

# STRATEGIES FOR USING ONLINE INVIGILATED EXAMS

**Author: Associate Professor Phillip Dawson, Deakin University**

## What are online invigilated exams?

Online invigilated exams (also known as remote proctored exams, supervised online exams, or some other combination of these words) are a type of computer-based assessment that is supervised to reduce the likelihood of cheating. They are an attempt to reproduce exam conditions outside of face-to-face exams, and they are usually undertaken by students at their own homes on their own computers. The supervision takes many forms, usually including some combination of the following (Dawson, 2021):

- **Lockdown:** special software is installed on the student's device that stops them from accessing unauthorized programs or information. For example, in a closed-book exam, the software might attempt to stop the student from accessing any software other than the exam platform, deny access to the student's documents, and block access to all other websites.
- **Authentication:** student identity is verified through a variety of means, commonly through using the webcam to check if the student matches an official photograph that may be stored on an identification card or in a database. Additional authentication approaches include analyzing the student's typing patterns, as these are believed to be unique, or the use of fingerprint scanners. Passwords are not usually enough for authenticating as they can be easily shared.
- **Monitoring:** the student's computer, their microphone and their webcam are used to attempt to ensure that test conditions are being maintained. This takes various forms, involving a mix of human invigilators and artificial intelligence, and the analysis of the student behavior can be done live as the student sits the exam or retrospectively with a recording of the exam.

Most education providers that use online invigilated exams make use of a third-party vendor for the invigilation, who may also provide the exam platform. Alternatively, the education provider may use their learning management system or a different third party exam platform. Examples of vendors in this space include:

- Examity
- IRIS Invigilation
- Pearson VUE
- Proctorio
- Proctortrack
- ProctorU



This is an incomplete list, presented in alphabetical order without any implication of endorsement. A more complete list is maintained by the [eAssessment Association's Special Interest Group on Remote Proctoring](#).

## What are the main types of online invigilated exams?

There are two main distinctions to be drawn when discussing online invigilated exams. Firstly, there is the distinction between real-time invigilation and recorded invigilation. Secondly, there is the distinction between invigilation that is done by people or by artificial intelligence. In real-time invigilation, students are monitored in as they do the exam, which means that any suspected problems can be investigated immediately. For example, ProctorU (2020) state that over six months of exam data, consisting of 2.5 million exams, invigilators intervened to stop potential breaches in 15% of exams, and in 39.4% of exams students had to remove unpermitted resources before the exam commenced. In recorded proctoring, the student's exam activities are saved, usually alongside a recording from their webcam. The combined recording is either analysed routinely at a later time, or saved for optional follow-up. Human invigilated exams involve a person watching either the live exam or the recording. Artificial intelligence invigilation involves special software that has been developed to identify potential misconduct breaches. Human invigilation is usually undertaken by invigilators employed by the vendor, and it is usually the more expensive option when compared to artificial intelligence invigilation. Combinations of approaches are often used, such as real-time artificial intelligence invigilation, with any suspicious cases flagged for later investigation by a human invigilator. Costs vary for different types of exams, and while some providers are reluctant to publish costs, media reports indicate around \$10 to \$20 per exam sitting for artificial intelligence invigilation and \$15 to \$35 for human invigilation (Dimeo, 2017; figures are in AUD converted from USD, October 2020).

## Do online invigilated exams stop cheating?

No assessment approach completely stops cheating, and to expect online invigilated exams to do so would be unreasonable. However, as online invigilated exams are chosen over other task types based on promises they make cheating harder, less likely, or easier to detect, it is important that they achieve these aims at least to an extent. There is some evidence that proctoring is associated with lower grades, which is used to support arguments that it leads to lower rates of cheating (e.g. Brothen & Peterson, 2012). Similarly, there is evidence that keystroke analysis is able to tell the difference between transcription typing (e.g. typing in a pre-prepared answer) and generative writing (e.g. making up the answer as you go) (Trezise, Ryan, de Barba, & Kennedy, 2019) which lends support to monitoring approaches. However, there is a lack of peer reviewed research involving actual attempts to cheat in online invigilated exams, which may be due to a reluctance to participate in this sort of research by some vendors (Dawson, 2021). Several online sources claim to have found ways to cheat in online exams (e.g. Chase, 2018), and some of these even offer cheating approaches for sale (e.g. mpgh.net, 2019), though it is difficult to verify if these work. On balance, the evidence suggests that online invigilation offers a degree of



anti-cheating protection, especially with respect to authenticating who the test-taker is. They are most effective at discouraging and detecting opportunistic attempts by students who have not researched how to cheat, but like all assessment types there are a set of cheating approaches for online invigilated exams that are very difficult to stop.

## Are online invigilated exams compatible with the Higher Education Standards Framework?

Accreditation and regulatory requirements are “frequently and ominously” cited as a reason for using online invigilated exams (Butler-Henderson & Crawford, 2020). In an Australian context there is no mandatory requirement for higher education providers to use online invigilated exams in particular, or examinations in general. However, [Standard 5: Institutional Quality Assurance](#) does require that “Preventative action is taken to mitigate foreseeable risks to academic and research integrity including misrepresentation, fabrication, cheating, plagiarism and misuse of intellectual property, and to prevent recurrences of breaches” (5.2.2). Online invigilated exams could be part of a strategy to fulfil this requirement. However, it is important that they are only used where they are capable of assessing the particular learning outcome; [Standard 1: Student Participation and Attainment](#) requires that “Methods of assessment are consistent with the learning outcomes being assessed, are capable of confirming that all specified learning outcomes are achieved and that grades awarded reflect the level of student attainment” (1.4.3). The selection and design of appropriate assessment methods for a given outcome is an expert practice requiring significant judgement (Bearman et al., 2017), and there is no one assessment type suitable to all disciplines, outcomes and contexts. Online invigilated exams are therefore compatible with the Higher Education Standards Framework, but in no way mandatory – just as traditional face-to-face pen-and-paper exams have never been mandatory. Many of the criticisms of traditional exams also apply to their online invigilated counterparts: student performance in exams represents what they are capable of in an artificial environment, under stress, with restricted resources and constant surveillance. These and other downsides need to be carefully weighed against the need for the authentication and control of circumstances that exams provide (Dawson, 2021).

## What potential risks and problems are there with online invigilated exams?

Online invigilated exams are the subject of frequent criticism. Much of this criticism comes from a fundamental disagreement with online invigilated exams for three key reasons. Firstly, some educators think that examinations are an outmoded assessment approach, and they worry that online invigilated exams are just another way to extend the life of the exam. Secondly, many students, educators and privacy advocates worry that online invigilated exams are a type of surveillance. Thirdly, from an academic integrity perspective, many argue that online invigilated exams are founded on a distrust of students that is incompatible with the development of a culture of positive academic integrity. In addition to being



important matters for providers to address, these objections have also led to protests, petitions, legal action, and other problems for providers that use online invigilated exams.

Beyond moral and pedagogical objections, online invigilated exams also pose a range of practical risks and problems. The student experience can be poor, especially if an institution has not prepared adequately, with media reports of frequent interruptions to test-takers, prohibitions on bathroom breaks, and user interface challenges. There have also been high-profile technology failures, ranging from exams becoming unavailable during large-scale high-stakes tests, through to data security breaches leading to the leaking of information about hundreds of thousands of test-takers. Finally, there is the concern that there is limited independent evidence in support of the anti-cheating benefits of online invigilation (Dawson, 2021).

## What are the potential benefits and opportunities of online invigilated exams?

The rapid uptake of online invigilated exams suggests that for many institutions the benefits and opportunities of online invigilated exams outweigh their potential risks and problems. The most significant of these benefits is that they enable exams to be conducted online with something akin to traditional invigilation. When a provider believes that a particular exam is essential, online invigilated exams afford a sort of continuity in assessment design when face-to-face exams are infeasible. This is often a key factor in the use of exams, especially when professional accrediting bodies are involved who may be thought to demand the use of invigilation of some type.

There are a range of other, usually secondary motivations for using online invigilated exams. Pedagogical benefits are often cited from a shift to online exams in general, and many of these apply to online invigilated exams. Online exams allow for a richer range of task types and media to be used than traditional pen-and-paper; they allow for immediate feedback on some question types; and the invigilation can be used to understand students' work processes. There are also a range of potential benefits for students, who mostly prefer online exams rather than paper-based exams (Butler-Henderson & Crawford, 2020). These include the ability to type rather than write, and to undertake the exam in a familiar environment on their own computer, which may support the accessibility features they already use. Students may also prefer to take the exam at home rather than travel to a campus or exam center; this is one of a range of logistical benefits for both institutions and students, which also include increased flexibility in exam scheduling and the lack of a need for dedicated exam venues.

## When are online invigilated exams appropriate?

While there are many valid criticisms and concerns pertaining to online invigilated exams, there are some circumstances where they may be appropriate. These include:



1. Situations where an external accrediting body mandates the use of an invigilated examination but it is not feasible to hold one face-to-face on a campus or testing center
2. For the assessment of lower-level learning outcomes involving factual recall where it is difficult to otherwise control access to materials
3. Where fine-grained detail about a student's work processes (not just their work products) is required, and assessment needs to be conducted at a distance
4. When 'one right answer' type tasks need to be assessed remotely and there are concerns about collusion

These typical use cases for online invigilated exams are motivated by a variety of factors: professional body requirements; concerns about plagiarism, collusion or other forms of cheating; and a desire for greater detail about students' work. However, this list should not be taken as endorsement that online invigilated exams are necessary in these circumstances – there may be creative ways to rethink them without invigilation. For example, in response to (1), there have been instances where professional accrediting bodies have been believed to require an invigilated exam, but on consultation with them a provider has discovered the accreditor to be more flexible. For (2), a careful examination of the assessment plan for the degree program might reveal that a particular assessment task is not high stakes enough at the degree level to warrant the use of invigilation. For (3), an alternative tool like an assignment writing platform (e.g. Cadmus) might provide the same affordances for work process tracking without the use of invigilation or an exam assessment mode. For (4), it may be possible to re-think the task to have student-specific permutations in the requirements, or to be more open-ended.

## Ten practice suggestions for online invigilated exams

What follows is a list of recommendations for the use of online invigilated exams. This list has been workshopped with online exams practitioners and scholars. The list starts from the assumption that in some contexts online invigilated exams are a suitable assessment type; this proved to be a contentious assumption, and it is worth noting that there are some within higher education who would view any use of online invigilated exams as unacceptable. However, if a provider has decided to use online invigilated exams, the following recommendations will help address the potential risks and harms, while making the most of the benefits and opportunities this assessment type provides.

### 1. Online invigilated exams are used as a last resort

Online invigilated exams should not be seen as a default assessment task type, applicable to all learning outcomes in all circumstances. Instead, they should be used only after other options have been considered and deemed unsuitable. Some providers have instituted a requirement to provide a detailed justification for any proposed use of online invigilated exams. A typical 'last resort' use case for online invigilated exams might be where lower-level learning outcomes such as memorization need to be assessed, and the specific moment of assessment is high-stakes in terms of determining if the student has met the outcomes of their program of study. If the assessment must be conducted at a distance, the



affordances provided by online invigilation may uniquely enable the assessment of this sort of recall knowledge. However, if the recall of factual knowledge is not essential for verification of program level outcomes, the assessment moment could instead be adapted into a higher-level task which may not need the sort of information restriction that online invigilation affords. Further information about the decision-making involved in either moving online exams online or transforming them into another task type is provided by Bearman, Dawson, O'Donnell, Tai, and Jorre de St Jorre (2020), [including a flowchart and worked examples](#).

## 2. Exam designs are sound assessments of learning

The quality of online invigilated exams is heavily dependent on the characteristics of the underlying exam design and its place within an overall program of study. Online invigilation is best suited to assessment *of* learning, which intends to assure that students have met specific learning outcomes, rather than assessment *for* learning, which promotes student learning. The usual considerations surrounding assessment *of* learning, such as reliability and validity, apply to online invigilated exams. If basic work on reliability and validity has not been done on an exam design there is little point in deploying online invigilation. Professional accrediting bodies may have their own set of requirements around exam designs that institutions need to adhere to as well.

## 3. Only the minimal restrictions required are used

Designers of online invigilated exams need to make a range of decisions about the types of restrictions placed on students, such as if they will be allowed to use certain software programs, files, books, paper notes, or websites. It may seem paradoxical, but each restriction placed on students has the potential to make the assessment less secure if it cannot be enforced (Dawson, 2021). For example, in a traditional closed-book exam, students need to be denied access to notes and textbooks, and inadequate enforcement of this prohibition makes the exam less secure. In contrast, in an open book exam such prohibitions no longer need to be enforced, reducing the range of potential cheating approaches available. Restrictions around the use of notes are particularly challenging for online invigilated exams, as a range of supposedly effective ways to use notes are available online, with many that would appear highly effective. The need to only apply restrictions that are absolutely necessary and reasonably enforceable applies beyond just the use of notes in online invigilated exams; it is a fundamental principle for assessment security in general (Dawson, 2021).

## 4. Students are offered an alternative

There are a range of reasons why students may wish to not undertake an online invigilated exam, such as: concerns about privacy; not owning the required equipment; not having access to a quiet, private space with reliable Internet; lack of confidence with technology; or accessibility concerns. While these are important systemic issues to address for improving equity and access to online invigilated exams for all, students should also be provided an alternative. This can take many forms, ranging from an entirely different assessment task that assesses the same learning outcomes, through to sitting the same examination under in-person invigilation or on a computer at a testing center. In addition to the benefit to students who opt out, the establishment of an alternative provides a degree of fault tolerance in the instance that the online invigilation is unavailable, a circumstance that has already happened in multiple Australian high-stakes examinations.



## 5. Equity, diversity, adversity and accessibility are catered for

Higher education students come from a diverse cross section of society, and concerns have been expressed that online invigilated exams provide advantage to already-advantaged groups, and further entrench disadvantage for others. As with other aspects of learning and teaching, the Universal Design for Learning (UDL) principles provide some guidance on how to support all students in assessment (CAST, n.d.). Many of these considerations are common to other assessment types, however online invigilation also comes with some specific areas for consideration. Both artificial intelligence and human proctoring needs to consider the diverse appearances of students, which might include skin tone and face coverings. It also needs to consider the diverse behaviours of students, which may include eye gaze patterns that diverge from the norm without the intent to cheat. Diverse physical needs of students such as frequent bathroom breaks also need to be accommodated for, as do diverse mental health needs. Students' living conditions, including their access to stable Internet, a quiet and safe space to sit the exam, caregiving requirements, and access to a reliable high-quality computer, also need to be considered. For providers these factors introduce significant complexity that needs careful, early consideration. Accommodation might include the provision of alternative exam spaces; special instructions for invigilators; accessibility technologies; loans of computers and/or mobile broadband devices; as well as accommodations traditionally provided in face-to-face examinations such as breaks during exams.

## 6. Providers pilot online invigilated exams adequately before using them in assessment

Online invigilated exams are typically used in high-stakes assessment, which makes pilot testing essential. Piloting should be conducted first in a no-stakes environment, with real students completing real tasks that do not influence their grades. The scope of a pilot can then be gradually expanded to more and more meaningful assessment moments. Piloting is much more than a technological exercise; it also surfaces many challenges with policy, pedagogy, logistics and student acceptance.

## 7. A whole-of-institution approach is taken

Online invigilated exams projects should involve a collaboration between many groups within an institution. While the business owner within the organization might variously be the exams unit, the IT department, or the learning and teaching office, a successful online invigilated exams project requires active involvement of all of these areas and others. Some of the additional parties include legal departments to navigate what can be complex agreements with external vendors; governance teams who may need to facilitate changes to policy and procedure; and institutional data teams who need to arrange evaluation surveys. But most importantly, there needs to be a plan to actively engage with the everyday educators and students who will use the tools.

## 8. Regulatory requirements and standards around privacy and data security are met

Online invigilated exams use information that would not usually be gathered about students to assure the security of their assessment. Much of this information is 'personal information' as defined by the Privacy Act, and both providers and vendors are required to adhere to



strict rules around its collection, accuracy, de-identification, use, storage, disclosure, retention and disposal. This personal information may include not just the student, but also others, such as minors who the student may be caring for. Many education providers and online invigilated exams vendors operate across multiple jurisdictions, which introduces significant regulatory complexity. For example, some European institutions have chosen not to use online invigilated exams as they believe the approach is incompatible with Europe's stringent GDPR privacy legislation (Clausen, 2020). Privacy partially relies on data security, and like many industries, there have been large-scale breaches of online invigilated exams vendors. As with other technology acquisitions, providers' IT departments should do their usual due diligence around data security and request the results of external audits and evidence of relevant certifications (e.g. [ISO 27001](#), [SOC 2](#)).

## 9. Effective governance, monitoring, QA, evaluation and complaints procedures are in place

Online invigilated exams are a major undertaking, so should be subject to similar governance, monitoring, quality assurance, evaluation and complaints procedures as any other initiative. Most online invigilated exams are offered through a third-party vendor, so these procedures need to extend to the partnership as well.

## 10. Staff and student capacity building and support are available and ongoing

Staff and students require a new set of capabilities to make the most of online invigilated exams. For staff, these include capabilities in using the new software to author and administer exams, as well as how to interpret any data about student conduct, as well as broader assessment design matters around when online invigilated exams are appropriate. For students, capacity building needs to cover practical matters like how to set up their space, technology and connections, as well as information about their rights and how their data will be used. Both staff and students need convenient access to support services before, during and after their exams, and clear guidance about what they can do if they think something has gone wrong.

## Key resources

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- e-Assessment Association Remote Proctoring Special Interest Group <https://www.e-assessment.com/remote-proctoring-sig/>

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## Author's Bio

Associate Professor Phillip Dawson is the Associate Director of the Centre for Research in Assessment and Digital Learning (CRADLE) at Deakin University. His academic integrity research focuses on contract cheating and new digital threats like computer hacking and artificial intelligence. He has published over 50 books, chapters and journal articles, and his research has received support from a range of Australian and international research funders and educational technology companies. His two most recent books are *Defending Assessment Security in a Digital World: Preventing E-Cheating and Supporting Academic Integrity in Higher Education* (Routledge) and the co-edited collection *Re-imagining University Assessment in a Digital World* (Springer).

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