition to academic and privacy considerations, administrators also considered operational factors. Key considerations were about the practicality of implementing educational technologies (such as cost, scalability, and integration with existing tools). We observe that operational considerations—which do not, at a surface level, appear to be connected to security and privacy—actually drive decisions that have *significant* impact on security and privacy.

Cost. Many participants mentioned the cost of proctoring software as an important consideration (U_{AUS}^2, U_{AUS}^{4-7}, U_{USA}^{10-13}). Administrators from Australian institutions that did not adopt proctoring tools saw the cost as prohibitive (U_{AUS}^{2-4}). Similarly, some U.S. participants felt that the cost of proctoring tools restricted their use, especially when increasing license numbers at the start of the pandemic. One U_{USA}^{11} participant stated that early on in the pandemic, the vendor *"gave us better pricing for a larger [number] of users,"* as an

"introductory package which was extremely cheap for that beginning year." However, at the start of 2022, when the vendor attempted to double the price, they *"renegotiated a new contract at a much smaller... license primarily to support the online programs... But what happened when we came back to campus [was that] more people than we thought started to use it... so we had to kind of up our license."* They were able to minimize the cost of these tools by only supporting base functionalities and leaving departments to pay for additional features. U_{USA}^{11} participants noted that the lockdown browser and AI flagging features were relatively inexpensive compared to live proctoring. In this way, cost impacted the monitoring features ultimately adopted. In contrast, some Australian participants noted that cost did not limit adoption at all (U_{AUS}^8, U_{AUS}^9). The U_{AUS}^8 administrator stated: *"it's not particularly a challenge because traditional exams are very expensive as well. So, it's pretty much the same."* U_{AUS}^9 also did not consider cost to be a limitation as they had put aside *"several million dollars"* to develop their custom tool and support remote learning.

Scalability. Administrators discussed the importance of the remote proctoring tool in supporting a large number of students at one time, with some sharing skepticism and negative experiences. At U_{AUS}^6, which did not adopt proctoring tools, a participant reflected that *"we also knew at scale, it would crash ... [Another university] had an absolute nightmare... at times, [they] had to cancel the exam because [students] were just a puddle of goo on the floor, having waited 40 minutes to get into their exam."* A U_{AUS}^9 participant described experiencing such issues firsthand: *"we had a really poor experience... we found that the standard time to get a response to a student whose technology was failing was 13 minutes... ultimately it was decided that that was really the end of that relationship."* U_{AUS}^9 subsequently abandoned this provider and built their own tool. Administrators also focused on whether the *university* could support use of the tool at scale. As the U_{AUS}^2 participant noted, *"the other [consideration] was institutional readiness because [at] that point we've [only] done a small-scale [implementation]... rolling out a proctoring tool across the university, we thought there were too many unknowns and we thought that that might actually be a big risk."*

Moving to digital learning and integrating with existing systems. Some universities emphasised the need to move towards digital education and assessment as a reason for adopting, and maintaining, remote proctoring (U_{AUS}^1, U_{AUS}^{6-8}). The U_{AUS}^8 participant commented that *"COVID was a forcing function. It forced the sector to digitally transform... Now that we had managed to get over the hump [of] digital transformation, we're going to keep going forward and not return."* Others noted that digital exams provided benefits such as reducing the need to organise large venues for in-person exams (U_{AUS}^7) and allowing for an automated and efficient system for grading (U_{AUS}^6). In this context, it was important that proctoring tools integrated well with existing systems. For U_{USA}^{10}, integration with their learning management system

was a key reason they proceeded with one proctoring vendor over another.

> **Summary of academic, privacy, and operational considerations (RQ2):**
> - Efficacy in maintaining academic integrity was generally the most important factor in adoption.
> - Many had concerns about surveillance of students through video, audio, and software.
> - Some students actively approached administrators with concerns about surveillance, installing software on personal devices, and the biased effects of the tools
> - Administrators also balanced a number of long-term operational factors such as cost, scalability, and integration with existing systems.

7. How administrators weighed considerations and mitigated privacy concerns

University administrators considered a wide range of (often competing) factors in deciding whether to adopt proctoring tools. Administrators often prioritized the need to ensure academic integrity over privacy concerns, but attempted to mitigate privacy concerns by adjusting monitoring features and promoting alternative 'authentic' assessments.

7.1. Trade-offs and balancing considerations

Administrators considered student privacy in various ways at different stages of the decision-making process. Despite this, privacy was generally not a key factor in the decision to adopt or not to adopt remote proctoring technologies. Rather, administrators' belief about the efficacy of the tools in curbing academic dishonesty was the driving factor, with privacy and operational factors secondary concerns.

Academic integrity and operational concerns outweighed privacy issues for those who adopted the technology. Many ultimately decided that proctoring tools were necessary from an academic and operational perspective, despite the privacy concerns. For instance, one participant from U_{AUS}^6 noted that *"as a rule, [student concerns and input] would always be an... important consideration for deciding to use [a tool] or not. [But it is] not the only [factor]. [If] students really didn't like it, but if we felt that the pros outweighed the cons, we might still go with it."* U_{AUS}^6 initially did not adopt proctoring tools due to these student concerns around privacy, but later adopted a lockdown browser system due to issues with academic integrity. A participant from U_{USA}^{11} also explained that, *"more than likely, most [people] would see in favour of operations continuing versus somebody's privacy potentially being adversely affected, particularly if they knew about it going into the course."*

Inconsistent consideration of privacy and ethics. While all participants expressed concerns around student privacy, there were significant differences in *when* and *with what weight* participants considered privacy and ethical factors. At U_{AUS}^4,

the decision-maker decided not to adopt proctoring software on the basis of institutional values and ethical concerns about the *"gendered and racialized effects of online proctoring."* Instead U_{AUS}^4 wanted to *"build a new relationship with students."* The participant explained that although they considered cost and *"a desire to move towards more authentic forms of assessment,"* the decision was primarily *"taken on the basis of our values. And it really was a more comfortable way into it... I think those value-based decisions are the ones that hold your best stead."*

In contrast, at U_{AUS}^2, the lack of confidence in the efficacy of the software was a key factor in their decision not to adopt, as was IT governance, cost, institutional readiness, and the ability to pivot to alternative assessment models. Student privacy was part of the discussion, but *"it was not the primary consideration."* Similarly, U_{AUS}^6 spent time testing whether proctoring software could be circumvented before considering ethics: *"putting aside the ethics... does the tech work? We'll come to the ethics conversation if the tech works. And the tech didn't work."* U_{AUS}^9, which created its own tool, considered ethical and equity concerns raised by students during the design phase of their custom software: *"from the initial conversation at [the] academic board meeting [it was discussed that there] was a need to be considerate of all students and very inclusive in our design."*

7.2. Universities adjusted their online exam systems in an attempt to mitigate privacy concerns.

Many universities in our dataset that adopted remote proctoring software despite privacy concerns attempted to mitigate those concerns. In this way, privacy considerations played a larger role in *how* proctoring systems were deployed, rather than *whether* they were deployed.

Use of lockdown browsers and AI proctoring to alleviate concerns about video monitoring by human proctors. Concerns about privacy influenced which *type* of proctoring software the university acquired. Some universities, such as U_{AUS}^6, adopted lockdown browsers and conducted exams on campus due to concerns about video monitoring software *"collect[ing] a huge amount of data."* Participants believed lockdown browsers collected far less data than video monitoring. One U_{AUS}^6 participant commented, *"a lockdown browser is obviously a local environment which is not harvesting any information back to any vendor. It is just providing an environment which is secure in theory to the applications that are approved to be run on it... remote [video] proctoring is collecting and storing large amounts of personally identifiable data. I think there is probably a difference in the type of information that is at risk of being captured... I think people are comfortable with lockdown browsers."* Although it is plausible that a lockdown browser could operate locally, prior work indicates generally that proctoring software is highly privileged and engages in "sweeping surveillance" in order to prevent academic dishonesty [22]. While lockdown browsers that are browser extensions are limited by the operating system, other lockdown browsers are standalone

executables [68]. Though out of scope for this work, future work could investigate the technical accuracy of the mental model that lockdown browsers are more privacy-preserving.

Other universities selected AI-assisted video monitoring to mitigate privacy concerns. Participants believed that AI-assisted proctoring was more private than a third-party human proctor monitoring a video feed of the student in real time. The U_{AUS}^8 participant explained: *"we were able to explain to students how [with the AI-assisted proctoring system] the camera is not looking at your room, it's very much just looking at your eyes so it's looking at a very narrow set of information. So people's room privacy... has not been compromised. The data that goes from the computer to the servers [are also] end to end encrypted [and] the company doesn't have access to the data, it goes straight to us and meets EU standards like the GDPR."* The U_{AUS}^8 participant noted that *"our number one focus was [that] whatever solution we adopted we had to ensure that... students felt that we were protecting their privacy."* At U_{AUS}^1, too, a participant explained that the student concerns raised above and the lawsuits initiated by students in the U.S. contributed to their decision to use AI-assisted proctoring software where *"there is no human intervention"*. Another U_{AUS}^1 participant noted, *"we made the decision that... we would never do live supervision, like having somebody watching your every keystroke... So we do recorded supervision and we use... AI to check it. And so if there's a problem, we get a flag from the AI to let us know that we need a human being to check it. And it's [U_{AUS}^1] staff who checks it."* We discuss the accuracy and implications of these mental models in Section 8.

Optional university-provided space and hardware. Some universities offered opt-outs to alleviate concerns about video-monitoring software invading students' privacy. If students objected to installing proctoring software, they could use a university device with the software already installed (U_{AUS}^1, U_{AUS}^6, U_{USA}^{11}), sit an exam using Zoom (U_{USA}^{10}), or, for those objecting to surveillance *at home*, take the exam on campus (U_{AUS}^1, U_{USA}^{10}). One U_{AUS}^1 participant noted, *"You just needed to flag [that] you had a concern. We would give you space on campus for you to come and either use our computer or bring your computer. But you're still going to be using [proctoring software]."*

Educating students and instructors about the software's privacy and equity implications. In addition to opt-outs, some universities (U_{AUS}^1, U_{AUS}^6, U_{AUS}^8, U_{USA}^{12}) also focused on communicating to students and instructors about how the proctoring software would use student data. At U_{USA}^{10}, the teaching and learning department worked with faculty members to raise awareness of *"privacy implications and equity [implications]"* of using proctoring tools, helping faculty members decide whether they were suitable for their courses. U_{AUS}^8 produced video briefings for students and *"explained how the software doesn't get access to your machine. It only goes live when you do the test and then you take it off your machine afterwards so it doesn't have access to your hard drive. That again was very important because students*

were concerned about that." Prior work has found that some proctoring software gains elevated system privileges and can persist after the exam [22]; we discuss the accuracy of administrators' mental model in Section 8.

Within our dataset, the Australian institutions tended to communicate about privacy through central mechanisms (such as from university executives). The U.S. institutions used mixed-media for communication - relying on instructors to communicate with students about the use of proctoring tools and their privacy implications through course syllabi; displaying privacy policies on monitors campus-wide; and dedicating institutional web-pages for proctoring-tool related policies and procedures. As a U_{USA}^{11} participant stated: *"we work from a position that the instructor is the person who's the gatekeeper of the privacy of the students, and we support them the best we can to make sure they are."*

7.3. Promoting alternative, 'authentic' assessments over traditional invigilated exams.

In addition to the above mitigation efforts, many administrators discussed promoting alternative, 'authentic assessment' models in place of supervised exams, reducing or eliminating the use of remote proctoring tools. Alternative forms of assessment include open-book exams, oral presentations and portfolios. This frequently coincided with discussions around 'authentic assessment,' a form of assessment that aims to better model real-world use of skills and knowledge [27]. All institutions that did not adopt proctoring tools had strong policies in favor of alternative assessment, and many institutions that did adopt proctoring tools did as well. By promoting alternative assessment and reducing reliance on invigilated exams, administrators believed they could avoid many of the privacy and ethical concerns around proctoring tools, reflecting *non-use* as a privacy-preserving strategy [9, 32, 66, 69].

A variety of reasons for using authentic assessments over exams. Some universities centrally promoted authentic assessment for the sake of pedagogy: *"we felt like proctoring would be a backward step [as] it would push too many units just into a really simple invigilated environment and wouldn't take us towards more authentic assessment, which is part of our curriculum and assessment design policy suite"* (U_{AUS}^2). The U_{AUS}^2 participant explained that even after the pandemic, *"over 50% of units that moved to alternative assessments never went back to exams."* U_{AUS}^1 also promoted authentic assessment for the sake of *"designing exam[s]... better."* Other universities promoted alternative assessment as a response negative feedback about proctoring software. U_{USA}^{10} eventually ceased to promote proctoring tools at all and only enabled it *"if people... come to us and request [it]"* due to complaints from students about *"the way [the proctoring system] recognizes students of color... [and how] it flagged [them] more."* Instead, U_{USA}^{10} *"focused a lot on, what are some alternative assessments that you could do if you don't want to [use] a proctoring tool."* Finally, some participants commented that the advent of generative AI would force

them towards alternative assessment. As a U_{AUS}^8 participant explained, *"the next revolution will be what AI is going to do, which is just going to force us to move towards alternative assessment... because we're going to have no choice."* A U_{AUS}^6 participant shared this view: *"We're not going to win against the AI... it's an arms race."*

Limitations of alternative assessments; future use of invigilated exams. Notwithstanding the movement towards alternative assessment models, many participants believed that invigilated exams would continue to be a key form of assessment. One reason for this was pressure from accreditation bodies. As a participant from U_{AUS}^4 noted: *"the [discipline] deans have expressed concern about the [accreditation body] and how demanding they're being in terms of the proctoring requirement."* A U_{AUS}^1 participant said they are slowly working with accreditation bodies to keep only capstone, pivotal exams in a digitally supervised format, with other milestones being assessed using alternative, 'authentic' methods. Additionally, even with centralized pressure for alternative assessment models, *"there are disciplines that are deeply convinced that they can only assess in ways that need invigilation"* (U_{AUS}^4). Even participants from universities that did not adopt proctoring recognized the limitations of alternative assessment and believed that there could still be opportunities for proctoring tools. The U_{AUS}^2 participant explained, *"when you're working with a student who will never be on campus and who you are working with at a distance, the challenge of creating really high quality, authentic assessments that can be done securely is quite difficult."* For these instances, the participant explained they were actively looking for *"a really good assessment platform... where we can do all kinds of different assessments... that's not tracking the student... with a camera [or] a lockdown browser, but something much more authentic."*

> **Summary of how administrators weighed considerations and mitigated privacy concerns (RQ3):**
>
> - Privacy was generally not a key factor in the decision to adopt or not adopt remote proctoring tools.
> - Many administrators felt that academic integrity and operational concerns outweighed privacy concerns
> - Administrators tried to mitigate privacy concerns through the use of certain features over others, university-provided hardware or space, and user education.
> - Administrators indicated a long-term move towards "authentic assessment" as both better a pedagogical practice and one that eases the need for remote proctoring.

8. Discussion and Conclusions

Decision-making around the adoption of proctoring tools is a complex, multifaceted process. Our results show that different institutional structures and governance processes impacted when decisions were made, who was responsible for the decision, and how these decisions were made. Decision-makers considered many competing academic, privacy and operational factors. While some of these factors do not

immediately appear to be connected to security and privacy issues, they ultimately impacted adoption decisions and as a consequence, student privacy and data security. Where proctoring software was adopted, privacy concerns also influenced the particular software that was adopted, the ability to opt out of using the software, the communication around risks, and the promotion of alternative assessment models. In the course of our study, we observed two tensions that contributed to the complexity around this decision-making: 1) a structural and procedural tension between centralized and decentralized decision-making; and 2) a substantive and strategic tension between ensuring academic integrity and protecting student privacy. We explore these below and argue that while these considerations are complicated and often involve moral and philosophical judgments, neither are unworkable, diametrically opposed interests. In fact, understanding these complexities allows for better, more informed decision-making around EdTech.

8.1. Tension: centralized vs decentralized adoption of remote proctoring

Our data reveals an inherent tension between centralized control over the procurement of EdTech and faculty autonomy in selecting appropriate assessment tools. Centralized adoption generally ensures that key parties responsible for assessing regulatory and technical risk (such as legal and IT departments) are involved in the procurement process, as explored in Section 5 and prior work [19]. On the other hand, decentralized, faculty-led adoption affords faculty the ability to select the best assessment method for *their* courses and their students. However, individual faculty and departments are unlikely to have the subject matter expertise and resources to thoroughly assess regulatory and technical risk. As in the case of U_{AUS}^6 (Section 5), central departments may have less oversight, leading to the adoption of tools that breach state privacy regulations.

We found that this tension manifested in different ways depending on the jurisdiction and strategic priorities of the institution. The U.S. universities in our study, for example, allowed for more faculty discretion in deciding to use remote proctoring. Central departments routinely advised and supported faculty in making these decisions, though individual faculty members made the final decision. In the Australian institutions, faculty members had some autonomy in the selection of assessment tools, but they appeared much more restricted by central strategic priorities. Notably, consultation with lay-faculty members was not a significant feature of decision-making. This is consistent with the trend away from academic governance and towards a strong executive (Section 2). The extent to which decision-making was centralized was roughly inversely correlated to the age of the institution, again, matching the institutional profiles identified by Marginson and Considine [48].

Recommendation: strengthen partnerships between central administration, faculty, and students. All of these parties are affected by, and have a vested interest in, the use of EdTech. They each bring valuable insights into how these tools are adopted and used in practice. As prior work has shown [18], students bring privacy and security perspectives from their lived experience. It is therefore crucial that they are *structurally involved* in the acquisition process. Faculty, too, are users of the technology [6], and bring deep pedagogical experience. Neither students nor faculty, however, have the resources to evaluate technical security or compliance with data protection regulations. Central administrators, on the other hand, do possess these resources and are better able to align procurement with broader strategic and operational objectives. We recommend that these parties, work together closely when considering the adoption of EdTech. This may involve changes to current decision-making processes and ensuring that all parties are properly involved and informed in the decision to acquire these tools.

8.2. Tension: academic integrity vs student privacy

The second tension in our work relates to the substantive considerations in the decision-making process. We found that administrators struggled to balance two main competing demands: promoting academic integrity and preserving student privacy. Many administrators considered, and tried to mitigate, student privacy concerns. However, few cited privacy and ethical considerations as a determinative factor in their decision to adopt or not adopt proctoring software. This is in line with prior work that shows that security and privacy factors are only part of the decision to adopt particular tools and are often in conflict with other priorities [5]. In this case, administrators prioritized concerns around academic misconduct despite skepticism around efficacy of these tools and their potential to undermine student privacy.

Recommendation to universities: updating mental models about remote exam proctoring and digital security. Our work reveals that administrators and instructors sometimes have inaccurate mental models around proctoring software. This prevents them from effectively understanding and mitigating student privacy and security concerns. For example, some administrators selected AI proctoring systems because they felt it was less privacy-invasive than a human proctor. Another administrator assumed that lockdown browsers operated locally without sending data to a third party over a network. While AI proctoring *may* feel less privacy-invasive than monitoring by a human proctor, computer vision models notoriously face racial discrimination issues [14, 35]. Further, the automation of proctoring (through AI or a lockdown browser) does not mean data is kept locally, and thus the connection to privacy is unclear. While we do not expect administrators to become experts on systems and network security, it is incumbent on them to understand key privacy and security issues about the tools they are responsible for procuring and to consult with subject matter experts.

A related recommendation is to develop a framework for assessing the ethical and privacy dimensions of potentially risky tools. As we have seen in Section 7, there was considerable difference in how each university approached privacy,

academic and operational considerations. Some rejected remote proctoring tools on the basis of privacy, security, and ethical concerns. Others opted to test the technology first and then establish mitigations to alleviate privacy, security, and equity concerns. While the goal of this paper is not to prescribe *how* to make these difficult decisions, there is room to build in an established process to effectively weigh these competing considerations. Future work may explore the role of regulations and regulatory guidelines in promoting this consistent and structured approach to decision-making. It is remarkable that some of these decisions were a reflection of the personal ethical values of senior administrators rather than applying a pre-established framework for ethical decision-making. As prior work has found that administrators often consult peer institutions [37], there is also potential for universities to collaborate and share knowledge about respective frameworks.

Recommendation to universities: 'opt-in' remote proctoring for students. Some of the universities in our dataset that implemented remote proctoring provided alternative options for students with privacy and equity concerns. Students could opt out of using their own devices and taking the exam from their personal environments. These students were provided with an option to use university devices and could sit the exam on campus. Such mechanisms may reduce concerns about equity and privacy. They ensure that students are not downloading potentially untrusted and invasive software on their computers, and they allow students' homes to remain private to the university and third-parties. While we support these alternative options, we advocate for an 'opt-in' model instead of the 'opt-out' approach. We believe that the default position that is endorsed by universities should be one that seeks to protect student privacy. Where students believe the efficiency gains outweigh privacy risks, they may then 'opt-in' to using these tools. However, we caution that the 'opt-in' model is not without limitations. Depending on the implementation, students may feel pressured to 'opt-in' and not free to exercise their right to avoid the use of these tools. Further, even when students 'opt-in' to proctoring, issues with racial discrimination [14, 35, 41] and efficacy [40, 45, 72] still persist. Universities, therefore, are not absolved of their responsibility to ensure that proctoring software is both ethical and effective.

Recommendation to EdTech companies: center privacy, security, and equity. We also strongly recommend EdTech companies to prioritize privacy, security, and equity in the design of their products. Our paper and others reveal significant appetite for remote proctoring software that fulfills its primary purpose: promoting academic integrity. Our study found that administrators adopt these tools *despite* private concerns, however, we envisage a future where administrators adopt tools *because* they address privacy concerns. As we have seen, remote proctoring software contains invasive features and privileges that are, in other contexts, reserved for malware [15]. In our study, participants expressed a desire for privacy-preserving software that was 'authentic', promoted

academic integrity, and supported a movement towards digital assessment and education. EdTech providers have an opportunity to address these needs and promote the provision of ethical, privacy-preserving educational technologies.

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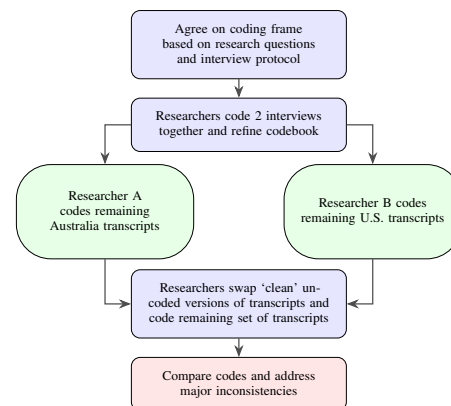
Appendix A: Coding Methodology

Figure 1: Process flow for the coding methodology. For a detailed description of the process see Section 4.

Appendix B: Interview Protocol

Below is our full semi-structured interview protocol. The Australian and US protocols differ slightly due to differing regulatory frameworks and minor personal preferences of the interviewer in terms of the depth and order of questioning. We highlight the questions that were specific to the Australian interviews.

Pre-recording Thank you for agreeing to participate in this interview. The purpose of this interview is to learn about online exam proctoring tools – before, during, and going forward post-COVID. Your data will be used to improve our understanding of how decisions are made regarding the use of these tools in higher education. Your individual responses will be anonymous in products, such as articles or presentations, resulting from this study. You are not required to participate in the study.

This interview is to be recorded. The recording will be transcribed and then the recording will be deleted. Is it ok that I start the recording now? *[only start recording if they give a verbal yes response].* Participation in this interview is voluntary and there are no consequences for deciding not to participate at any point. Do you wish to participate in the interview and acknowledge your consent as specified in the informed consent document we shared when scheduling the interview? [*a verbal 'yes' is required before continuing*]

As a thank you for participating in the study you are eligible to receive a $25 Amazon gift card. If you decide during the interview that you no longer wish to participate in the study you will still receive that compensation. Do you have any questions before we start? [*Begin recording.*] Today is (date). I am (interviewer name) interviewing (participant name).

Background Information
1. Can you describe your position(s) at the university from pre-covid (pre-2020) to today?
2. What are/were the responsibilities of your position in relation to student online privacy and security?
3. What has been your familiarity with online exam proctoring tools – their implementation, use, or policies associated with them?
   - *Follow-up:* If the participant responds that they are unfamiliar, provide the following:
   - *Definition:* Online exam proctoring is a category of technologies for exam integrity in virtual setups when the students attend an exam virtually. Examples include, monitoring the voice input-outputs of the student's device, blocking all website accesses from the exam device, or recording the webcam view and monitoring the feed later.
4. Are you, or someone else, responsible for making the decision to use or have access to proctoring tools?
5. Are you, or someone else, responsible for communicating with students about the expected use of these technologies at the university?
   - *Probe*: And is this also communicated to university applicants?
6. (Aus-only) What has been the impetus for considering online proctoring tools?
   - *Probe*: Has cheating in examinations been a major concern?
   - *Probe*: What are the considerations unique to your institution that are shaping your policies around examinations and test taking?

Pre-Covid
1. If you were familiar with them at the time, which online exam proctoring tools were in use pre-COVID? *[If not aware, jump to Initial-COVID questions below]*
   - *Probe*: Which of these were used most frequently?
   - *Probe*: (Aus-only) For which contexts were these used and at what level were the decisions made?
2. Who was using online exam proctoring tools?
   - *Probe*: Did faculty or students ask questions about security & privacy issues with online exam proctoring tools pre-COVID?
3. When implementing new online exam proctoring tools, what testing did the Office of Information Technologies and others do before implementation?
   [If we have policy documents downloaded from their website, refer to those in the following question]
4. Does your office [*IT or Provosts or Instructional Core*] have any security & privacy policies in place related to online exam proctoring tools, or similar tools?
   - *Probe*: Are these policies provided to students and faculty?
   - *Probe*: (Aus-only) How were the Australian Privacy Principles in the Privacy Act 1988 or other regulations [*insert state laws relevant to interviewee e.g. the Information Privacy Principles in the Privacy and Data Protection Act 2014 (Vic)]* policies discussed (formally or informally) in relation to online exam proctoring tools?
   - *Probe*: (US-only) Were FERPA policies discussed (formally or informally) in relation to online exam proctoring tools?
   - *Probe*: If they ask about what is considered within security and privacy policies: "Security and Privacy Policies cover every aspect of data use from obtaining consent to the collection of the data and right up to the erasure of it. It tells staff, users and regulators that security is a priority. The policies should match

actual security and privacy practices rather than being too minimalist or too aspirational."
   - *Follow-up*: If we have found implementations or policies associated with online proctoring tools on the university's websites, then follow-up here with questions about their familiarity with these examples. For instance, "we saw online that the school of medicine is using XYZ, were you familiar with their use of this tool and how it was implemented?"
5. (Aus-only) What privacy impact assessments, vendor security assessments, or other risk assessments were conducted?
6. (Aus-only) Did the university tailor any specific policies to manage data sharing with online proctoring service providers or their affiliates?
7. (Aus-only) C an you please describe the procurement process for this software? Specifically, which parties were involved in decision-making and how were they consulted?
   - *Probe*: In what way if any, was the University's general counsel (or equivalent) contacted for advice?

Initial-COVID
1. Can you provide a narrative, from the [*IT or Provosts or Instructional Core*] perspective, of what happened with online exam proctoring tools when COVID first hit in 2020?
2. Which university offices, beyond your office of [*IT or Provosts or Instructional Core*], were generally involved in these discussions and decisions?
3. (Aus-only) What alternatives were considered? What were the major factors weighed in the decision?
4. Which features or options were NOT selected (or made available) for use in these tools, if any?
   - *Probe*: Were security or privacy concerns part of the reason why these were not selected?
5. Do you know if potential student security & privacy concerns (such as the tool's access to their web browser data, or later access to video recordings of students) were disclosed to faculty and/or students prior to their use of the online proctoring tools?
   - *Probe*: Do you know if administrators were informed of student security & privacy concerns?
   - *Probe*: What was the nature of consultations with academics, students, or other stakeholders and what were their contributions to the decision-making process?
6. Do we know if or how much student data were saved by the online exam proctoring tools used during COVID in Spring of 2020?
   - *Probe*: To whom? Who asked? Why did they ask?
7. Do you have data on the usage of these tools in 2020 during their initial implementation?
8. Did your office of [*IT or Provosts or Instructional Core*] receive any complaints or concerns from students (and/or faculty) regarding the security and privacy of the online exam proctoring tools?
   - *Probe*: If so, how were those handled and resolved?
   - *Probe*: How many?
9. Was licensing for online exam proctoring tools different across schools within the university?
10. What was the feedback from the faculty and students about online proctoring?

Going forward (COVID)
1. Going forward now that the COVID lockdowns are done, what is the plan for online exam proctoring tools?
2. Are there plans or policies now in place for any re-reviews or evaluations during implementation of online exam proctoring tools?
3. Has the institution established any new policies that will influence future decisions related to online exam proctoring tools, and related technologies?
4. What benefits were derived from their use?
   - *Probe*: Perception or real improvements in academic integrity
5. What ongoing challenges do you see with their continued use?
   - *Probe*: Student concerns?
6. Given your experiences to date, what would be your ideal implementation of these and related technologies going forward?

Next Steps
1. Are there others whom we should talk to learn more about the use of online exam proctoring tools at the university?

Closing Thank you again for your time to meet with me. Just a reminder, all of the information you have shared is confidential and we will not use your name in reporting out on specifics from these interviews. Your Amazon gift card will be sent electronically. If you have another email address, other than the one we used for scheduling the interview, that you would like for us to use when creating the gift card, please email that to me after the interview. If you have any questions or concerns about this interview or the use of your responses, please feel free to contact the project supervisor [*PI name*] at any time.

Appendix C: Codebook

Table 2: Qualitative Codebook

Parent code	Child code	Definition
Staff and Student Perceptions	-	Staff and student perceptions about online proctoring tools
	Student Feedback	Feedback obtained from students
	Staff Feedback	Feedback obtained from staff (including faculty members)
Interviewee Reflections and Perceptions	-	Interviewee's own reflections and perceptions about online proctoring tools
	Positive perceptions about online proctoring tools	Positive interviewee perceptions
	Negative perceptions about online proctoring tools	Negative interviewee perceptions
Future Considerations Surrounding Online Proctoring	-	Considerations likely to impact the future use of proctoring tools
	Use of generative AI	Developments in generative AI and its impact in education and assessment
	Changing assessment models	Current or prospective changes in assessment models (such as movements towards alternative assessment types)
	Desire for invigilated exams	Push from faculties and staff for invigilated exams
Types of Proctoring Tools	-	Discussion around the nature of the proctoring tools that were considered
	Recorded Proctoring (including use of AI flagging systems)	Proctoring tools that were based on recordings of students (including those that applied an AI flagging feature to detect 'suspicious' behaviour)
	Lockdown Browsers	Proctoring tools that prevented students from accessing prohibited websites
	Live Online Proctoring	Proctoring tools that involved live observation of students (frequently by third-party proctors)
	Anti-Plagiarism Tools	Tools that prevented students from plagiarising in assessments
	Usage rates	Discussion about the numbers of faculties or students that used these tools
Implementation Process	-	Discussion about the process of implementing proctoring tools
	Support and training for staff and students	Support and training provided to students and staff in the implementation of proctoring tools
	Policy notification to students	Notification to students about policies relating to the use of proctoring tools
	Piloting	Experiences relating to piloting online proctoring tools
Decision-Making Process	-	Decision-making processes relating to the use of online proctoring tools
	General ed-tech decision-making processes	General decision-making processes applicable to the adoption of educational-technologies
	Decision-making processes pre-COVID	Decision-making processes before the COVID-19 pandemic specifically in relation to online proctoring tools
	Decision-making processes post-COVID	Decision-making processes after the COVID-19 pandemic specifically in relation to online proctoring tools
	Decision-making processes during-COVID	Decision-making processes during the COVID-19 pandemic specifically in relation to online proctoring tools
	Consultations with other universities	Consultations or discussions with other universities about the adoption of online proctoring tools
	Student Surveys	Surveys conducted with students to understand student perceptions about proctoring tools
Decision-Making Bodies	-	Individuals or departments that were involved in the decision-making in relation to proctoring tools
	Student Partnerships	Partnerships and consultations with students during the decision-making process
	Central and Faculty Decision-Making	Role of central committees and faculties in the decision-making process
Academic Decision-Making Considerations	Considerations related to academic assessment and examinations (content/substantively)	
	Improved outcomes	Improvements in student academic performance
	Academic Integrity	Concerns around maintaining academic integrity of assessment including prevention of academic misconduct and cheating on examinations
	Accreditation Bodies	Requirements of professional accreditation bodies and other higher education quality assurance bodies
	Alternative Assessment Types	Consideration of alternative assessment models to traditional on-campus examinations
Operational Decision-Making Considerations	Considerations related to the processes and administration of assessment and examinations (i.e. processes/efficiencies/productivity)	
	Digital Learning and e-Assessment	Movement towards digital education and online assessment
	Student experience	Consideration of students' experience in using these tools
	Ease of use	Ease of use of proctoring tools
	Cost	Financial costs associated with implementing online proctoring tools
	Workflow Streamlining	Effect of proctoring on streamlining assessment delivery and grading workflows
Privacy, Data and Ethical Decision-Making Considerations	Considerations around privacy, ethics, and data protection	
	Third Party Proctors	Concerns around external proctors
	Access to Data	Consideration around who has access to captured data about students
	Bias and Ethics	Bias and other ethical concerns surrounding proctoring tools
	Faculty Concerns	Privacy, data and ethical concerns raised by members of faculty and staff
	Storage of Data	Considerations around the storage of student data
	Student Concerns	Privacy, data and ethical concerns raised by students
	Equity	Equity and inclusion implications
Security and Technical Decision-Making Considerations	-	Considerations around security and technology infrastructure
	Maintenance of proctoring systems	Technical maintenance of proctoring tools
	Reliability and efficacy of proctoring systems	Reliability and technical effectiveness of proctoring tools to meet intended objective
	Integration with other systems	Integration of proctoring tools with wider enterprise infrastructure
	Scalability	Scalability of proctoring tools to numerous faculties or to the wider enterprise
	Technical Support	Ability of proctoring solution vendor to provide adequate technical support to students and staff

An extended version of the codebook, including quotes and counts for each code is available at https://osf.io/2pdbx/.

Appendix D: Meta-Review

The following meta-review was prepared by the program committee for the 2025 IEEE Symposium on Security and Privacy (S&P) as part of the review process as detailed in the call for papers.

D.1. Summary

This paper presents a qualitative analysis of a structured interview study with 20 university administrators (chancellors, deans, etc.) from the US and Australia. The study questions investigate universities' decision-making processes around remote (online) proctoring software and considerations for the students' privacy needs in relation to other institutional needs. This work provides insights into the timelines/processes associated with adoption and what considerations are taken when making these adoption decisions.

D.2. Scientific Contributions

- Provides a Valuable Step Forward in an Established Field; and
- Addresses a Long-Known Issue.

D.3. Reasons for Acceptance

1) This is important work with a rather understudied population; and
2) This work brings forth the perspectives of decision-makers with respect to the problem of balancing institutions academic integrity enforcement needs with students rights to privacy.