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What is the student experience of remote proctoring? A pragmatic scoping review

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Abstract

Remote or online proctoring (invigilating) is a technology primarily used to improve the integrity of online examinations. The use of remote proctoring increased significantly as the world switched to online assessment during the COVID-19 pandemic. Remote proctoring received negative media attention, including concerns about user privacy, discrimination and the accuracy of automated systems for detecting and reporting cheating. However, it is unclear whether these media concerns fully reflect the experiences of students. Online assessment offers a number of potential advantages to learners and education providers, and it seems likely that it is here to stay. It is essential to fully understand the learner experience of remote proctoring, with a view to ensuring it is as effective as possible while meeting the needs of all stakeholders, especially those being proctored. We undertook a scoping review of research into the student experience of online proctoring, with a pragmatic focus, aimed at developing guidance for higher education providers, based on the student experience. We reviewed primary research studies which evaluated the student experience of the use of remote proctoring for summative assessment in Higher Education. We used the Education Research Information Center database (ERIC)

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and Google Scholar. 21 papers were identified, from which the positives and negatives of the student experience were extracted, along with the main recommendations from the research. These were then synthesised into a series of summary recommendations by thematic analysis, by a team of researchers that included students and academic staff. We found that student experience was largely negative, influenced by concerns over privacy, technological challenges, fairness and stress. Recommendations were to include the student voice in decisions about how and why to use remote proctoring and limiting the use of remote proctoring. Working with students as partners and limiting the use of remote proctoring where possible, are key to ensuring a positive student experience.

1 | INTRODUCTION

In Higher Education, examinations have traditionally been conducted in-person, under a specific set of 'closed-book' rules; time-limited, with students not allowed to communicate with each other or to access any other materials apart from those provided to them by examiners. To ensure that these rules are adhered to, examinations are policed by staff members, known as proctors or invigilators, who monitor examinees. Students report that when they are in unproctored environments, they are more likely to commit acts of academic dishonesty; in part because it is easier but also because a lack of proctoring signals the (lack of) value that an education provider places on that assessment (Duncan & Joyner, 2022; Dyer et al., 2020).

Online examination systems came to the fore during the COVID-19 pandemic, which brought a sudden and near-total shift to online learning and remote assessments (Brown et al., 2022). Online examinations offer a number of potential benefits to learners and to education providers. For example, they may be more flexible, less stressful and cheaper to administer. Thus it seems likely that online examinations will continue to be extensively used post-pandemic. However, academic misconduct in online examinations appears to be high and increased further during the pandemic (Newton & Essex, 2023). Online examinations are now seemingly subject to further challenges with the emergence of smart generative Artificial Intelligence tools such as ChatGPT, which are freely available and are sophisticated enough to pass examinations in a range of disciplines (Newton & Xiromeriti, 2023).

One, seemingly intuitive, approach to reducing cheating in online examinations is the use of an online, or remote, proctoring system (Han et al., 2023). Remote proctoring systems currently exist in three basic formats, broadly classified as online live proctoring (OLP), recorded proctoring (RP) and automated artificial intelligence proctoring (AI) (Arnò et al., 2021; Hussein et al., 2020). These can be combined with other measures such as 'lockdown browsers', where the authorised test taking device (i.e. computer) is only allowed to access certain websites or other resources, or only allowed to run specific software. OLP is essentially an online version of real-time in-person proctoring. Test-takers are monitored remotely, but in real-time by human proctors (Almutawa, 2021; Arnò et al., 2021; Hussein et al., 2020). Generally, one remote proctor can monitor between 1–16 test-takers. The proctor will confirm i.d. manually and may ask test-takers to provide a 'room check' to verify their environment is aligned with rules, for example no other people are present, and no unauthorised materials or devices can be accessed (Kharbat & Abu Daabes, 2021).When a student is suspected to be in breach of the rules, the proctor

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can intervene in real-time, and the locked-down browsers can be remotely frozen and placed under review (Arnò et al., 2021; Hussein et al., 2020). RP refers to proctoring that stores audio and video footage of test-takers for post hoc human review (Almutawa, 2021; Arnò et al., 2021; Hussein et al., 2020). AI proctoring refers to an environment that utilises automated motion capture technologies to identify suspicious behaviours of the test-taker and flag them for further review (Almutawa, 2021; Arnò et al., 2021; Hussein et al., 2020).

Students believe that remote proctoring is effective at reducing cheating (Hylton et al., 2016) and there is some, albeit limited, evidence that student report less frequent cheating when proctoring is used (Newton & Essex, 2023).

1.1 | COVID-19 and remote proctoring in the media

As educational providers shifted rapidly to online assessment during 2020, remote proctoring quickly gained notoriety in the media. Reports detailed harrowing experiences where students being monitored by remote proctoring were terrified of being flagged as 'cheats' and would weep with stress and fear. Some were so afraid to leave their computers, in case this caused them to be flagged as cheats, that they chose instead to urinate on themselves, or wear adult diapers (Cheek, 2020; Harwell, 2020). One pregnant student reportedly went into labour but stayed at her examination rather than leave and be flagged as cheating (Cheek, 2020). Students with dark skin reported that the software would not recognise them, leading to allegations that the systems were inherently racist, having been calibrated with Caucasian students (Asher-Schapiro, 2020; Swauger, 2020). Other media reports claimed that the proctoring services discriminated against students with legitimate circumstances, such as ADHD, that might cause them to behave in a way that the proctoring services would incorrectly flag them as cheating (Ignatowski, 2022). The proctoring companies pushed back against these allegations, claiming they were unfounded, or anecdotal, and that staff had behaved illegally when trying to access and publicise the inner workings of the systems. This resulted in ongoing back-and-forth legal disputes between proctoring companies and individual university staff (Corbyn, 2022), fuelled in part by further media stories claiming that, despite the proctoring systems, cheating was widespread, with students finding innovative ways to circumvent the systems, motivated in part by the stress caused by the proctoring systems themselves (Geiger, 2021). A significant backlash against remote proctoring has then played out in the media, with students worldwide petitioning universities and governments to ban the use of remote proctoring (Asher-Schapiro, 2020), some successfully (Asif, 2021; Chin, 2021).

1.2 | Existing policy in higher education

In order to be transparent with students about assessments, it is crucial that universities clearly state what behaviours should be avoided and make these clear and available to students and teachers (Nushi & Firoozkohi, 2017). In order to allow students to feel confident in supplying online proctoring services with their personal data, a security policy can reduce concerns by clearly defining a short data retention period and guaranteed purge of collected data after that, reassuring students that any other use of their data is prevented except for the specific purpose of the online examination (Slusky, 2020). Students can access the privacy policies of specific remote proctoring services through their websites, where they can read policy surrounding the use of their data. However, Lindsey Barrett highlights that even if the instructor were to provide students with the privacy policy of the remote proctoring company, it would not contain sufficient information for the students to adequately ascertain the privacy risks (Barrett, 2021). There is also a clear imbalance of power; do students have a choice to refuse to use remote proctoring on the basis of these privacy concerns?

There are additional practical issues associated with online proctoring. A student must have appropriate access to relevant devices and technical capacity for completing the examination, such as a webcam and a device

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that can support the proctoring software (Hussein et al., 2020). Some universities may provide their students with devices to allow them to engage in online proctoring, whereas others require that students provide their own devices. Some policies may also require that students have access to a private room, free from distractions and then place restrictions on what students can/cannot do. For example, students may be told that they cannot use the toilet during the examination (Delft TU, 2023). Access to the correct technology and private space may be easy for most students to obtain, but some students may be limited by their socio-economic status or caregiving duties that prevent them from adhering to these conditions.

Conijn et al identified contextual factors that increase test anxiety: 10% of students were facing financial issues, and some students did not have access to reliable technology nor a dedicated study space at their disposal (Conijn et al., 2022). In Australia, when advising strategies for the use of online invigilated examinations, the Tertiary Education Quality and Standards Agency (TEQSA) recommend that accommodation must be provided for students who do not have the appropriate means to complete an online proctored examination. This might include provision of computers and/or mobile broadband devices, or alternative examination spaces so that students are not disadvantaged when online proctoring is selected as a form of assessment (Dawson, 2021).

In some cases, students are required to pay for the proctoring service itself, for example the University of Illinois requires a fee of 16USD per hour (University of Illinois, 2022). This cost was a factor in decisions by some universities *not* to make widespread use of remote proctoring during the switch to online learning during the COVID lockdowns (Silverman, 2021). This payment issue then further complicates the privacy concerns; if students are mandated to use a proctoring service, but have to pay for it themselves, then it requires them to supply the proctoring company with personal financial information (Scassa, 2022).

1.3 | Importance of student experience

There is a basic moral argument that student experience and perception of remote proctoring should be considered a main priority when evaluating the success and further use of remote proctoring. Furthermore, Higher Education provision has taken on a more consumerist, private-sector model in countries such as the United States, United Kingdom and Australia. Here there is increasing emphasis on student satisfaction, reflected in university league tables. In the United Kingdom, the National Student Survey (NSS) is a completed annually by final-year undergraduate students and the results can have a significant influence on future student recruitment. One domain of the survey captures student views on 'Assessment and Feedback' and this is consistently a domain where scores are the lowest (Burgess et al., 2018). Thus, there is an additional pragmatic incentive for universities to ensure that online assessments are conducted in a way which results in a positive student experience.

1.4 | Theoretical framework

We have used pragmatism as our theoretical framework. The pragmatic research paradigm has its roots in the philosophy of pragmatism, emerging late in the 19th century and eventually evolving into multiple different forms (Biesta & Burbules, 2003, p. 4). Despite this philosophical heterogeneity, a common thread of most approaches to pragmatic research is an emphasis on asking research questions whose answers are of practical use in the real-world (Feilzer, 2010; Kaushik & Walsh, 2019). Many different research paradigms will consider the practical implications of their findings, for example in the discussion, but for pragmatists this aim is at the heart of the research, starting with the research question and running through the framing of the question, the methods, analysis and discussion. A pragmatic approach to decision-making in educational practice and policy emphasises the importance of choosing the most *useful* (rather than the 'best') research evidence, along with the context in which it will be applied and the judgement of those applying it (Newton et al., 2020).

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In this study then we aim to synthesise some existing research evidence on the student experience of remote proctoring, to understand it, but also to try and turn those findings into something useful. We identify the main themes of the research; the positive and negative aspects of the student experience and then the recommendations about how to capture the positives, and address the negatives, using suggestions from the research itself and then our own recommendations based upon the findings. The research team is composed of both staff and students to ensure that both perspectives are captured in the recommendations. The aim then is to produce generalisable recommendations, that practitioners and organisations can apply in their own context (Newton et al., 2020).

1.4.1 | Objectives

1. What aspects of remote proctoring do students report as positive and could these be improved or further disseminated?
2. What aspects of remote proctoring do students report as negative and could these be improved?
3. What is 'best practice' for implementing remote proctoring in Higher Education settings in a way that implements the actions from '1' and '2'.

2 | METHODS

We undertook a pragmatic scoping search of the literature. A scoping review is designed to be used when characterising a new or emergent field, with the aim of providing a rapid perspective and synthesis (Arksey & O'Malley, 2005). Research questions used in scoping reviews are designed to explore, define and understand a novel field, rather than asking the sorts of specific, narrow questions associated with a traditional systematic review or meta-analysis (Tricco et al., 2018). Thus a scoping review normally has less of a focus on appraisal of study qualities and restricted inclusion criteria based on specific methodologies (Munn et al., 2018). The study was conducted and is reported, according to the PRISMA extension statement for scoping reviews (Tricco et al., 2018).

2.1 | Information sources

We used two main databases; the education research database ERIC (www.eric.ed.gov) and Google Scholar. No date limits were set. Where studies were included then the reference lists were reviewed to identify any additi0nal studies. We used Google Scholar as in other pragmatic education research reviews (Newton, 2018; Newton & Essex, 2023; Newton & Salvi, 2020) because it has a greater coverage of grey literature and dissertations/theses (Haddaway et al., 2015; Jamali & Nabavi, 2015). However Google Scholar has limited search functions compared to other research databases, making it impossible to accurately systematically quantify search results since many searches return overlapping results (Boeker et al., 2013) and it is not possible to exclude the results of one search from another, or to download search results, and so it is not possible to report the search results and subsequent filtering using a traditional PRISMA flow chart for all sources. Due to the language skills of the research team we were only able to review research studies published in the English language.

2.2 | Search

The full set of search terms used was; 'student experience of online proctoring', 'student experience of remote proctoring', 'student experience' AND 'online proctoring', 'student experience' AND 'remote proctoring',

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'user experience' AND 'digital proctoring', 'user experience' AND 'remote proctoring', student experience AND 'proctorio', student perception AND 'online proctoring', 'online proctoring', 'remote proctoring', 'educational proctoring', 'virtual proctoring', 'student proctoring experience', 'university proctoring', 'video surveillance' AND 'online exams', 'video surveillance' AND 'online proctoring', 'proctorU', 'proctoring' AND 'student voice', 'cheating' AND 'online proctoring', 'student experience' AND 'cheating', 'online proctoring' and 'student', 'cheating' AND 'proctorio', 'online exams' AND 'cheating' AND 'higher education', 'student opinion of online proctoring', 'faculty and student perceptions of online proctoring', 'student perception on virtual proctoring', 'virtual proctoring affecting students', 'academic integrity' AND 'cheating' AND 'online exams', 'cheating' AND 'online exams' AND 'proctor' AND 'student experience', 'user experience' AND 'digital proctoring', 'user experience' AND 'remote proctoring'.

Inclusion criteria

- Participants were students in Higher Education
- Online/Remote Proctoring was used for summative assessments.
- Primary research into student experience. This could be quantitative, qualitative or mixed methods, including surveys, focus groups, interviews etc. They key component is that the student experience was directly captured in studies where students were the key participants.
- English Language publications

Exclusion criteria

- News or opinion pieces
- School/Further Education
- Reviews (studies that were cited in reviews were screened against the inclusion/exclusion criteria, but we only extracted data from those studies in which the primary data were generated, so as to limit the number of interpretative steps between the data and our analysis)

2.3 | Selection of sources of evidence

Each search term was entered separately into each database, without excluding the results from previous searches (due to the limitations explained above) and the results were manually searched by one of the research team. Each search result was considered against the inclusion/exclusion criteria by one of the authors, on the basis of the abstract. If it appeared that a search result met the criteria, or it was unclear, then a further consideration was made of the full text of the study. If there was uncertainty at this point, then this was resolved through discussion at weekly research team meetings. All included studies were discussed and agreed for inclusion by the research team. A total of 349 unique search results were identified using ERIC. 44 of these were selected for further consideration on the basis of the abstracts, of which 14 were included in the final analysis, 18 eligible studies were identified from Google Scholar. After removing duplicates, 21 studies were included in the final analysis.

2.4 | Data charting process

Two authors each independently read every study, extracting and summarising the data into positive and negative aspects of the student experience, and the recommendations that we would make on the basis of the findings of the study. The pragmatic anchoring question for the recommendations was 'on the basis of these findings, what would you advise educators, and universities regarding their use of online proctoring' and authors reviewed the

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content of a paper looking for answers to that question. This could be in for the form of explicit recommendations made within the paper under review or could include an author of the current study making a judgement based upon the content of the paper. Three authors separately coded these data using the principles of thematic analysis (Braun & Clarke, 2006) wherein the extracted data (positives, negatives, recommendations) were coded into common themes. The themes were then developed and agreed by the three authors, and the individual recommendations were then coded into those themes, collapsing replicate findings into single points (e.g. where a specific negative aspect of remote proctoring was reported by more than one study). This process was revisited repeatedly until 'thematic saturation' was reached. That is, additional papers identified in the literature searches did not reveal any additional possible themes.

3 | RESULTS

3.1 | Selection and characteristics of sources of evidence

The included studies and some of their key characteristics are shown in Table 1.

We reviewed 21 studies which included a total of 18,742 participants across all studies. Data were retrieved from approximately nine countries. One study (Balash et al., 2021) did not state a country but used participants who were recruited online using Reddit and Prolific.co.

4 | SUMMARY OF POSITIVES

4.1 | Perception of efficacy for detecting cheating Behaviours

Many students perceive online proctoring services to be as effective as in-person proctoring for the deterrence of cheating in examinations (Alessio & Messinger, 2021; Duncan & Joyner, 2022; Njuguna, 2022; Reedy et al., 2021). When no proctor is present, students perceive it as easier to cheat and feel more inclined to do so which can be exacerbated by online conditions (Alessio et al., 2018; Duncan & Joyner, 2022).

4.2 | Convenience

Generally, online proctoring enables the user to complete testing in any uninterrupted space at any time within a set timeline (Coniam et al., 2021). Students highlighted that this flexibility allows them to complete their examinations with relative ease and comfort (Milone et al., 2017; Muckle et al., 2022). The benefits of convenience were further emphasised during the COVID-19 when remote proctoring enabled examinations to take place in a way that avoided the usual large gatherings (Balash et al., 2021; Muckle et al., 2022). Students were also more inclined to like online proctoring when it aids in reducing study or result delays (Meulmeester et al., 2021).

4.3 | Increased comfort in environment and reduction of test anxiety

The flexibility offered by allowing students to complete examinations flexibly and comfortably led to reduced test anxiety for some students. Specifically, Conijn et al found that students who can *choose* their own testing environment experienced less test anxiety (Conijn et al., 2022). Familiarity and comfort in one's environment were also beneficial for those who deal with mental health conditions or learning disabilities like ADHD (Duncan

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TABLE 1 Studies included in the review.

Author (Year)	Country	Discipline	Number of participants (*N*)	Type(s) of proctoring
Alessio et al. (2018)	USA	Medicine	97	OLP, Unproctored
Alessio and Messinger (2021)	USA	Multidisciplinary	228	AI
Almutawa (2021)	Kuwait	Multidisciplinary	478	AI, RP, OLP
Arnò et al. (2021)	Italy	Nursing Science	92	OLP, AI
Balash et al. (2021)	Unspecified[a]	Multidisciplinary	102	AI
Bergmans et al. (2021)	Netherlands	Computer Science	30	AI
Coniam et al. (2021)	England	English Language	920	OLP
Conijn et al. (2022)	Netherlands	Multidisciplinary	1760	Online, Blended
Duncan and Joyner (2022)	USA	Computer Science	7297	AI
Hussein et al. (2020)	PICT	Multidisciplinary	162	OLP, RP, AI
Kharbat and Abu Daabes (2019)	UAE	Information Technologies (IT)	126	AI
Kolski and Weible (2018)	USA	Psychology	272	RP
Meulmeester et al. (2021)	Netherlands	Medicine	597	AI
Milone et al. (2017)	USA	Pharmacy	622	OLP
Muckle et al. (2022)	USA	Pharmacy	2245	OLP
Njuguna (2022)	Kenya	Business, Information & Communications Technology (ICT), Education	193	OLP
Raman et al. (2021)	India	Business, Biotechnology, Microbiology	430	OLP
Reedy et al. (2021)	Australia	Multidisciplinary	1970	OLP, Unproctored
Sefcik et al. (2022)	Australia	Multidisciplinary	253	AI
Woldeab and Brothen (2019)	USA	Multidisciplinary	631	AI
Woldeab and Brothen (2021)	USA	Multidisciplinary	237	AI, Traditional
Number of Countries				9
Total N				18,742

Note: '*N*' refers to the number of student participants in the study (some studies included faculty and other participants).

Abbreviation: PICT, Pacific Islands, Countries and Territories.

[a]Recruited from Reddit and Prolific.co.

& Joyner, 2022). Woldeab and Brothren compared anxiety scores from students taking final examinations using remote proctoring, with those taking final examinations invigilated in-person. They did not find a difference in anxiety scores, using a validated measure (Westside Anxiety Scale), although their proctored sample was small ($N = 44$). However, *post hoc* analyses suggested that 'online proctoring had a negative effect on students with high anxiety' (Woldeab & Brothen, 2019). More research is needed to fully understand any impact of online proctoring on students test anxiety.

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5 | SUMMARY OF NEGATIVES

Negative themes were dominant in the reviewed studies, across disciplines, universities and countries. Challenges highlighted predominantly included concerns regarding user privacy, technical issues and personal concerns referencing fairness and stress.

5.1 | Privacy concerns

Concerns over user privacy were perhaps the most pervasive and multi-faceted theme across studies. When using online proctoring, participants are often required to provide large amounts of personal information to third parties (Bergmans et al., 2021). A general lack of clarity on who has access to such information, as well as the duration and way it is stored, leading to a risk of data leaks, were all negative features of proctoring (Balash et al., 2021; Bergmans et al., 2021; Sefcik et al., 2022). More fundamentally, users cited personal discomfort as a result of their likeness being actively or passively monitored, captured or listened to by an unknown person or software (Almutawa, 2021; Balash et al., 2021; Muckle et al., 2022). The format suggests that the requirement to be digitally proctored can make students feel as if they are participants in mandatory surveillance (Duncan & Joyner, 2022). Scanning of personal rooms or workspaces was also considered a particularly invasive but necessary requirement for digital proctoring to be successful (Balash et al., 2021).

5.2 | Technological issues

Online proctoring often requires installing third-party software. Students report difficulty with installation itself and that not all devices are compatible with some software providers (Njuguna, 2022; Sefcik et al., 2022). Installation issues become particularly challenging and exacerbated in situations where live technical support or resources to resolve issues were scarce (Njuguna, 2022). Software was reported as inconsistently registering or recognising certain facial features (Arnò et al., 2021). Many software issues are paired to hardware issues as well. Participants identify camera and microphone challenges (Sefcik et al., 2022), along with concerns about even being able to afford the required technology in the first place (Njuguna, 2022). Connectivity also negatively impacts experience; access to consistent and affordable internet is a pre-cursor for the success of using proctoring services, with bandwidth requirements often higher than the examination itself (Arnò et al., 2021; Njuguna, 2022).

5.3 | Fairness

Concerns including user behaviour, environments and socio-economic situations were all reported as relevant elements that negatively impacted the fairness of remote proctoring. As Kolski and Weible note, many participants display subconscious movements, cognitive processing behaviours and physical coping mechanisms that could unfairly trigger some proctoring software (Kolski & Weible, 2018), while proctoring software is not always capable of detecting some cheating behaviours in a reliable and meaningful way (Almutawa, 2021). Additionally, students sometimes note that they lack the proper examination-taking environments further influencing their performance to be worse due to added stress or distraction; for those who are low-income this situation is often worse, again making the system unfair (Kolski & Weible, 2018; Njuguna, 2022).

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5.4 | Stress

A hyper-awareness of being under surveillance led to some students reporting weaker performance in online proctored examinations (Almutawa, 2021). Stress was exacerbated in those students who lack computer literacy (Coniam et al., 2021) or lack test-format familiarity experience, impairing examination performance (Reeveet 2008 in (Conijn et al., 2022)). Some students who previously experienced low-test anxiety in traditional proctoring settings fared worse in online environments as they had an increase in online test anxiety (Conijn et al., 2022). Concerns over technology, and fairness, would also reasonably seem to lead to an increase in stress. Thus, although test anxiety might be reduced by offering flexibility and comfort, this can be at the cost of student comfort in other ways.

6 | SUMMARY OF RECOMMENDATIONS

1. Use compulsory remote proctored examinations as a last resort only when necessary and where it is the most valid, reliable and 'best' possible method.
2. Include students in the development of and decision-making process for, assessments.
3. Use online proctoring as an accompaniment to in-person proctoring or offer it as an alternative to increase accessibility.

6.1 | Use compulsory remote proctored examinations as a last resort only when necessary and where it is the most valid, reliable and 'best' possible method

Any compulsory use of proctoring is underpinned by the use of a specific type of closed-book assessment. Lee suggests that this format is rooted in a problematic educational approach focused on teacher-centred knowledge transmission (Lee & Fanguy, 2022). It would be preferable to encourage use of assessment formats which may not require proctoring at all, such as personalised assignments (Alessio et al., 2018) student-generated content and case base examinations (Milone et al., 2017) and 'open-book' examinations which might deter cheating behaviours (Duncan & Joyner, 2022), although these now appear to be under threat from artificial intelligence tools such as ChatGPT (Newton & Xiromeriti, 2023). Some circumstances where remote proctoring could be considered viable method would be low stakes and frequent examinations as different stressors surrounding the examination would be minimised (Duncan & Joyner, 2022). In these cases, proctoring does discourage some cheating (Newton & Essex, 2023; Njuguna, 2022) and provides reassurance to students that other students are finding it harder to cheat (Alessio & Messinger, 2021; Duncan & Joyner, 2022). This recommendation would appear to be valid for both traditional campus-based programmes and distance-learning programmes, although the latter may have less flexibility in the administration of summative assessment.

6.2 | Include students in the development and decision-making process for assessments

Students are arguably the main stakeholders in any type of discourse pertaining to academic assessments. Despite this the studies have highlighted major discrepancies in privacy, comfort or technological concerns that were not fully considered or communicated to students (Balash et al., 2021; Bergmans et al., 2021; Conijn et al., 2022; Hussein et al., 2020; Meulmeester et al., 2021; Njuguna, 2022). It follows that students often reported that they lacked necessary information, understanding of expectations or even general support leading them to be confused and anxious with online proctoring (Balash et al., 2021; Kolski & Weible, 2018). As a

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pre-cursor, providing students with as much information early on could enable them to make well-informed decisions according to their own individual needs (Balash et al., 2021). There are already many examples of this form of partnership working between students and their institutions, for example through honour councils and the appointment of student representatives to decision-making bodies within the institution. In England, the Office For Students is the government-appointed regulator of Higher Education Providers. Their effective practice advice states that universities should '*Include student representatives on decision-making panels so that student opinions can be taken on board when making changes to university processes, procedures and strategies*.' (Office for Students, 2020). This recommendation seems even more important for higher education providers whose dominant offering is via distance learning and where the remote nature of the students might make representation more challenging.

6.3 | Use online proctoring as an accompaniment to in-person proctoring or offer it as an alternative to increase accessibility

Despite the largely negative sentiment towards proctoring, there are clearly positives, and a heterogeneity of responses with some aspects, particularly the impact on test anxiety. Therefore, online proctoring might be best used as an accommodation or supplemental method of delivery for students who are unable to attend on-campus examinations or potentially for those who fare better, or prefer, the online examination environment. This potentially boosts accessibility overall (Bergmans et al., 2021; Reedy et al., 2021). This recommendation could also be interpreted as advice for higher education providers whose dominant provision of learning, teaching and assessment is via distance learning; some form of in-person assessment may be highly desirable for certain students.

7 | DISCUSSION

The purpose of this pragmatic review was to provide recommendations to universities based on the positive and negative themes identified in research into the student experience of remote proctoring.

7.1 | Summary of evidence

The studies identified highlighted an overall net-negative sentiment from students in relation to their experiences with online proctoring, even though some positives were identified. In multiple studies, a substantial majority of students were explicitly in favour of avoiding the use of online proctoring where possible; for example 98% of participants surveyed by Alessio and Messinger agreed they would not use the software again, which was echoed in Kharbat and Abu Daabes study, albeit at a lower level (77.3%) (Alessio & Messinger, 2021; Kharbat & Abu Daabes, 2021).

Concerns about privacy dominated the narrative. The basic set-up of many remote proctoring systems replicates the 18th century concept of the 'Panopticon', designed by philosopher Jeremy Bentham. In a Panopticon, an anonymous authority entity undertakes unpredictable unseen surveillance with the aim of reducing undesired behaviours. The unseen and unpredictable nature of the surveillance causes the person under surveillance to assume that they are *always* being watched. Bentham's design was intended for multiple settings, including schools, although it is perhaps most commonly and notoriously associated with prison design, and psychological breakdown (Miller & Miller, 1987). The hidden or unseen, and unpredictable nature of the surveillance conducted by remote proctoring also seems to cause those being watched to assume a level of fear over all of their actions, all of the time (Lee & Fanguy, 2022; Meulmeester et al., 2021), and underpins many of the concerns reported.

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The positive aspects highlighted were straightforward; students perceive proctoring to be effective and convenient. These positive aspects seem partly based on a projection of what is familiar to students: traditional learning experiences. In general, the rapid shift to online learning during COVID-associated lockdowns has simply adopted traditional methodology to teach and assess students despite being a different and complex environment (Brown et al., 2022). Thus, the trend in positive themes for student experience can be viewed as a reflection of what they are most familiar with rather than an innovation in online learning and remote assessments. Negative aspects perhaps reflect broader issues, beyond the assessment, in particular privacy and technological challenges. By addressing these issues, we might also drive tangible change and innovation for remote assessments.

Many universities already deploy approaches of the type we recommend. For example, the University of London conducted 25,000 remote proctored examinations over the course of three months in the summer term of 2020; prior to starting the assessments, the University engaged with students and gathered feedback that contributed to a detailed FAQ so students could obtain answers to questions any questions that may arise during the remote assessment process (University of London, 2022). The University of Edinburgh stated in their assessment policy that online proctoring should be reserved for a few high-stakes examinations where there is no satisfactory alternative and that is should not be mainstreamed but remain an option. However, the University has recently decided to not proceed with using online invigilation services following a report on the use of proctoring service 'Examity' in the 2021–2022 academic year (University of Edinburgh, 2022). The University of Edinburgh is not the only university to limit or discontinue its use of online proctoring based on students concerns (e.g., Kharbat & Abu Daabes, 2021; Silverman, 2021; University of Illinois, 2022), while some institutions formed coalition groups against proctoring to provide a more unified stance on remote assessments and thus are resetting the terms on the narrative for remote assessment overall (Logan, 2021).

7.2 | Limitations

One feature which is both a strength and a potential weakness was the saturation of information in the consulted research. Despite the breadth of potential articles available through ERIC and Google Scholar, the team encountered thematic saturation quite quickly, and eventually content overlap once narrowed down with distinct terms. In essence, the same themes were coming up again and again. In addition to assessing the employment of the practical recommendations offered above, research could further benefit from studies adopting an intersectional approach when considering the student experience through different social, cultural, economic and personal lenses. In this way, evidence could become more diverse and provide clearer reasoning on different factors that may impact student assessments.

There are multiple variables contained within the studies reviewed here; different countries, with different privacy laws, different universities, different disciplines, pre/during COVID, different years (as the technology evolves) and different types of proctoring. Many of these variables may play a role impacting the student experience of remote proctoring. We did not see any influence of these variables in the research undertaken here, and the results and recommendations would seem to be valid regardless of whether these variables have an impact. For example, privacy laws may be different in different countries, and so the data protection concerns would be differentially impacted. However, many of the concerns expressed by students were largely independent of a legal definition or consideration of privacy. Instead, the data spoke to a basic unhappiness about intrusion and discomfort. Nevertheless, some further research on these variables could be helpful for education providers when implementing remote proctoring.

One variable which appears to be a factor in our analysis is the distinction between established providers and online learning, and campus-based providers who are considering the switch to online assessment. Many of the studies reviewed were conducted during the COVID-19 pandemic and acknowledge institutions' relatively fast shift to the online learning format, although it was not always clear whether the data were collected during lockdown, or as a result of a rapid shift to remote proctoring or the evaluation of an existing system. Nevertheless

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this likely affected some results as government policy outweighed institutional policies leaving even less room for the student to be considered in almost every scenario. For example, Balash notes that 97% of respondents in their study reported proctored examinations to be a mandatory decision from a higher authority (Balash et al., 2021). Thus very recent studies are likely to be influenced by student experience throughout COVID, where perhaps education providers had less flexibility due to societal and government pressures, alongside time and resource constraints.

Nevertheless, the pandemic also underscored the need for remote proctoring, and many providers learned a lot, very quickly, during the transition to remote assessment. There was a sharp increase in the rate of cheating in online examinations during COVID, up from a rate that was already high, although there was some evidence that cheating was reduced by remote proctoring (Newton & Essex, 2023). Even as education providers continue to recover from the lockdown learning required by the pandemic, there is another emergent crisis in Higher Education assessment; the very rapid spread of Artificial Intelligence tools such as ChatGPT; these are extremely good at passing the sorts of examinations used in Higher Education (Newton & Xiromeriti, 2023) and are already freely, ubiquitously available. Any education provider that currently delivers online summative assessments will again quickly have to deploy some form of remote proctoring in order for those assessments to remain valid. It is clear that the recommendations are derived largely from evaluations of the implementation of remote proctoring by providers who have some form of campus presence, and so should prove useful to traditional universities if they wish to effectively use remote assessments as part of their response to the academic integrity challenges posed by tools such as ChatGPT.

However, unfortunately another limitation of the findings here is that they will take time to implement, and most cannot be implemented by individual educators; instead they require an institutional approach. The lessons learned through rapid implementation of remote proctoring during lockdown and then reviewed here, are alas not a quick fix. Even then, a recent review notes that remote proctoring will not completely eliminate malpractice, and there is a need to ensure that the positive aspects of the technology are not sacrificed in attempting to do so (Han et al., 2023). There is also possibly a gap in the literature from established providers of distance learning and their experiences with remote proctoring, which could support traditional campus-based providers in their use of the technologies.

We focused only on the use of remote proctoring for summative assessment, on the basis that there is a greater need to ensure the security of these, when compared to formative assessments. This is also perhaps a limitation; a consideration of remote proctoring for formative assessments might give a fuller picture of the student experience, although we did not identify any studies which explicitly examined formative assessments. This is an area for further research and practice development; one route to allaying some of the concerns expressed by students might be simply to use it formatively as preparation for summative assessments, and so allow for familiarity and to work through any technical challenges.

A final limitation to consider for this study was the approach to consulting research emphasised only the student voice and no other stakeholders. While the focus of this research was to give an explicit platform to the student voice in the proctoring experience, it would be interesting to consider how the narrative of remote proctoring could develop further by including additional perspectives to contextualise the line of thinking to administer remote proctoring, in particular it would be beneficial to consider perspectives from both sides of the currently heated debate about privacy.

7.3 | Conclusions

As the Higher Education sector recovers from the lockdown learning forced by COVID, it appears that another challenge to assessment is already here, in the form of ChatGPT and similar tools. For online assessments to remain valid, there is an urgent need to either begin the effective implementation of remote proctoring, by working with students as partners to increase the likelihood of a positive student experience and/or to limit the use of

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proctoring and instead utilise in-person assessments. However, both these approaches will require an institutional approach and will take time to implement.

AUTHOR CONTRIBUTIONS

P. M. Newton: Conceptualization; investigation; writing – original draft; methodology; validation; writing – review and editing; formal analysis; project administration; data curation; supervision. **E. Marano:** Investigation; writing – original draft; writing – review and editing; formal analysis; data curation. **Z. Birch:** Investigation; writing – original draft; writing – review and editing; formal analysis. **M. Croombs:** Investigation; writing – original draft; writing – review and editing; formal analysis. **C. Gilbert:** Investigation; writing – original draft; writing – review and editing; formal analysis. **M. J. Draper:** Supervision; writing – review and editing; conceptualization.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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