EFFECTIVE ONLINE EDUCATION REQUIRES VALID ONLINE ASSESSMENT PROCEDURES

COULD ONLINE PROCTORING OFFER THE ANSWER?

by **Marja Verstelle** and **Marinke Sussenbach**

Online education has become a more trusted format over the past few years. A growing number of leading universities are now offering fully accredited programmes online in addition to their range of MOOCs. This is ideal for working graduates seeking to keep up with the latest developments in their field, groups of regular students spending time abroad on a work placement or pre-Master's students. This range of online programmes requires a valid online assessment protocol. Online assessment should allow us to determine whether the student is actually the person taking the test and verify that he or she is doing so without unauthorised assistance. Online proctoring can offer a solution in this regard, but is still far from commonly accepted in the Netherlands. Is this hesitance justified? And does online proctoring offer the best possible solution in terms of online assessment?

How does it work?

Online surveillance, generally referred to as online proctoring or e-proctoring, comes in three different forms: live, via retroactive assessment of taped tests and automated proctoring. The process starts with authentication. Students log in and are connected to an online proctor via their webcams. They are then required to display their ID and answer a number of questions. In some cases, the proctor will require the student to offer a 360-degree view of the room. In other cases, students may also be subjected to a biometric verification procedure. This procedure might be based around the student's unique typing pattern, whereby he or she would then be required to type the same sentence at each testing moment. Once the authentication procedure has been completed, the online proctor will monitor the testing process in order to ensure that the student is completing the questions without unauthorised assistance. In the case of live proctoring, the proctor may issue a warning where necessary. In the case of retroactive proctoring on the basis of a taped test, the proctor will review a video at high speed. This process is frequently outsourced to low-wage countries. In the event of suspected irregularities, the proctor will flag the test. The third method, automated proctoring, involves automatic monitoring and identification of any potential irregularities by the computer. The examinations board of the university itself will be responsible for issuing a final assessment in all cases (live, retroactive review of taped tests and automated proctoring). In most cases, institutions will outsource the proctoring process to specialised companies that take charge of the entire procedure, from scheduling of the examination with individual students through the flagging of suspected irregularities.

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Preconditions

Students must meet various preconditions in order to qualify for online proctoring. The most important of these conditions are: a lockable PC, laptop or tablet; a stable Internet connection; a closed room with a 'clean desk' and no intrusions from house mates; acceptance of the use of camera monitoring or video recording. These preconditions limit the application of online proctoring. The student will assume responsibility for the equipment and room. Some students lack the necessary equipment, while the average student room will not be suited to this purpose. These preconditions must be clear to the student before he or she enrols in an online course.

Some of the aforementioned limitations are being resolved through increasingly innovative solutions. For example, new technologies allow for students in regions without stable Internet connections to keep working when their connection is interrupted. The recording on the local PC will continue in the background and can then be automatically sent to the proctor once the connection has been re-established. Solutions have also been developed to address the issue of toilet breaks. Tests can be offered in segments, enabling students to take a sanitary break after completing each individual component.

The aspect of camera monitoring has raised more questions than any of the other preconditions. How long will the recordings be retained and how will the proctoring company safeguard the students' privacy? Students are entitled to peruse the proctoring company's privacy policies (a recent article in The Chronicle offers some insight into the working methods applied by such firms). Studies have also shown that some students find camera monitoring to be a distracting factor; other studies contradict this finding (Fask et al., 2014; Case & Cabalka, 2009). This is undoubtedly related to the individual proctoring service; according to a recent New York Times article, students feel such services occasionally overstep the mark. The article describes an automated proctoring solution that requires students to remain seated in the same position for the entire duration of the test, whereby they constantly see themselves in a small on-screen window. Some universities in the United States seek to accommodate students who find this practice distracting by offering physical exam halls as an alternative.

Costs

Examinations currently cost around 20 Euros. Some US universities charge these costs on to their students. This precondition must also be made known to the students before they enrol in an online course.

Uptake

The underlying technology is (and will probably always remain) under development. MOOC providers broadly apply online authentication to secure the awarding of verified certificates; participants or their employers are willing to pay a fee of around 50 dollars. Online authentication and proctoring are becoming an increasingly integral part of online accredited education. According to a survey amongst US institutions offering remote education, (2013 Student Authentication and Online Proctoring Report) 67% of respondents reported they were currently applying some form of online authentication or proctoring. The University of Amsterdam is currently applying online proctoring as part of a pilot project with an international pre-Master's target group, while Delft University of Technology (see box), Utrecht University and Wageningen UR are doing the same for online postgraduate education.

E-proctoring is currently applied in online education. In the Netherlands, this form of proctoring is exclusively used outside of the traditional programmes. We should ask ourselves whether e-proctoring can also offer an alternative to the digital testing of large groups of on-campus students, currently being accommodated by the higher education sector through the construction of increasingly costly exam halls. Large-scale online proctoring as an alternative to the exam hall does not seem to offer a feasible alternative at present. This is due to students' difficulties in meeting requirements in the area of equipment and testing locations, and the currently unquantifiable risk of fraud.

What are the alternatives to online proctoring?

Those enrolling in an online course or programme have made a conscious decision based on flexibility in the area of time and location: the ability to learn at the institution of one's choice, from one's own country or alongside a busy career. If we aim to cater to this international postgraduate target group, we will have to facilitate 'anytime, anywhere' testing. Are there any viable alternatives to online proctored testing? The most basic alternative would be for online students to book a flight and take the final test in the relevant institution's exam hall. This phenomenon is not uncommon in the case of MOOCs. Open universities have been offering a more customer-friendly alternative for many years, facilitating examinations at specialised commercial testing centres around the world. In a third alternative, examination facilities can also be offered through fellow education institutions.

Online proctoring or alternative assessment methods?

The various available publications on online proctoring consistently emphasise increasingly stringent monitoring and technical security. However, a focus on the most suitable assessment methods will yield equally positive results. In the words of one respondent: "Security & authentication technologies can and will be defeated (not just for online courses). Course assessments should be carefully designed by instructors to measure the authentic learning ability of each user (i.e. writing samples, essays, short answers-all of which should require critical thinking on the spot and in a limited timeframe) such that they will prove as valid online as they are in the face-to-face classroom." (2013 Student Authentication and Online Proctoring Report)

Online proctoring basically substitutes the invigilator in the exam hall by an online colleague. Instead of engaging in an 'arms race' of increasingly stringent monitoring procedures, we can also take this opportunity to improve the quality of assessment and learning by reconsidering which aspects of the curriculum we want to test and how we aim to test them. Instead of a single 'guillotine-like' testing moment at the end of each course, ICT offers a growing array of possibilities to conduct more regular assessments in new formats, yielding improved learning outcomes. These include serious gaming, adaptive learning and 'continuous assessment'.

Research

The amount of available research on online proctoring is still limited, and generally consists of pilot study evaluations. The findings tend to vary. Whereas some case studies conclude that online proctoring has a negative impact on students due to higher levels of distraction, stress, technical problems and the inability to ask for explanations on potentially ambiguous exam questions (Fask et al., 2014), other studies do not identify any significant differences (Case & Cabalka, 2009).

Online proctoring pilots at Delft University of Technology

Delft University of Technology aims to meet the growing international demand for lifelong learning. The institution is offering high-quality education – on a fully online basis where possible – through TU Delft Online Learning. The ability to administer various types of summative digital tests in a secure online environment had long proved an elusive missing link in the process. Demand and need for flexible tailored education has increased over the past few years. The emergence of MOOCs has helped to break open the market for *specialized tracks* in the online course segment. In another interesting development, online proctoring can help add value to non-accredited courses such as MOOCs and the associated specialised tracks. A good example in this would be the edX Global Freshman Academy.

We expect to see a growing number of students participate in online courses and tracks within and outside the context of degree programmes. This option should especially be popular amongst professionals in need of flexibly designed short-term learning tracks that offer all the advantages of online learning and reflect the professional environment. Online proctored exams will be key in this regard.

Pilot projects

Delft University of Technology is currently focusing on an 'audit and review' method known as Remote Proctor Now (RPNOW). Crucially, the system is available on a 24/7 basis. This flexibility is essential, as participants are located in different time zones. The first phase involved the resolution of various technical issues relating to bandwidth and different webcam types. In the current phase we will gain practical experience and determine how we can service various target groups (working professionals, undergraduate students) and embed the system within the organisation. Rather than the system itself, its effective integration into the university represents the most important innovation: this process should be designed to inspire sufficient confidence in the system's quality and reliability. A working group comprised of various stakeholders (such as the examinations board and lecturers) has been established to this end, and will be addressing questions such as:

1. How will we incorporate the various time zones into our examination policy?
2. What happens if the examinations board decides a student has committed fraud on the basis of the images, and the student appeals against this decision?
3. Should students be allowed to use a notepad or calculator on their PC?
4. To which forms of assessment is online proctoring suited?
5. Should online proctoring be subject to more or different preconditions than face-to-face proctoring?
6. Which administrative burdens will this involve?

The start of the 2015-2016 academic year will see the launch of small-scale online proctoring at various online Master's courses such as Aerospace and Civil Engineering. In parallel to this development, a test panel partly composed of students will assess whether the system is performing adequately and whether any additional preconditions will have to be applied in the event of fraudulent behaviour. For example, we have opted to develop additional video tutorials on conducting an effective desk room scan and expanded our standard RPNOW policy. We will be assessing the system's performance over the coming period and determining whether the convenience of home testing continues to outweigh the number of required safety checks.

Some studies compared online proctored examinations with testing in exam halls. Interestingly enough, online proctors may be quicker to detect fraud than invigilators in the exam hall (Case & Cabalka, 2009). All findings are contextual: related to the relevant test, target group and proctoring solution being used. Nevertheless, these studies do help to offer clearer insight into the effects of online proctoring and may even clear up some common misconceptions.

How does the Dutch higher education sector feel about online proctoring?

Most examinations boards, lecturers and institutions are justifiably sceptical about the validity of this assessment method (Siemens, 2015). After all, the value of our degree certificates is at stake, and fraud can cause major reputational damage to both the relevant institution and the online education sector in general. This reticent attitude cannot be resolved until online proctoring has become a more familiar and accepted phenomenon. On the other hand, online testing will be crucial in ensuring the international competitiveness of our online programmes. We tend to forget that invigilators in the exam hall are also incapable of preventing every form of fraud. If nothing else, though, we are familiar with this form of monitoring. Further progress will thus require greater familiarity with online proctoring.

How do we proceed from here?

The LinkedIn OPE (Online Proctoring Europe) group is one example of an appealing collaboration. The above section describes various pilot projects by Dutch research universities; their valuable experiences deserve to be widely evaluated and shared. SURFnet and the Digital Assessment Special Interest Group can play a key coordinative role in offering more insight into online proctoring and instilling confidence in potential users. We would like to invite everyone currently involved in digital assessment and online education to jointly focus on the following six aspects:

1. Organise research projects in order to provide greater insight into online proctoring and instil confidence. How great is the likelihood of fraud? This aspect could be researched by means of a comparative study involving fraudulent mystery guests participating in both written examinations at exam halls and online proctored examinations.
2. What about the relevant legislation and regulations? Does this allow for online proctoring, and – if so – under which conditions? Will there be any need to adjust the relevant regulations? Which aspects will have to be enshrined in the teaching and examination regulations?
3. Offer insight into the solution providers. Which providers are currently active on the market? Which technological solutions are they offering, and what are their pros and cons? How reliable and adequately trained are the online proctors offered by the key providers, and which procedures have these companies put in place to ensure their quality?
4. Offer insight into business cases. Which aspects do you focus on when selecting an online proctoring provider? Which organisational costs can institutions expect to incur? How do the costs/benefits compare to the alternatives described above?
5. Which assessment forms are suited to online proctoring, or can offer an alternative to online proctoring? Challenge institutions with an incentive scheme to explore these questions.
6. Share organisational best practices: how should online proctoring be organised, what should you communicate to students, which conditions should students be expected to meet?

In conclusion

We started this article by asking whether the cautious acceptance of online proctoring was justifiable. In our view, online proctoring for the time being mainly offers a solution for the providers of online education. Those seeking to attract an international target group with online programmes will also have to offer online assessment: the alternatives tend to be too expensive for students (airline tickets) or require too much organisation (whereby the programme is forced to organise on-site assessment for each student). Online proctoring technology has now developed to a stage where it can offer a reasonable degree of certainty. However, fraud can never be ruled out entirely. Suppliers will continue to develop increasingly sophisticated solutions. Carefully designed assessment procedures can offer even greater certainty. Continued collaboration will yield clearer insight into the pros and cons, limitations, opportunities and alternatives to online proctoring. MOOCs, courses for professionals and pre-Master's tracks that are not linked to any formal degree certificates offer an ideal opportunity to gain further insight into online proctoring on the basis of evaluation and research.

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Literature

- Alderson, J. (2015). The Developing Market for Online Proctoring. http://www.eduventures.com/2015/08/the-developing-market-for-online-proctoring/.
- Case, R., Cabalka, P. (2009). Remote Proctoring: Results of a Pilot Program at Western Governors University. 25th Annual Conference on Distance Teaching & Learning. http://www.uwex.edu/disted/conference/Resource_library/proceedings/09_19933.pdf.
- Cluskey Jr., G.R., Ehlen, C.R. & Raiborn, M.H. (2011). Thwarting online exam cheating without proctor supervision. Journal of Academic and Business Ethics, Vol. 4, p1. http://www.txstate.edu/honorcodecouncil/Student-Resources/Additional-Resources/contentParagraph/0/document/Integrity%20of%20online%20exams.pdf.
- Fask, A., Englander, F. & Wang, Z. (2014). Do Online Exams Facilitate Cheating? An Experiment Designed to Separate Possible Cheating from the Effect of the Online Test Taking Environment. Journal of Academic Ethics. Vol. 12, Issue 2, pp. 101-112. http://link.springer.com/article/10.1007%2Fs10805-014-9207-1#page-1.
- Siemens, N. (2015). Toetsen op afstand (Online Proctoring): In een zaal met militaire precisie, op afstand, of gecombineerd?? https://www.surfspace.nl/artikel/1758-toetsen-op-afstand-online-proctoring-in-een-zaal-met-militaire-precisie-op-afstand-ofgecombineerd/