



International Education Standards – Assessment (IES 6) Fit-For-Purpose 2022 Literature Review

BACKGROUND

1. *IES 6, Assessment of Professional Competence* prescribes the requirements for the assessment of the professional competence that aspiring professional accountants are required to demonstrate by the end of Initial Professional Development (“IPD”). This involves assessing learning outcomes aligned to competence areas to have confidence that an aspiring accountant has attained the required level of professional competence by the end of IPD.
2. Assessments are a key feature of the journey to becoming a professional accountant. Every year, thousands of aspiring professional accountants write low- to high-stakes in-person paper-based or computer-based examinations. The past few years have brought new challenges and opportunities, including the evolution of candidate assessment. With COVID-19 forcing many examination centers across the world to close, professional accountancy organizations (PAOs) had to either postpone or pivot to remote online examinations.
3. Based on the input from IFAC Member Bodies’ Accountancy Education Directors and the Forum of Firms, further outreach and consideration was deemed appropriate to consider if any revisions to the existing IES, specifically IES 6, was needed.

INFORMATION GATHERING – LITERATURE REVIEW

4. The Working Group has conducted a literature review as part of the IES 6 Fit-for-Purpose project. The below documents the online assessment and proctoring resources. The online resources below are grouped to assist in focusing on four specific aspects of online assessment and proctoring:
 - A. Short narratives published online in the IFAC Knowledge Gateway, PAO Activities
 - B. Aspects of Proctoring to Consider in Online Examinations/Assessment
 - C. Impact of Online Assessments on Student Performance
 - D. Issues of Integrity and Online Assessments

(A) SHORT NARRATIVES PUBLISHED ONLINE IN THE IFAC KNOWLEDGE GATEWAY, PAO ACTIVITIES

[PAOs Counting on Each Other – The Race to Online Examinations](#)

Assessments are a key feature of the journey to becoming a professional accountant. Every year, thousands of aspiring professional accountants write low- to high-stakes in-person paper-based or computer-based examinations.

[CA ANZ’s Rapid Move to Online Exams and Beyond -A Case Study of Six Weeks from Start to Delivery](#)

During a [virtual knowledge sharing event](#) for professional accountancy organizations on the [race to online examinations during COVID-19](#), Simon Hann of the Chartered Accountants Australia + New Zealand (CA ANZ) said that the rapid move to online exams due to COVID-19 within a period six weeks required – in short – blood, sweat, and tears. In its report, [Our rapid move to online exams and beyond](#), CA ANZ shares its journey.

[ACCA’s Swift Introduction of Remote Invigilation in COVID-19](#)

During a [virtual knowledge sharing event](#) for professional accountancy organizations on the [race to online examinations during COVID-19](#), Alan Hatfield, Executive Director – Strategy and Development at ACCA, shared ACCA’s swift introduction of remote invigilation in COVID-19. The report, [ACCA’s remote invigilation journey](#), provides more detail.



[Online Examinations During COVID-19: How MonICPA Turned Disruption into an Opportunity](#)

The COVID-19 pandemic has provided plenty of challenges and opportunities for professional accountancy organizations (PAOs) in our approach to operational activities. A key purpose we serve is assessing future professional accountants. The accountancy education cycle is important in ensuring that PAOs deliver an adequate pipeline of competent professional accountants to the workplace. As the bodies responsible for administering the entry examination, PAOs fulfill a key public interest need.

[Top Marks for Chartered Accountants Ireland's 2020 Online Exams](#)

As the largest accountancy body on the island of Ireland numbering 29,000 members, Chartered Accountants Ireland is proud of its mandate as the sole education provider and examining body for its 6,600 Chartered students. Back in February 2020, the future of our examinations looked steady, with a tried and tested model based on traditional exam halls, invigilators, paper scripts and exam markers huddled together in dense concentration over the following weekends. What could possibly go wrong?

(B) ASPECTS OF PROCTORING TO CONSIDER IN ONLINE EXAMINATIONS/ASSESSMENTS

Giller, P. (2021), E-PROCTORING IN THEORY AND PRACTICE: A REVIEW, A Report commissioned by Quality and Qualifications Ireland, October 2021. <https://www.qqi.ie/sites/default/files/2021-12/e-proctoring-in-theory-and-practice-a-review.pdf>

Forward: Since the start of the COVID emergency, remote assessment has been high on everyone's agenda across the education sector. Invigilated examinations were impossible under lockdown conditions and this led to the implementation of alternatives including remote examinations. The latter stimulated interest in e-proctoring. In response to this, and with the support of the National Academic Integrity Network (NAIN), Quality and Qualifications Ireland (QQI) commissioned a landscape review of e-proctoring (i) literature (ii) policies and practices and (iii) experiences of: Irish and foreign higher education institutions; academic and professional support staff; students, including international students; and professional, statutory and regulatory bodies. The review aims to inform higher education academic staff and managers about the opportunities and challenges of implementing e-proctoring. It begins by looking at the main drivers for the adoption of e-proctoring, the various approaches that are used and the extent of the adoption nationally and internationally. It then considers the practicalities involved in implementing e-proctoring and follows-up this with some case studies, including successes and failures. The review goes on to explore some of the challenges that institutions will face when implementing e-proctoring, outlines some of the services that are available and presents some alternatives to e-proctoring. The review concludes with recommendations for institutions thinking about implementing e-proctoring. Assessment is complicated and e-proctoring, like most items in the assessment toolkit, has limitations but in the right setting and properly implemented it can be useful.

Kharbat, F. F., & Abu Daabes, A. S. (2021). E-proctored exams during the COVID-19 pandemic: A close understanding. *Education and Information Technologies*, 26(6), 6589–6605. <https://doi.org/10.1007/s10639-021-10458-7> (Open Access)

Abstract: Researchers have focused on evaluating and exploring the online examination experience during the COVID-19 pandemic. However, understanding the perceptions of using an e-proctoring tool within the online examination experience is still limited. This study explores the first unique experience for students' attitudes and concerns using an e-proctoring tool in their final exams during the COVID-19 pandemic. It also highlights the e-tools' impact on students' performances to guide educational institutions towards appropriate practices going forward, especially as the pandemic is expected to have far-reaching consequences. A mixed-methods analysis was used to examine heterogeneous sources of data including self-reported data and officially documented data. The data was analyzed by a qualitative analysis of the focus group and quantitative analyses of the survey questions and exam attempts. In June 2020, students participated in a focus group to elaborate on their attitudes and concerns pertaining to their e-proctoring experience. Based on the preliminary outcomes, a survey was developed and distributed to a purposive sample ($n = 106$) of students from information technology majors who had taken at least one e-proctored



exam during the COVID-19 pandemic. Finally, 21 online exams with 815 total attempts were analyzed to assess how well students performed under an e-proctored test. The study's findings shed light on students' perceptions of their e-proctoring experience, including their predominant concerns over privacy and various environmental and psychological factors. The research also highlights challenges in implementing the e-proctoring tool as well as its impact on students' performance.

Kolski, T., & Weible, J. (2018). Examining the Relationship Between Student Test Anxiety and Webcam Based Exam Proctoring. *Online Journal of Distance Learning*, 21(3), 1–15.

Abstract: With increased pressures on maintaining a stellar academic performance for future academia or occupational possibilities, students may suffer test anxiety at some point in their higher education journey. For decades, empirical, observational, research has been conducted to determine the psychological and physiological effects of test anxiety. This exploratory research examines the in-situ behaviors displayed by students while taking online course exams through use of a virtual proctor and how that relates to student self-reported indications of test anxiety. While the top ten behaviors observed to occur most frequently (e.g., directional change in gaze, furrowed eyebrows) do not align with reported physiological responses of test anxiety, the findings of this exploratory research can prepare instructors for what behaviors they can expect to see from their students while taking virtual proctored exams. In interviews, students self-identified behavioral coping skills used while taking their exams. This unexpected finding was consistent with the behaviors demonstrated by students and invites the opportunity for instructors to incorporate material within their eLearning courses that will help students become calmer while taking their online exams.

Lilley, M, Barker, T & Meere, J. (2016) 'Remote live invigilation: a pilot study', *Journal of Interactive Media in Education*, no. 1, pp. 1-5.

Abstract: There has been a growth in online distance learning programmes in Higher Education. This has led to an increased interest in different approaches to the assessment of online distance learners, including how to enhance student authentication and reduce the potential for cheating in online tests. One potential solution for this is the use of remote live invigilation. This work reports on a small scale pilot study where a group of 17 online distance learning Computer Science students from 7 different countries (Egypt, Kenya, Saudi Arabia, Slovakia, Trinidad & Tobago, United Kingdom, Zambia) took part in an online test using remote live invigilation. Some examinees expressed concerns about data security and privacy. Furthermore, some examinees expressed concerns about the extent to which the remote live invigilation process would be intrusive, and impact negatively on their online assessment experience. Overall, findings from this study suggest that the remote live invigilation did not affect the assessment experience of the examinees in any way, with some examinees reporting that knowing that a live proctor was present gave them "peace of mind" in case technical problems occurred during the online test. Additionally, examinees suggested that remote live invigilation should be used more widely in online distance learning programmes as a means to enhance credibility.

Milone, A. S., Cortese, A. M., Balestrieri, R. L., & Pittenger, A. L. (2017). The impact of proctored online exams on the educational experience. *Currents in Pharmacy Teaching and Learning*, 9(1), 108–114. <https://doi.org/10.1016/j.cptl.2016.08.037> (Not Open Access)

Abstract: This study explored new ways to maintain academic integrity for large enrollment, completely online courses. We examined the use of ProctorU as our proctoring strategy with the objectives to identify any implementation challenges and understand the impact of using an online proctor on the student experience.

In fall 2013, students were surveyed after each exam. Based on these preliminary findings, ProctorU-related questions were included in the course evaluation administered in spring 2014. A mixed-methods analysis plan was used to examine the results, including quantitative analysis and qualitative analysis of open-ended survey questions. In the fall 2013 surveys, 88.95% of students reported being satisfied with their experience using ProctorU. Of those who were unsatisfied, following three emerging themes were identified: took too long to setup, technical difficulties, and personnel issues with proctors. In the spring 2014 course evaluation data, the majority of students rated the experience "good" (57.53%), but a large



number of those same students also commented on issues they encountered. Over half of the students indicated that the use of ProctorU would influence their future decision to take another online course, either negatively or positively.

The question of how to maintain academic integrity with online courses is still an ongoing question, but this project demonstrates that online proctoring does influence the educational experience in ways that must be considered when determining the risk and benefit balance of proctored and unproctored assessments.

Nigam, A., Pasricha, R., Singh, T. *et al.* A Systematic Review on AI-based Proctoring Systems: Past, Present and Future. *Educ Inf Technol* **26**, 6421–6445 (2021). <https://doi.org/10.1007/s10639-021-10597-x> (Open Access)

Abstract: There have been giant leaps in the field of education in the past 1–2 years.. Schools and colleges are transitioning online to provide more resources to their students. The COVID-19 pandemic has provided students more opportunities to learn and improve themselves at their own pace. Online proctoring services (part of assessment) are also on the rise, and AI-based proctoring systems (henceforth called as AIPS) have taken the market by storm. Online proctoring systems (henceforth called as OPS), in general, makes use of online tools to maintain the sanctity of the examination. While most of this software uses various modules, the sensitive information they collect raises concerns among the student community. There are various psychological, cultural and technological parameters need to be considered while developing AIPS. This paper systematically reviews existing AI and non-AI-based proctoring systems. Through the systematic search on Scopus, Web of Science and ERIC repositories, 43 paper were listed out from the year 2015 to 2021. We addressed 4 primary research questions which were focusing on existing architecture of AIPS, Parameters to be considered for AIPS, trends and Issues in AIPS and Future of AIPS. Our 360-degree analysis on OPS and AIPS reveals that security issues associated with AIPS are multiplying and are a cause of legitimate concern. Major issues include Security and Privacy concerns, ethical concerns, Trust in AI-based technology, lack of training among usage of technology, cost and many more. It is difficult to know whether the benefits of these Online Proctoring technologies outweigh their risks. The most reasonable conclusion we can reach in the present is that the ethical justification of these technologies and their various capabilities requires us to rigorously ensure that a balance is struck between the concerns with the possible benefits to the best of our abilities. To the best of our knowledge, there is no such analysis on AIPS and OPS. Our work further addresses the issues in AIPS in human and technological aspect. It also lists out key points and new technologies that have only recently been introduced but could significantly impact online education and OPS in the years to come.

Prince, D.J., Fulton, R.A., Garsombke, T.W. (2009) ‘Comparisons of Proctored Versus Non-Proctored Testing Strategies in Graduate Distance Education Curriculum’ *Journal of College Teaching & Learning* – November 2009 Volume 6, Number 7

Abstract: The authors studied the testing pattern grades in four e-campus courses at Troy University with 76 graduate students. In their research, the authors found significant differences in average test grade scores between tests taken electronically without a proctor as compared to those administered using a live or a remote proctor overall. To control for differences among courses, a statistical test was solely conducted on the courses which had the same instructor, same text, and similar tests with comparable results; students scored significantly lower on proctored exams versus non-proctored exams. To enhance the quality of courses in the online environment, the researchers recommend several “best practices” pedagogical strategies based on their findings and an extensive literature review.

Weiner, JA & Hurtz, GM (2017) ‘A comparative study of online remote proctored versus onsite proctored high-stakes exams’ *Journal of Applied Testing Technology*, vol. 18, no. 1, pp. 1320.

Abstract: Advances in technology have spurred innovations in secure assessment delivery. One such innovation, remote online proctoring, has become increasingly sophisticated and is gaining wider consideration for high-stakes testing. However, there is an absence of published research examining remote online proctoring and its effects on test scores and the examinee experience. This paper describes a quasi-experimental field study carried out with three professional licensing examinations administered



concurrently at different test sites that offered either onsite proctoring in testing centers or remote online proctoring in computer kiosks where the testing was proctored via Internet-connected video communication and surveillance. Results using both classical test theory and item response theory methods revealed substantial reliability and a strong degree of measurement equivalence across proctoring conditions. Candidates revealed slightly less positive reactions to some of the remote proctored testing conditions, but reactions were positive overall and had virtually no relation to test performance. Overall, the results of this study support the equivalence of kiosk-based remote online proctored exams and exams proctored onsite in test centers.

Cramp, J., Medlin, J., Lake, P., Sharpe, C., Lake, P., University of South Australia, Sharp, C., & University of South Australia. (2019). Lessons learned from implementing remotely invigilated online exams. *Journal of University Teaching and Learning Practice*, 16(1), 137–155. <https://doi.org/10.53761/1.16.1.10> (Open Access)

Abstract: This paper outlines the key issues of remotely invigilated online exams (RIOEs) and presents ways to avoid and resolve the issues for educators who are considering implementing them. The purpose of this paper is to share the lessons learned during the process of implementing and evaluating RIOEs and highlight the key considerations required to conduct RIOEs more seamlessly, whilst minimising students' cognitive load. With the continued growth, and future importance of online tertiary education, this paper provides an important contribution to the understanding of the best methods and practices by which to conduct online examinations and provides a foundation for continued research and enhancement of effective RIOEs.

The paper follows an extensive Action Learning process to develop and present a case study that was conducted across nine fully online business courses in a start-up venture for the University of South Australia. Cognitive load theory underpins the case study, which enabled the researchers to gain profound understanding into the RIOE process, identify issues and offer resolutions. RIOEs require more systematic and effective design compared to traditional paper-based exams and should be supplemented by early and clear communication with students. Educators should enable and encourage students to rehearse the exam service access procedures prior to their exams and students should be provided with real-time responsive technical support for any ad hoc issues that may present during the exam. These factors play a critical role in ensuring the successful implementation of RIOEs.

(C) IMPACT OF ONLINE ASSESSMENTS ON STUDENT PERFORMANCE

Alessio, HM, Malay, N, Maurer, K, Bailer, AJ & Rubin, B. (2017) 'Examining the effect of proctoring on online test scores', *Online Learning*, vol. 21, no. 1, pp. 208-208.

Summary: There is a general perception that the credibility of online classes is poor due to breaches in student integrity. Proctoring software have been developed to address and prevent academic dishonesty. The study compared online test results from proctored versus unproctored online tests (including unproctored with Lockdown). Test performance of 147 students enrolled in multiple sections of an online undergraduate course on Medical Terminology (which is a lower-level undergraduate elective course) were compared using linear mixed effects models with nearly half the students having no proctoring and the remainder required to use online proctoring software. Based on the results, students enrolled in the same online course with video monitoring scored an average of 17 points lower than their peers with no test proctoring or unproctored with Lockdown. The time taken by students with proctoring was also lesser (30.5% less of the time allocated) compared to those without proctoring, suggesting the likelihood of academic dishonesty by using prohibited resources during the test. Lockdown software without video monitoring did not have a similar impact as that with video monitoring. The study concluded that proctoring with video monitoring significantly negatively impacts online test grades, probably because it deters cheating and would improve academic integrity of online tests.

Andreou, V., Peters, S., Eggermont, J. et al. Remote versus on-site proctored exam: comparing student results in a cross-sectional study. *BMC Med Educ* 21, 624 (2021). <https://doi.org/10.1186/s12909-021-03068-x>



Summary: This study aims at contributing to evaluation research by comparing exam results of an on-site proctored high-stakes medical exam to those of a remote proctored high-stakes medical exam using customised proctoring software. Remote proctoring was utilised to administer a proficiency-test for admission to the Advanced Master of General Practice (AMGP) where exam results of the remote proctored exam group were compared to those of the on-site proctored exam group (472 used remote proctoring while 121 were present on campus). The results indicated that exam results are equivalent and comparable between the remote and on-site proctored groups. As such, indicating that remote proctoring could be a viable solution for administering high-stakes medical exams. A sophisticated proctoring software registering behaviour and recording sound and image to prevent fraud has proven to be efficient without affecting exam outcomes. However, potential privacy issues and increased test anxiety influencing educational experience should be considered when determining and choosing remote types of proctoring.

Daffin, JLW & Jones, AA (2018) 'Comparing student performance on proctored and non-proctored exams in online psychology courses', *Online Learning*, vol. 22, no. 1, pp. 131-145

Summary: One of the criticisms of online learning is a lack of academic integrity in the online environment. The purpose of the study is to explore the integrity issue and to investigate student performance on online examinations. The study utilized a sample of about 1,700 students who took 15 online psychology classes of varying difficulty at Washington State University across 4 semesters (from spring 2015 to spring 2016). It was found that students performed 10–20% better and took about twice as long on non-proctored versus proctored exams. The effect held when comparing in-house proctoring service used during this time against ProctorU, suggesting that the proctoring service used was not a factor in student performance. In each online class, one exam is proctored and the remaining exams are non-proctored. Results showed better performance when the exam was non-proctored than when it was proctored. Finally, it was concluded that the change in instructors did not affect the results of the examinations. There is a need to design courses with the risk of academic dishonesty in mind. The current study adds to the growing body of literature showing that students perform better when an online exam is not proctored. Cheating is one explanation for this behaviour, but so is student-reported anxiety about test taking.

Gemma Cherry, Michael O'Leary, Oksana Naumenko, Li-Ann Kuan, Linda Waters, Do outcomes from high stakes examinations taken in test centres and via live remote proctoring differ?, *Computers and Education Open*, Volume 2, 2021, 100061, ISSN 2666-5573, <https://doi.org/10.1016/j.caeo.2021.100061>. (Open Access)

Summary: The paper was designed to examine not only the extent to which candidate outcomes are equivalent but also the extent to which the psychometric properties of tests are comparable across contexts in which candidates taking credentialing examinations were being proctored using live remote proctoring (LRP) technology or in testing centres using the more traditional proctoring approach (test centre proctoring, TCP). The study uses data from eleven professional licensure examinations taken by 14,097 candidates across four US States to compare outcomes. Candidate outcomes were compared using average percent correct and passing rates. Results show similarities between candidate outcomes and the psychometric properties of examinations that are proctored via LRP and TCP. We find no evidence to suggest that candidates perform or behave differently across testing modes. Additionally, there is no indication that candidates completing an examination using their own device is altogether different to completing an examination at a traditional testing centre, on the devices provided. Overall, with the exception of some observable differences in metrics pertaining to item discrimination and timing, no detectable pattern was observed in favour of either mode. The study is significant in that it provides early evidence supporting the use of LRP in high stakes contexts.

(D) ISSUES OF INTEGRITY AND ONLINE ASSESSMENTS



Bearman, M., Dawson, P., O'Donnell, M., Tai, J. and Jorre de St Jorre, T. (2020) Ensuring academic integrity and assessment security with redesigned online delivery. Deakin University, Melbourne. <http://dteach.deakin.edu.au/2020/03/23/academic-integrity-online/>

Summary: This guide is designed to assist with redesigning assessment, to suit fully online delivery, without invigilated exams. Some assessments can easily move to online delivery or submission some assessment will need to be redesigned to ensure that quality and rigour are maintained. The content includes: a) Academic integrity, assessment security and digital assessment that outlines the latest research on how to keep digital assessment tasks secure; b) Three key questions to guide redesigning exams for online delivery; c) redesigning exams: decision helper that provides a decision tree to assist moving exams to new formats; d) examples of converting single answer correct/MCQ questions to a unique answer format; e) tips for moving practical exams or assessments to online equivalents; f) Tips for moving complex unique response exams (eg essay style) to online equivalents

Coghlan, S., Miller, T., & Paterson, J. (2021). Good Proctor or “Big Brother”? Ethics of Online Exam Supervision Technologies. *Philosophy & Technology*, 34(4), 1581–1606. <https://doi.org/10.1007/s13347-021-00476-1> (Open Access)

Abstract: Online exam supervision technologies have recently generated significant controversy and concern. Their use is now booming due to growing demand for online courses and for off-campus assessment options amid COVID-19 lockdowns. Online proctoring technologies purport to effectively oversee students sitting online exams by using artificial intelligence (AI) systems supplemented by human invigilators. Such technologies have alarmed some students who see them as a “Big Brother-like” threat to liberty and privacy, and as potentially unfair and discriminatory. However, some universities and educators defend their judicious use. Critical ethical appraisal of online proctoring technologies is overdue. This essay provides one of the first sustained moral philosophical analyses of these technologies, focusing on ethical notions of academic integrity, fairness, non-maleficence, transparency, privacy, autonomy, liberty, and trust. Most of these concepts are prominent in the new field of AI ethics, and all are relevant to education. The essay discusses these ethical issues. It also offers suggestions for educational institutions and educators interested in the technologies about the kinds of inquiries they need to make and the governance and review processes they might need to adopt to justify and remain accountable for using online proctoring technologies. The rapid and contentious rise of proctoring software provides a fruitful ethical case study of how AI is infiltrating all areas of life. The social impacts and moral consequences of this digital technology warrant ongoing scrutiny and study.

Coghlan, S., Paterson, J., Cohny, S., & Miller, T. (2021). Unis are using artificial intelligence to keep students sitting exams honest. But this creates its own problems. *The Conversation*, November 10. <https://theconversation.com/unis-are-using-artificial-intelligence-to-keep-students-sitting-exams-honest-but-this-creates-its-own-problems-170708> (Open Access)

Summary: It is important to find ways to fairly administer exams remotely given that it may not always be able to replace exams with other assessments. Some educational institutions claim proctoring technologies are needed to prevent cheating. Some other institutions and students are concerned about hidden dangers. Institutions using automated proctoring software need to be accountable. This means being transparent with students about how the technology works and what can happen to student data. This article summarises what proctoring software does and why it is used, and the need to weigh the risks inherent in the technology.

Dendir, S., & Maxwell, R. S. (2020). Cheating in online courses: Evidence from online proctoring. *Computers in Human Behavior Reports*, 2, 100033. <https://doi.org/10.1016/j.chbr.2020.100033> (Open Access)

Abstract: This study revives the unsettled debate on the extent of academic dishonesty in online courses. It takes advantage of a quasi experiment in which online proctoring using a webcam recording software was introduced for high-stakes exams in two online courses. Each course remained the same in its



structure, content and assessments before and after the introduction of online proctoring. Analysis of exam scores shows that online proctoring was associated with a decrease in average performance in both courses. Furthermore, the decrease in scores persists when accounting for potential confounding factors in a regression framework. Finally, in separate regressions of exam performance on student characteristics, the regression explanatory power was higher for scores under proctoring. We interpret these results as evidence that cheating took place in the online courses prior to proctoring. The results also imply that online proctoring is an effective tool to mitigate academic dishonesty in online courses.

Hylton, K., Levy, Y. & Dringus, L. P. (2016) 'Utilizing webcam-based proctoring to deter misconduct in online exams', *Computers and Education*, vol. 92–93, pp. 53–63

Abstract: Deception and dishonesty in online exams are believed to link to their unmonitored nature where users appear to have the opportunity to collaborate or utilize unauthorized resources during these assessments. The primary goal of this study was to investigate the deterrent effect of Webcam-based proctoring on misconduct during online exams. This study involved an experimental design in comparing an experimental group and a control group. Both groups attended the same course, used the same e-learning system, with the same instructor, and took the same set of online exams. One group was monitored by a Web-based proctor while the other was not monitored. The results indicated no statistically significant difference between the scores of the two groups, although the non-proctored group had slightly higher scores. There was a statistically significant difference found on the time taken to complete the online exams where the proctored group used significantly less time to complete their exams. The results of a post-experiment survey indicated that those who were not proctored perceived to have experienced greater levels of opportunity to engage in misconduct than those who were monitored by a Web-based proctor.

Langenfeld T. (2020). *Internet-Based Proctored Assessment: Security and Fairness Issues*. *Educational Measurement, Issues and Practice*, 10.1111/emip.12359. <https://doi.org/10.1111/emip.12359> (Open Access)

Abstract: The COVID-19 pandemic has accelerated the shift toward online learning solutions necessitating the need for developing online assessment solutions. Vendors offer online assessment delivery systems with varying security levels designed to minimize unauthorized behaviors. Combating cheating and securing assessment content, however, is not solely the responsibility of the delivery system. Assessment design practices also effectively minimize cheating and protect content. In developing online assessment solutions, organizations also must strive to ensure that all students have the opportunity to test.

Reedy et al. (2020), *Responding to the COVID-19 emergency: student and academic staff perception of academic integrity in transition to online exams at three Australian universities*, *International Journal for Educational Integrity*, 2021 17:9

Abstract: This paper explores the perceptions of academic staff and students to student cheating behaviours in online exams and other online assessment formats. The research took place at three Australian universities in July and August 2020 during the emergency transition to online learning and assessment in response to the COVID-19 pandemic. The study sought to inform decision making about the future of online exams at the participating universities. Quantitative and qualitative data were collected using online surveys. The findings of the study led to seven key observations, most notably the need to redefine the characteristics of academic misconduct to account for changes wrought to examinations in a digital world. The study concludes with lessons learned in relation to enhancing academic integrity in digital examinations and assessments.

Tomasi, L.F., Fifiel, V. L., Widener, M. (2009) 'I've Got My Virtual Eye on You: Remote Proctors and Academic Integrity' *Contemporary Issues in Education Research – First Quarter 2009 Volume 2, Number 1*



Abstract: This paper discusses the challenges of online teaching, the reasons students cheat and one means of curtailing that cheating in the online environment. The use of Secureexam Remote Proctor System in one university application is reviewed.

Jaap, A., Dewar, A., Duncan, C., Fairhurst, K., Hope, D., & Kluth, D. (2021). Effect of remote online exam delivery on student experience and performance in applied knowledge tests. *BMC Medical Education*, 21(1), 86. <https://doi.org/10.1186/s12909-021-02521-1> (Open Access)

Abstract: The use of remote online delivery of summative assessments has been underexplored in medical education. Due to the COVID-19 pandemic, all end of year applied knowledge multiple choice question (MCQ) tests at one UK medical school were switched from on campus to remote assessments. We conducted an online survey of student experience with remote exam delivery and compared test performance in remote versus invigilated campus-based forms of similar assessments for Year 4 and 5 students across two academic years.

Very few students experienced technical or practical problems in completing their exam remotely. Test anxiety was reduced for some students but increased for others. The majority of students preferred the traditional setting of invigilated exams in a computer lab, feeling this ensured an even playing field for all candidates. Mean score was higher for Year 4 students in the remotely-delivered versus campus-based form of the same exam (76.53% [SD 6.57] vs. 72.81% [6.64]; $t_{438.38} = 5.94, p = 0.001; d = 0.56$), whereas candidate performance was equivalent across both forms for Year 5 students. Remote online MCQ exam delivery is an effective and generally acceptable approach to summative assessment, and could be used again in future without detriment to students if onsite delivery is not possible.