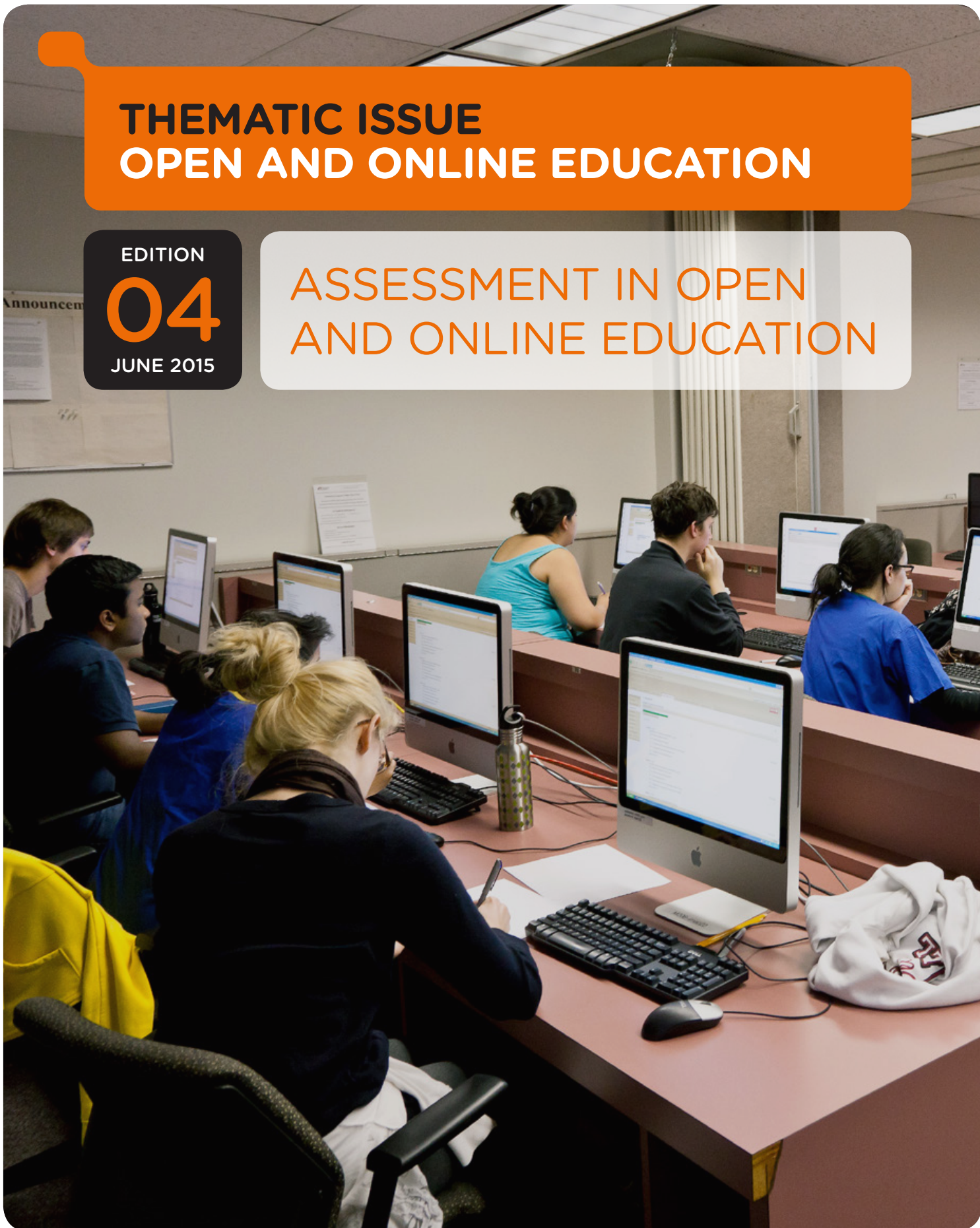# THEMATIC ISSUE
OPEN AND ONLINE EDUCATION

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ASSESSMENT IN OPEN AND ONLINE EDUCATION

SURF

ABOUT THIS THEMATIC ISSUE

This is the fourth thematic issue by SURF and the special interest group Open Education that addresses open and online education. The core theme in this edition is 'Assessment in open and online education'. This issue has been produced in close collaboration with the special interest group Digital Assessment.

The content of this thematic issue is based on the masterclass 'Online Assessment in MOOCs' organised by SURFacademy on 2 April 2015 at Delft University of Technology. Many speakers at this masterclass have restructured their contributions as articles at our request.

More information

- SURF Open and Online Education innovation project: www.surf.nl/open-and-online-education
- Open Education special interest group on SURFspace (with information in Dutch about the special interest group, news, articles, literature, videos and conference blogs): www.surfspace.nl/openeducation
- Open Education special interest group on LinkedIn (with news and discussions): http://tinyurl.com/SIGOpenEducation
- Digital Assessment special interest group on SURFspace (in Dutch): https://www.surfspace.nl/sig/6-digitaal-toetsen/

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INTRODUCTION

In this fourth thematic issue on open and online education, we are looking specifically at the topic of Assessment. The contributions are grouped under four different themes:

Formative testing and peer review

During the masterclass 'Assessment in MOOCs', Sharon Klinkenberg and Marjon Baas presented a pitch designed to start a discussion about formative assessment in MOOCs. In Marjolein van Trigt's article, you can read how they both concluded that there are many opportunities in this field, such as through providing test questions at different levels. You can also read more about the use of peer feedback within MOOCs in the article based on Annemarie Zand Scholten's presentation.

Summative assessment through online proctoring

After completing all of the learning elements of an MOOC, the student can opt to conclude the process with a summative assessment. More and more experience is being gained in remote invigilation or *online proctoring* for summative assessment in open and online education. Marja Verstelle has written an overview article on this topic. Meanwhile, Meta Keijzer-de Ruijter and Janine Kiers look at the different types of certificates offered by Delft University of Technology on the successful completion of a MOOC and touch on several other aspects in their article. Natasa Brouwer and Daniel Haven describe the practical experience of the University of Amsterdam in the context of a pre-Master's course, and Nils Siemens provides an intermezzo on privacy and ethics in digital testing.

Recognition

A question that is frequently asked about open and online education is: as a student, can you incorporate a MOOC certificate into a formal curriculum? A discussion was held on this topic Robert Schuwer.

Vision for the future

Yvonne Rouwhorst and Lisanne van Kessel describe what students today really think of developments in digital assessment in open and online education: it represents the digital dream. We conclude our thematic issue with some ideas by Jan Haarhuis, Heino Logtenberg and Ria Jacobi on the future of testing in online and blended education.

Assessment in open and online education is currently at an exploratory stage, but will undoubtedly become increasingly important. Let us continue to share our experiences, so that together we may discover how and in what context *online proctoring* can best be implemented, how *peer reviewing* can be optimally applied, and how we can quantify the value of knowledge acquired through MOOCs in the form of study credits.

Marjon Baas, Saxion University of Applied Sciences and special interest group Open Education
Annette Peet, SURFnet and special interest group Digital Assessment
Janina van Hees, SURFnet and special interest group Open Education

ARTICLE

THE EFFECTIVENESS OF FORMATIVE ASSESSMENTS IN OPEN AND ONLINE EDUCATION AND CAMPUS-BASED EDUCATION

by Marjolein van Trigt

What can open and online education and campus-based education learn from each other in the field of formative assessment? During the 'Online Assessment in MOOCs' masterclass organised by SURF on 2 April 2015, experts discussed the effectiveness of peer feedback and other forms of interim assessment. The discussion was preceded by pitches by advisor for IT in Education Marjon Baas and Sharon Klinkenberg, Chair of the special interest group Digital Assessment, with both experts concluding that there is still room for improvement.

Marjolein van Trigt is a freelance writer and journalist. She writes about the influence of technology on our everyday lives, including for the magazine *Vrij Nederland*. She regularly writes articles for SURF on developments in open and online education.

The best solutions are sometimes born of necessity. The mass nature of MOOCs leaves no room for individual guidance and support. The only way to let students know how they are doing during the course is via (automated) assessment and *peer feedback*. As such, MOOC participants are regularly subjected to interim quizzes. They receive automatic feedback on incorrect answers and are encouraged to keep practising. The quality of formative assessment in MOOCs is currently so high that it is sometimes regarded with envy by regular (campus-based) education. According to Marjon Baas, advisor for IT in Education at Saxion University of Applied Sciences, although the wider use of formative assessments would offer numerous benefits in regular education too, lecturers simply do not have the time to devote more attention to this aspect of teaching. A busy lecturer who has to personally review every single written assignment will think twice before bombarding the class with interim assignments.

One solution here may be to get the students themselves to review each other's work. Fellow students already play an important role in the learning process in MOOCs, as the lecturer cannot respond personally to thousands of participants. Learners assess each other's written assignments and hold lively discussions about the correct answers to test questions in the forum. Due to the scale of the courses, peer feedback, or assessment by fellow students, is part of the course in MOOCs. In the classroom, however, peer feedback is less widely accepted as a valuable way to test learner progress. Students do not take each other as seriously as they do the lecturer, and because they know each other, the benefits of anonymous peer feedback in the MOOC are lost. Assessments sometimes take on a personal character, or simply do not carry as much weight. According to Baas: "Not everybody

From the floor comes the observation that MOOC students sometimes complain about *peer feedback* as well, e.g. if they do not agree with their fellow students' assessments. This is sometimes overcome in MOOCs by offering participants the option to assess the feedback they receive. In some cases, this feedback may even contribute to the students' final grades.

The average MOOC participant is well-informed about their progress thanks to a combination of high-quality assessment and the use of *peer feedback*, and is thus better prepared for the final exam than students who do not have these resources at their disposal. Baas contends that the experience gained by higher education institutions in the area of formative assessment in open and online education can be used to improve this competency among students. She believes that the 'flipped classroom' model can make it easier to turn peer feedback into a common feature of regular education. Students are instructed to watch a video at home and to complete the associated interim assignments. This structured set-up offers space to review and discuss each other's work in class. Through habituation and training, students will realise that assessing other people and receiving feedback from their fellow students can indeed make a valuable contribution to their learning process.

Motivation through fellow students

Motivating students is a real challenge for many lecturers, but is a piece of cake in MOOCs. Although only a third of MOOC participants are actually serious about the process, says Baas, this still amounts to several thousand people. This gives sufficient critical mass to keep a forum active twenty-four hours per day, in part because the students are distributed across a number of time zones. A quick glance at a MOOC forum demonstrates that a passive attitude is not by definition the *default mode* for learners. A voice from the floor asks whether MOOC students are sometimes very different from regular students. While this can of course be the case, Baas refers to the remarkable difference in work ethic between MOOC participants and students in campus-based education. Only rarely does one encounter students in a lecture hall who are as motivated as MOOC participants. Robert Schuwer of Fontys University, Chair of the Open Education special interest group, disagrees. "A study carried out by Harvard reveals very different data. When asked about their intention to follow a MOOC, two-thirds of the MOOC participants did not respond. Harvard's analysis showed that the highest drop-out rates were found in this group. Of the remaining participants, the majority did not yet know what they intended to do with the MOOC. I would therefore doubt whether they are really as motivated as

is being claimed." [editor's note: the source study is Ho et al., 2015[1]]

Annemarie Zand Scholten of the University of Amsterdam describes this type of participants as 'motivated until they drop out'. She echoes the distinction made by the MOOC platform Coursera between participants *and active learners*, i.e. those who register with the intention of completing the course. A discussion then arises around the question of whether learners who invest considerable time in *peer assessments* are more motivated than others, or whether they have a different style of learning. Some people simply dislike giving feedback, just as others dislike watching videos and would prefer to read the *transcripts*. In other words, they participate in courses with a motive, other than that of learning from each other.

More money, love and passion

Sharon Klinkenberg, lecturer in statistics for psychology and psychobiology at the University of Amsterdam and Chair of the special interest group (SIG) Digital Assessment, takes evident pleasure in offering a few more reasons for the difference in the quality of formative assessment between open and online education and campus-based education. He asserts that more money is invested in formative assessmentin MOOCs, as well as more dedication and passion on the part of everybody involved. Lecturers are more likely to give maximum effort during interim assignments because they feel observed. Everything they produce is visible to the whole world. Finally, MOOC lecturers receive better support and facilitation. Higher education institutions are keen to set aside manpower and expertise for making high-quality videos, but are less willing to invest the same quantity of FTEs in formative assessment in regular education.

Baas and Klinkenberg independently reach the same conclusion: open and online education and campus-based education can and must learn from one another when it comes to the use of formative assessment and peer feedback. The sheer scale of MOOCs makes it easier to motivate students and encourage them to invest their time in improving both each other's work and the course as a whole. At the same time, there is still room for improvement in formative assessment in MOOCs, as Klinkenberg notes. Regular education is still further ahead in the use of adaptive learning, specifically in the context of digital education. Although big data derived from MOOCs is providing new opportunities for adaptive learning, they are still not being adequately seized, states Klinkenberg. MOOCs can be improved and made more personal by responding to different learning styles and offering test questions at different levels.

Large-scale learning provides opportunities for adaptive assessment

Klinkenberg believes that differences in learning styles are insufficiently exploited within MOOCs. Whereas regular education is gradually embarking on digital projects based on adaptive assessment, such as Rekentuin and Statistiekfabriek, in MOOCs it is still unusual for courses to adapt to the student's level. This remains the case even though the huge critical mass presents opportunities for introducing adaptive assessment, such as by adjusting the difficulty level of the interim quiz questions in order to suit the ability levels of individual students. While earlier adaptive assessment projects often ceased to function due to the insufficient scale involved, this disadvantage does not apply to a MOOC. Effective adaptive assessment requires sufficient questions to be available. In regular education there is rarely enough time to create this kind of additional material. Zand Scholten sees a viable alternative in the MOOC forum. She suggests getting students to formulate questions about the material as part of the course. "Throw them into the adaptive system and see for yourself which of the questions are effective."

There is no such thing as a perfect instructional video

As the large scale of MOOCs causes a huge amount of data to be generated, it is clear that learning analytics should be used to personalise open and online education. With the help of big data, algorithms can draw conclusions about the way in which individual students acquire knowledge. MOOCs can adapt to the student's learning style during the course. Nevertheless, diagnostics based on information from *assessments* are currently rarely used in MOOCs. The data is available, but at present it is often still a question of one video fits all in MOOCs, according to Klinkenberg.

It is clear to all participants in the discussion that there is no such thing as a perfect instructional video. By way of example, a superb explanation video about statistics that was created for one subject is quickly perceived as useless for another. On the other hand, videos stripped of all context are simply too abstract. Learners need specific examples. However, the more concrete and specific the video, the less it can be used in a wide range of contexts. Furthermore, a comment from the floor points out that there is data to show that a perfectly structured video is less likely to be retained by students.

Klinkenberg believes that the wealth of data generated by MOOCs ought to make it possible to track the interests of participants. A recommendation system similar to that used by Amazon would be able to refer students to appealing lesson components or new courses. Ongoing courses are still rarely adapted with the help of data, says Zand Scholten. Open-ended questions produce excellent insights, which enable one to see what is wrong with a particular question almost instantaneously. Dashboards need to be designed using learning analytics, which students can then use to compare their own performance with that of their fellow students. However, as Schuwer rightly points out, this confuses two separate issues. Using learning analytics to improve courses is a separate field to providing a recommendation system that allows students to view their progress on their course of study *on the fly*.

Blended education as the best of both worlds

Many of the possibilities under discussion are still a long way from being achieved, the floor concludes, but the groundwork has already been laid. Blended education may be able to build a bridge between both forms of education while combining the best approaches of each. As videos and assignments from MOOCs become more common in the lecture theatre and regular students become increasingly active on MOOC forums, the distinction between the two forms of learning will decline and may even disappear altogether. This can only benefit the overall quality of formative assessment.

[1] Ho, A.D., Chuang, I., Reich, J., Coleman, C.A., Whitehill, J., Northcutt, C.G., Williams, J.J., Hansen, J.D., Lopez, G. & Petersen, R.(2015). HarvardX and MITx: Two Years of Open Online Courses Fall 2012-Summer 2014. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2586847

INTERMEZZO

FORMATIVE ASSESSMENT AND PEER ASSESSMENTS IN MOOCS

by Marjolein van Trigt

Marjolein van Trigt is a freelance writer and journalist. She writes about the influence of technology on our everyday lives, including for the magazine *Vrij Nederland.* She regularly writes articles for SURF on developments in open and online education.

"It is time-consuming, but it provides clear benefits." That sums up the opinions of students who were asked about *peer feedback* by Annemarie Zand Scholten. The coordinator of *blended learning* initiatives at the University of Amsterdam offered a MOOC on Quantitative Research Methods in autumn 2014 for both her own pre-Master's students and participants across the world. As a MOOC, this interdisciplinary course is one component of a five-part series on 'solid science' offered by the University. Zand Scholten uses feedback provided by participants to improve formative assessment on the course for subsequent sessions.

Keep practising

Methodology and statistics are difficult subjects for many students, who benefit from plenty of practice. This is provided in the MOOC through methods such as in-video multiple-choice quiz questions, weekly tests and weekly reading and written assignments. Zand Scholten is enthusiastic about the first of these methods. "I plan to make more frequent use of this type of formative assessment in future," she says. "It is an accessible way of assessment whether or not learners are actually following the video properly." The weekly tests also have a primarily formative effect, as the student receives feedback for each wrong answer. The test can be taken multiple times, but the weighting is reduced for each attempt. This encourages the participants not to make haphazard attempts, and is an effective method for encouraging students to practice while cutting down on cheating.

Giving feedback also takes practice

The Coursera participants assessed each other's written assignments every week, and Zand Scholten used every opportunity to experiment with different forms of *peer feedback*. How can students be encouraged to review answers critically? Are they in a position to offer a balanced evaluation without any training? How much can we ask of them? "One stumbling block seemed to be a poor grasp of English," she says. "It is also important to gain experience in giving feedback. For example, a description such as 'each principle is assessed, but the majority of the arguments are weak' would be difficult for a candidate to assess if they have only just begun the course." She is more satisfied with the *peer assessments* that take place later in the course. By providing a detailed description of the assignment and specifying ample individual criteria (for example: 'are the items well formulated?'), she was able to help her students gain a better understanding of what she expected of them. Nevertheless, an experiment with parallel feedback assignments was less successful. The participants were supposed to choose a single assignment from a selection of eleven. However, some of them did not look at the module page where this was explained and grudgingly undertook all eleven assignments.

Feedback on the feedback

According to Zand Scholten, the best example of an *assessment* criterion in *peer assessment* is one in which both the assignment and the *assessment* are highly specific ('is the argument present; yes/no?'), and which offers the opportunity to provide open-ended feedback at intervals. This prevents the assessor from having to scroll all the way back when they reach the end of the form. The description of the assignment must be succinct and yet completely clear.

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Two things were still missing from the first MOOC run-through: calibration and self-assessment. Calibration refers to the setting of a sample assignment, after which the student must edit their feedback so that it falls within a specific margin. Research by Sadler & Good (2006) has shown that peer feedback is most effective when students are also required to assess their own assignments. Any assessments that are significantly more positive than the rest of the group are not counted.

Last of all, an assessment on a meta-level is conducted: the feedback indicates that students want feedback on their feedback. They want to assess each other properly, but above all they want to know what actually constitutes a good assessment. In actual fact, the lecturer should thank the students for their assessments by providing their own assessment in turn: what feedback was good?

Source

- Sadler, P.M. & Good, E. (2006). The Impact of Self- and Peer-Grading on Student Learning. Educational Assessment, 11(1), 1–31.

INTERMEZZO

ARTICLE

ONLINE PROCTORING: HOW DOES IT WORK? WHO DOES IT? AND WHERE IS IT GOING?

by **Marja Verstelle**

The level of confidence in online education has increased in recent years. More and more leading universities are offering both MOOCs and fully accredited programmes online. These programmes are ideal for working graduates who wish to stay up-to-date in their professional fields, for certain groups of regular students such as those who want to stay abroad for an internship, and for pre-Master's students. This range of online educational courses calls for valid online assessment. For online tests, we also want to be able to ensure that people are taking the test themselves and that they are doing so without unauthorised assistance. *Online proctoring* is one way of ensuring this, but it has been met with only lukewarm acceptance in the Netherlands. Is such a reaction justified?

Marja Verstelle (verstelle@iclon. leidenuniv.nl) is the coordinator of the IT in Education programme at the University of Leiden and co-founder of the Online Learning Lab, Centre for Innovation, Faculty Governance and Global Affairs, The Hague.

How does it work?

Online invigilation, generally referred to as online proctoring or e-proctoring, starts with authentication. In order to take a test online, you log in as a student and come into contact with an online proctor. You then show your ID to the webcam and answer a number of questions. You also use your webcam to allow the proctor to make a 360-degree check of the room in which you are sitting. Sometimes there is also a biometric check, such as one that detects an individual's unique typing pattern. This involves typing out the same sentence during each assessment for verification purposes. After authentication, the online proctor then invigilates the test in order to ensure that you take the test without any unauthorised help. This invigilation may be live, or may be carried out afterwards with the aid of a recording.

During live proctoring, the proctor may intervene if necessary, for example to give the student a warning. The test is generally also recorded (audio, video and/or screen). In proctoring based on a recording, the proctor replays the recording afterwards at fast-forward speed. This task is often outsourced to low-income countries. In the event of suspected illegal activity, the proctor flags the recording. In both live proctoring and retrospective proctoring via a recording, the examinations board has the final say in the event of illegal activity taking place. In the majority of cases, educational institutions confer the task of proctoring onto specialised companies that deal with the entire process, from scheduling the exam with individual students to flagging suspected illegal activity.

Prerequisites

In order to be able to make use of online proctoring, the student must meet a number of stipulations that are communicated in advance. The most important of these are:

- access to an electronic device (PC/laptop/tablet) that can be locked;
- a stable internet connection;
- an enclosed area with a 'clean desk' and without any intruding housemates;
- acceptance of working under camera supervision or video recording.

These prerequisites mean that there are limits to the application of online proctoring. Responsibility for the equipment and the space falls to the student. Not all students have access to equipment that meets the criteria, and student accommodation is also generally unsuitable. The prerequisites must be made clear before students register for an online course.

Some of the prerequisites are being met by means of increasingly clever solutions. For example, there are already ways to continue working even when the internet connection is temporarily interrupted, which benefits regions that lack stable internet connections. The recording runs in the background on the local PC, and once the connection is re-established the recording is automatically transmitted to the proctor. There are even solutions for toilet breaks. If the exam is offered in sections, students can take a break to refresh themselves after completing each section.

Of all the prerequisites, it is perhaps the camera supervision that raises the most questions. How long will the recordings be stored for, and how will the proctoring company deal with privacy? Students have a right to know what policy the proctoring company pursues in this area (a recent article in The Chronicle[3] offers an insight into the operations of proctoring companies). Research also shows that some students find camera supervision distracting, although other studies do not recognise this (Fask et al., 2014; Case & Cabalka, 2009). This doubtless depends on the proctoring service used, which can sometimes go too far in assessing students, according to a recent article in the New York Times[2]. The article describes a new automated (!) proctoring solution that requires students to remain seated in the same place in front of their screen during the entire test so that the student remains constantly visible in a small window. Some universities in the USA offer students who are unable to meet the requirements of this option to take the exam in a physical exam hall instead.

Costs

The costs of testing are currently around 20 euros per exam taken. Some American universities pass on the costs of online proctored exams to students. This is also a condition that the student must be aware of when registering for an online course.

Uptake

The technology is currently still under development (something that will probably always be the case). For

MOOC providers, online authentication is currently a standard prerequisite for the granting of a verified certificate, and participants or their employers are prepared to pay around 50 dollars for this. Online authentication and proctoring is becoming more common in online accredited education. In a survey of institutions in the USA offering remote education (2013 Student Authentication and Online Proctoring Report), 67% of respondents reported that they applied a form of online authentication or proctoring. More recent figures are, to my knowledge, unavailable. A few well-documented pilot projects have been run by Western Governors University (Case & Cabalka, 2009) and the University of Amsterdam (Brouwer & Haven, 2014). The latter has introduced online proctoring in a pilot project involving a target group of international pre-Master's students, while Delft University of Technology, Utrecht University and Wageningen University use it for online post-initial education.

We continue to see e-proctoring applied in online education, and in the Netherlands this still takes place outside regular programmes. The question is whether e-proctoring could be a viable replacement for the digital assessment of large groups of on-campus students, for whom more and more expensive exam halls are now springing up throughout higher education. Large-scale online proctoring as an alternative to exam halls seems unlikely at present. This is due to both the spatial and equipment requirements on the part of the students, and the risk of cheating, which cannot yet be accurately assessed.

What are the alternatives for online proctoring?

People who sign up to an online module or programme do so to benefit from flexibility in terms of time and location. It is also possible to learn at the institution of your choice, from your own country, or alongside a high-intensity job. If we want to adequately cater for these international and post-initial target groups, we must also make it possible to take tests anytime, anywhere. Are there any viable alternatives to online proctored tests? The simplest alternative is for online students to book flights and take their final tests in the exam hall of the institution offering the course. This option is employed in a few MOOCs. A more customer-friendly alternative is one that has been offered by open universities for many years: the facilitation of exams in test centres spread throughout the country or, for international students, in specialised commercial test centres distributed around the world. A third alternative is to offer exam facilities through educational institutions with whom partnerships have been established. This has already been happening for a long time on a small scale, and could also be organised on a larger scale.

Suitable forms of assessment

In all publications on online proctoring, the emphasis is increasingly on close monitoring and technical security. However, it is equally worthwhile for us to focus on suitable forms of assessment. To quote a respondent: "Security and 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 do in the face-to-face classroom." (2013 Student Authentication and Online Proctoring Report). As well as the aforementioned forms of assessment, online education at curricular level also provides a reason to stop and consider exactly what we want to assess and how. Instead of a single, crucial test at the end of a module, ICT offers more and more opportunities for different and more regular methods of assessment. We need only consider *serious gaming, adaptive learning*, and computerised adaptive testing (CAT) in this regard.

Research

The amount of research available is still limited, and what there is consists primarily of evaluations of pilot projects. The findings are varied. One case study might indicate a disadvantage for online proctored students (due to increased distraction, technical problems, stress and a lack of opportunity to ask for clarification of any ambiguous exam questions (Fask et al., 2014), while other studies find no difference whatsoever (Case & Cabalka, 2009). Sometimes these studies compare an online proctored exam with a test taken in an exam hall. Strikingly, online proctors sometimes appear to be more likely to flag cheating than invigilators in an exam hall (Case & Cabalka, 2009). All of these findings are tied to specific contexts relating to the test in question, the target group and the proctoring solution used. Nevertheless, these studies are useful in the sense that they provide greater insight into the effects of online proctoring, and may also serve to eliminate certain prejudices.

How does the Dutch higher education sector view online proctoring?

Most examination boards, lecturers and institutions are understandably highly critical of the validity of this form of assessment (Siemens, 2015). The issue concerns the value of our diplomas, and the reputational damage caused by cheating can be immense – not just for the institution involved, but also for online education in general. This reticence will remain in place as long as there is insufficient familiarity with online proctoring. On the other hand, online assessment is essential for online educational courses to be able to compete at international level. And we sometimes forget that we cannot always prevent every case of cheating, even when invigilating in a physical exam hall. However, this form of invigilation is at least familiar to us. It is thus important to boost the general level of familiarity with online proctoring.

What are the next steps?

One important initiative for collaboration is the LinkedIn group OPE (Online Proctoring Europe), which was launched at the start of this year. We have already mentioned a few pilot projects run by Dutch universities, and the experiences gained by these institutions are highly valuable in this context in terms of being thoroughly evaluated and shared. SURFnet and the special interest group Digital Assessment can play an important guiding role in providing more insight into online proctoring and building up confidence in this method. We invite them, as we do everybody involved with digital assessment and online education, to work together on the following six points:

1. Providing more insight into and building up confidence in online proctoring by organising research. What criteria can we use to determine when online proctoring works? (And indeed, what are the criteria for determining whether or not face-to-face proctoring works?) How great is the risk of cheating? This could, for example, be tested through a comparative study involving 'mystery guests' who cheat during written tests in exam halls and online proctored exams.
2. What about laws and regulations? Do these permit online proctoring, and if so under what conditions? Do regulations need to be adjusted? What might educational and examination rules need to account for?
3. Providing insight into solution providers. What providers are there? What technological solutions do they have, and what are the pros and cons? How reliable and how well-trained are the online proctors used by the most important providers? What procedures have been put in place by these companies?
4. Providing insight into business cases. What should you pay attention to when choosing an online proctoring provider? What organisational costs can you expect as an institution? What is the benefit-cost ratio compared with the aforementioned alternatives? We have an excellent opportunity to monitor and share the experiences of the Dutch pioneers in this field.
5. What test forms are suitable for online proctored testing? Encouraging knowledge-sharing and pilot projects in this area.

6. Sharing organisational best practices: how should online proctoring be organised, what should be communicated to students, what conditions apply to students?

Conclusion

We began this article with the question of whether the reluctance to accept online proctoring was justified. We assume that online proctoring is primarily a solution for online education providers in the short term. Anyone who wishes to attract an international target group with online programmes will also have to offer online assessment, as the alternatives quickly become too expensive for students (airline tickets) or require too much organisation on the part of the course (organising a local test for each student). Online proctoring technology is now advanced enough to offer reasonable security, although cheating cannot be ruled out entirely. Suppliers will continue to offer smarter solutions, and we can also achieve even greater security through carefully designed assessment. It is certainly worth continuing to work together on generating greater insight into the pros and cons, the limitations and the opportunities of online proctoring. And MOOCs – courses for professionals and pre-Master's students that do not result in formal diplomas – provide an unparalleled context for improving insight into online proctoring by means of research and evaluation.

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ARTICLE

IN PURSUIT OF THE EFFECTIVE APPLICATION OF CERTIFICATION AND PROCTORING IN ONLINE EDUCATION

by **Meta Keijzer-de Ruijter** and **Janine Kiers**

The assessment and certification of participants in MOOCs raise specific challenges. For example: how can you know whether a participant really is who they claim to be? How can you monitor the conditions under which an online test is taken on the other side of the world? What expectations are raised when issuing certificates? And how can you prevent foul play?

Delft University of Technology was the first Dutch university to launch MOOCs in 2013. This university now has 17 complete MOOCs available on the MOOC platform edX, as well as five MOOCs currently in progress, four that have been announced and several more in development. Some of these MOOCs are already being implemented for a second or even third time.

The pass-rate for MOOCs is notoriously low, at just 2% to 6%, but this can partly be explained by the fact that most participants register with a motive other than simply gaining a certificate. Nonetheless, DelftX (the name under which Delft University of Technology offers its MOOCs) has issued nearly 12,000 certificates to students who have successfully completed MOOCs.

DelftX offers three different types of certificates, aimed at three different target groups. The first part of this article looks at the differences between the certificates and their value on the job market. The second part describes Delft University of Technology's experiences with online proctoring, or remote invigilation during online testing. Both of these developments are still at an early stage. Delft University of Technology has a range of plans to follow up on its initial experiences, and has identified a number of challenges, outstanding questions and opportunities.

Three different certificates

The simplest form of certification offered by a MOOC is a certificate based exclusively on the edX Honor Code. Participants who complete a minimum number of assignments well during the course receive an Honor Code Certificate from DelftX. This includes the name that the learner entered upon registration and a link to a *verified* edX website, which confirms that the certificate has been awarded to this person. De waarde van het Honor Code Certificate is dan ook betrekkelijk; het dient puur om aan een (toekomstige)

Meta Keijzer-de Ruijter (M.A.Keijzer-deRuijter@tudelft.nl) has been working at Delft University of Technology as an advisor on ICT in education since May 2004. Over the years she has specialised in digital assessment. In this regard, she is closely involved in all kinds of developments in the field of digital testing at TU Delft, from package selection and setting up technical and functional support to assessment policies and test facilities. Meta is a member of the core team of the special interest group Digital Assessment and a project leader for digital assessment within the E-merge consortium.

Janine Kiers (j.a.kiers@tudelft.nl) is Product Manager DelftX MOOCs at Delft University of Technology. TU Delft has been offering MOOCs since 2013 and to date has developed and offered over 20 MOOCs. Numerous others are in development. Janine oversees the production, launch and quality of the MOOCS and their role in research, certification, branding and use in regular education.

No checks are made as to the identity of the person who sat the exam. The value of the Honor Code Certificate is therefore relative: it is designed purely to be presented to (future) employers, who must then check or find out for themselves what the employee or applicant has actually learned. Depending on the course, this certificate is awarded to 2% to 6% of participants in DelftX MOOCs.

Employers have greater certainty if the applicant is able to present an ID Verified Certificate. Before this certificate is awarded, checks are carried out to ensure that the photo on the participant's ID matches the person before the camera who is sitting the exam. The MOOC participant pays 50 dollars for this form of certification. The certificate carries the lecturers' signatures, a watermark and a link to a *verified* edX website, which confirms that the certificate has indeed been awarded to this person.

The pass rate increases hugely when participants pay to be certified. The pass rate of the Functional Programming MOOC increased by as much as fourteen times, to around 56%. It could therefore be concluded that paying for registration increases the chance of students receiving a certificate, but it is more likely that motivated students primarily register to obtain this certificate. Psychologically, registration has an additional benefit: once a participant has paid for a course, they are more reluctant to drop out. Even the ID Verified Certificate offers only a limited guarantee that the participant is actually the person who followed the MOOC and gained good marks after sitting the exam. Ultimately, the participant will have to demonstrate what he has learned during the interview or at work.

DelftX has also offered a third product on the edX platform since the start of 2015: for 250 dollars it is possible to participate in Professional Education. The number of participants in this form of online course is limited. It primarily involves professionals who wish to refresh their skills or expand their knowledge and engage in valuable interaction with their fellow students over a short period of time, such as five weeks. Because these courses are not Massive or Open, we refer to them as online courses rather than MOOCs. In the Professional Education course on Economics of Cybersecurity, 87% of participants received a certificate for the course and its associated *continuing education units* (CEUs). These study credits can be used as proof of training on the US job market, regardless of whether this training is compulsory or not. The participants receive a Professional Education Certificate from DelftX. This is a declaration that the participant has submitted proof of identity for the certificate and that they have paid to take part in the course. Again, this certificate is signed by the lecturers and contains a link to guarantee its authenticity.

Progress in the acceptance of unaccredited education

In education, we are observing 'unbundling', a phenomenon that has been commonly observed in the media and the music industry over the past few years. According to this development, people learn not just during formal education at recognised institutions, but also in more informal settings such as through MOOCs and other online courses. Although certificates provide an indication of the skills acquired, candidates can only show what they have learned by demonstrating it in practice. With this field still in development, Delft University of Technology is stimulating its progress by offering new types of courses and issuing suitable certificates. At the same time, consideration is being given to the requirements imposed and the expectations that are raised.

Recognition from existing professional associations could increase the value of Professional Education Certificates and may constitute an alternative means of obtaining continuing education credits. One obstacle to this is the fact that there are countless professional associations across the world. As such, it is difficult to obtain recognition in a centralised and unambiguous way. Certain professional associations may place additional requirements on examinations, for instance by insisting that the exam takes place under supervised conditions, or that participants must take an extra exam in order to actually be awarded ongoing education credits for the time that they have committed to training. Delft University of Technology is currently in discussion with the Dutch Royal Institute of Engineers, or KIVI, regarding the possible recognition of courses as part of their development of the 'chartered engineer' track.

To adopt a different perspective, other institutions may also attach merit to open courses. This is why the American Council on Education (ACE), a provider in the field of higher education accreditation in the USA, is working on an alternative credit project for higher education. The aim of the project is to identify, qualify and give accreditation to open courses such as the MOOCs offered by DelftX in order to make them a source of alternative credit for universities and colleges. ACE has persuaded twenty-five universities to use these courses in their curricula and award credits for them. Initiatives of this kind can serve to extend the coverage and value of the MOOCs offered by Delft.

Online proctoring: available 24 hours per day

In the United States, extensive use is already being made

of *online proctoring*, or invigilation during online tests. Broadly speaking, there are two types of systems. In the first type of system, a live proctor monitors the student via a webcam during the exam. The live proctor guides the participant through the identification process and system check, and makes adjustments where necessary. That means the student needs to show their ID and film the room they are located in using a webcam. In the second type of system, the system check, authentication and room monitoring are recorded and assessed after the end of the exam together with the recordings made of the student during the exam. Delft University of Technology has opted for the second type of system due to its 24/7 availability. This flexibility is highly convenient, as participants in online programmes are usually distributed over a number of different time zones.

The system used by Delft University of Technology is called Remote Proctor Now (RPNOW). The student logs in to the proctoring system, which starts the recording through the webcam. They are automatically guided through the authorisation procedure step by step. The program then performs a system check. If the student meets the requirements, they are able to access the exam. The recording is stopped once the exam is finished and the proctoring application is closed. Students are informed in advance by email as to the exam room requirements, the resources permitted, and how the students are to conduct themselves. The recordings (webcam, screenshots and audio recordings) made during the exam are assessed by two to three reviewers, who monitor whether or not the student has met these requirements.

If the student breaks one of the rules, this is flagged by the reviewer as a *rule violation*. This status indication does not yet have any consequences regarding the validity of the exam. Students are kept informed at all times whenever rule violations are observed. This provides an indication that the examinations board may well reach a different conclusion if the behaviour or situation is repeated in a subsequent online exam. Whenever a student is suspected of having benefited from the fact that a particular rule was breached, a *suspicious behaviour flag is applied*.

These flags are reviewed by a representative of Delft University of Technology, who decides whether or not the images should be presented to the examinations board. This board then makes a final judgment regarding the validity of the exam in accordance with existing procedures for addressing cheating.

Online proctoring systems compared

Potential obstacles to the use of this online proctoring system are (US) privacy legislation and regulations and the level of security. The cloud services commission at Delft University of Technology has approved the use of RPNOW for online invigilation purposes. This was preceded by thorough research into issues such as legislation, security and privacy. Before choosing RPNOW, Delft University of Technology compared a number of different online proctoring systems. This comparison was performed with the help of the study[4] by Foster and Layman (2013).

Gaining practical experience

An overview is slowly emerging of the benefits and critical points of online proctoring. Delft University of Technology is working on the organisational aspects, and is gaining more practical experience with RPNOW in the meantime. For example, there have not yet been any cases of students complaining about a decision made by the examinations board that cheating may have occurred. However, answers are still being sought for generally straightforward questions as well: would students prefer to use a notepad or a calculator on their PC? Should the exams be synchronous with the campus education cycle? As with certification, online proctoring is far from being a settled issue. It remains a relatively new area where many aspects are yet to be determined.

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[4] *http://www.caveon.com/blog2/wp-content/uploads/2013/03/Online-Proctoring-Systems-Compared-Mar-13-2013.pdf*

ARTICLE

THE BORDERLESS FLEXIBILISATION OF ASSESSMENT THROUGH ONLINE PROCTORING

by **Natasa Brouwer and Daniel Haven**

One important and frequently asked question is: how safe, reliable and valid can remote online examinations be? Another question that seems more relevant to us is: what does remote online assessment mean for student learning processes? In this article, we take a look at the practical experiences gained at the University of Amsterdam in 2014 and 2015. The university used an online invigilation method for remote exams that was developed by the Dutch start-up ProctorExam.

One important and frequently asked question is: how safe, reliable and valid can remote online examinations be? Another question that seems more relevant to us is: what does remote online assessment mean for student learning processes? In this article, we take a look at the practical experiences gained at the University of Amsterdam in 2014 and 2015. The university used an online invigilation method for remote exams that was developed by the Dutch start-up ProctorExam.

Online remote exams were the final missing link that would enable education to be provided entirely online. Although remote and borderless education has been available for some time, exams were often held in a physical location, or an alternative assessment took place that was often not the equivalent to that of a regular course.

In the United States, over 60% of students in higher education participate in at least one online course (Allen & Seaman, 2011). Online assessment is therefore growing in importance, leading to an enormous increase in the use of online invigilation (*online proctoring*). Currently, online proctoring targets the niche market of students following courses that take place completely online and who thus also sit their exams online. We predict that this market will explode in popularity in the near future. In the same vein as other new developments, the initial philosophy of online proctoring is generally well accepted by first-generation users ('early adopters'). Second-generation users (the 'early majority') make up the demographic core of the potential total market, and set major changes in motion.

The 'early majority' users of online proctoring can mostly be found in the United States. The applications vary from *business-to-consumer* products – where students prefer to sit their exams at home – to universities which require

Dr Natasa Brouwer (n.brouwer-zupancic@uva.nl) is a senior consultant at the Education Service Center of the Faculty of Science at the University of Amsterdam. She is also the coordinator of the IT for Education-FNWI Programme Board, which works on fostering educational innovation through ICT within the faculty. One of the topics she is working on is the flexibilisation of education with the help of remote digital assessment.
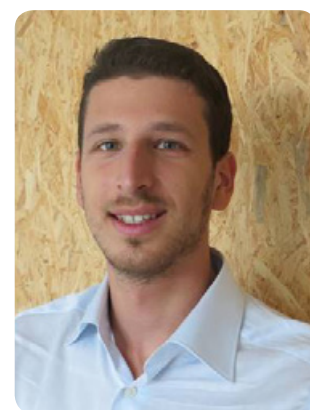
Daniel Haven (daniel@proctor-exam.com) is the director and founder of ProctorExam. This company provides security solutions for digital exams. ProctorExam works to globalise education and provide remote education (including exams) to students at any time by means of remote examinations.

students to utilise online proctoring. They do so because this allows them to assess greater numbers of students more efficiently than by using their own equipment, and to cater for them throughout the entire examination process.

Online proctoring is no longer exclusively used in open online education and MOOCs. Cima et al. (2014) have applied the proctoring method developed at MITx to the regular course 'Introduction to Solid State Chemistry'. As this allows them to facilitate mastering learning in a flexible manner, the success rate for each learning objective in this module has increased massively compared to the previous year (from 30% to as much as 4800%, depending on the learning objective).

Two scenarios

Two scenarios were implemented in the Faculty of Science (Faculteit Natuurwetenschappen, Wiskunde en Informatica, or FNWI) at the University of Amsterdam in 2014 and 2015 in partnership with ProctorExam:

- Students take tests in their own environment and are monitored by an invigilator, who observes the exam through two video cameras and can also view the computer screen. The entire test is recorded on video (ProctorExam Pro).

- Students take tests in a computer room at the faculty, and their computer screens are monitored and recorded on video (ProctorExam Light).

The videos can be played back after the exam in order to review any violations, or to make a check if required.

Remote online exams on the pre-Master's course in Information Studies

In 2012, an online pre-Master's course in Information Studies was launched at FNWI. This pre-Master's course enables future students to overcome any deficits in knowledge that they would need for a Master's degree in Information Studies, and to subsequently register for the Master's course. The expected target group for this pre-Master's course was primarily graduates of Dutch professional higher education courses, potentially along with students from neighbouring countries. The exams at the end of the online courses were taken on-site at the University of Amsterdam. However, the very first edition saw three participants sign up from distant countries, which led to the need for a remote exam. Physical attendance would have been too expensive and time-consuming for these three participants.

As a result, an online exam was organised for these three participants using video and audio contact, in which the participants' computer screens were shared with a lecturer who attended for the entire duration of the exam. Although it was time-consuming to prepare everything properly, the operation was still just about feasible for three participants. However, the experience made it clear that professional help was needed to invigilate remote exams. As US providers would have processed data in accordance with American legislation, the University of Amsterdam decided to look for alternatives. This resulted in a collaboration with ProctorExam and

The pre-Master's programme in Information Studies consists of five online courses. The educational design of these courses is based on assessment-driven learning, with online guidance provided by a moderator. The moderator organises a question-and-answer session via videoconference once a week.
An online exam takes place at the end of each pre-Master's course. If a student passes the exam, they are free to sign up to the Master's degree. There is no major difference between students from the pre-Master's course and students who join the Master's degree programme through the conventional channels when it comes to obtaining study credits. tevreden.

a successful pilot project with ProctorExam Pro in July 2014 involving 41 students. Since August 2014 (in the wake of the pilot project), all participants in the pre-Master's course in Information Studies have received the opportunity to sit exams remotely, provided that their equipment meets the technical requirements. Students can also optto take the exam on-site at FNWI if they wish to for personal reasons, but this is rare.

In order to avoid any surprises during the exam, all participants are asked to perform an equipment check well in advance of the exam as standard. They are not permitted to take part in the remote exam if they refuse, or if they fail the equipment check. To avoid additional stress during the exam, the admitted participants sit a dummy exam that is identical to a genuine proctored exam, but with a dummy question used in the test application.

The pre-Master's programme is held four times per year, and so far over 100 students have taken a remote proctored exam. A small number of students visit the university in order to sit the digital exam under the supervision of on-site invigilators.

All 41 participants in the pilot project of July 2014 (including all the participants that sat the exam on-site) completed a survey immediately after the proctored exam. This showed that 87% of participants were satisfied or highly satisfied with the online exam and the proctor. Three students (7%) were dissatisfied. A majority of 69% stated that the presence of an online proctor did not make them feel nervous (figure 1), while 13% indicated that they found it problematic. The majority of these students decided to take the exam on-site. The same evaluation was carried out after subsequent proctored exams, with similar results.

The presence of the online proctor made me feel more nervous than being invigilated at an on-site exam.
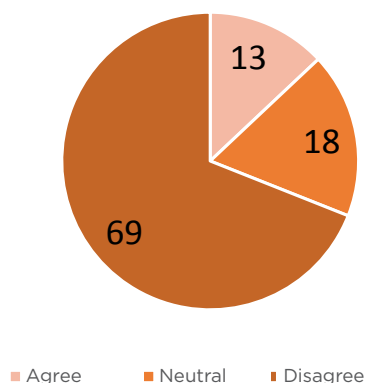

Figure 1 Student experiences under proctor supervision

As 20% of the participants were dissatisfied with the privacy regulations during the pilot project (figure 2), a lot of time was invested in improving communication on this issue. ProctorExam has also made the exam procedure clearer, and the look and feel has been improved as well. During the most recent pre-Master's courses in 2015 (in which 22 students took the online proctored exam), only two students were dissatisfied with privacy issues. They therefore sat the exam in the university computer room. A total of 11 students were satisfied or highly satisfied (50%) (figure 2). There was a slight reduction in the percentage of students who did not give a clear opinion regarding privacy issues during exams, but this still remained reasonably high.

We intend to continue to improve communication in future editions of the courses in order to increase student confidence. Given the fact that the numbers of participants in each course are relatively low, we will continue our monitoring for the time being in order to properly validate the data.
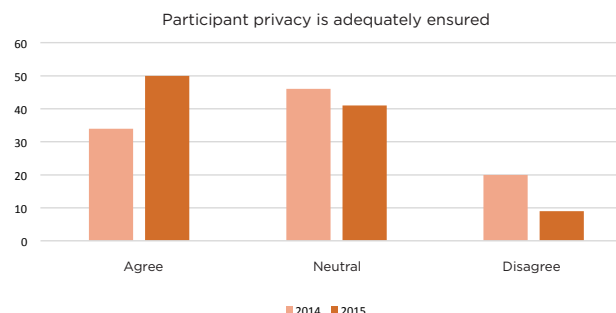

Figure 2 Student satisfaction regarding privacy in the proctored exam.

A customised workflow for proctored digital assessment has been developed for the pre-Master's course in Information Studies. Given that we are currently in an experimental phase, this will be further optimised in the near future in partnership with ProctorExam. There is still more to be determined and communicated to students, such as how long the videos of the exams may/must be retained, the consequences for students who conduct themselves in an undesirable manner during the exam, and the rules to be applied in the event of a disrupted internet connection. The security aspects of remote online exams must also be intensively examined during this phase.

In the meantime, a rapid increase can be observed in the number of foreign students registering for the Master's in Information Studies. The online pre-Master's programme and the examination supervised via ProctorExam Pro will offer capable students the opportunity to gain access to this Master's degree remotely.

Digital assessment in the regular Bachelor's module Operating Systems

In April 2015, an experiment was conducted using ProctorExam Light for the first time in the regular Bachelor's module Operating Systems. Over 100 students took part in a digital open-book test that was held in a standard computer room at the University of Amsterdam. The rules of play and the ProctorExam privacy statement were communicated to the students, who were entitled to refuse the digital test and opt to sit a paper exam instead if they wished. A few students chose to do so based on privacy considerations.

By adding this method of monitoring computer screens, the digital test could be held in a normal computer room without having to block the internet in order to protect against cheating issues. The initial experiences of both the lecturer and the students were very positive, and the lecturer intends to use ProctorExam Light again for a subsequent test

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Online proctoring with ProctorExam

The Dutch start-up ProctorExam provides a web-based platform that does not require students to download any software onto their computers. The platforms makes use of four basic elements:

1. 360° audio and visual monitoring;
2. ScreenSharing technology;
3. live supervision during tests;
4. video recordings that can be reviewed after the end of a test.

These four elements can be implemented in a flexible and modular manner: all four can be used or individual options such as the ScreenSharing technology can be selected as desired.

Students carry out a technical requirement check well in advance of any online tests in order to determine whether their technical resources are sufficient for taking a specific test (figure 3).
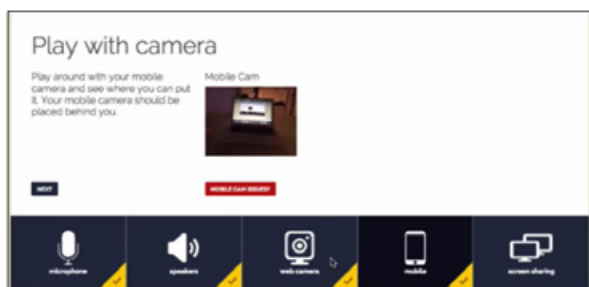

Figure 3 ProctorExam Pro technical check: step 4 (check mobile camera)

The exam setup is accompanied by a proctor. In figure 4a, the proctor can be seen on the right of the image. The candidate taking the test is on the left. The proctor is not visible while the online test is being taken (figure 4b).
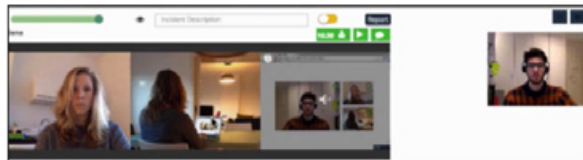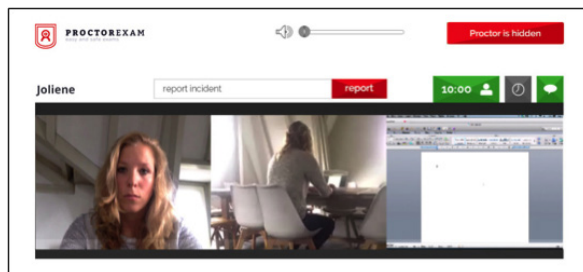

Figure 4a Proctored exam setup

Figure 4b Screen-print during a proctored exam (source: ProctorExam demo video)

ARTICLE

RECOGNITION OF MOOCS: A STATUS OVERVIEW

by Robert Schuwer

The awarding of study credits on the successful completion of MOOCs is a topic that has regularly surfaced in recent years in discussions about the possible effects of MOOCs on regular education. An investigation into the subject was produced in mid-2014 by NVAO (the Accreditation Organisation of the Netherlands and Flanders) (NVAO, 2014). One of its observations was as follows: "NVAO finds it unlikely that MOOCs will be subject to accreditation in the Netherlands or Flanders in the foreseeable future." In practice, however, higher education institutions are asking themselves whether study credits can be awarded, and what procedures can be used to do so. A panel discussion of this question took place during the masterclass 'Online Assessment in MOOCs' in April 2015. The members of the panel were Bob van den Brand (Tilburg University, member of the examinations board), Ernest van Bremen (Delft Extension School Digital Assessment and lecturer in Industrial Design; member of the examination board for Industrial Design), Marinke Sussenbach (project manager at the Delft Extension School and former project manager and adviser at the Dutch Ministry of Education, Culture and Science) and Fons Verbeek (LIACS, the IT institute at the University of Leiden, member of the examinations board). This article provides an overview of the experiences and ideas that arose during the discussion.

Robert Schuwer (r.schuwer@ fontys.nl) is a professor in Open Educational Resources (OER) at Fontys University ICT in Eindhoven. He has been involved in many OER projects since 2006. He is Chair of the core team of the SURF special interest group Open Education.

When MOOCs first began to gain in popularity in 2012, the following scenario was envisaged: A student follows a MOOC outside the regular curriculum. On successfully completing the MOOC, the student presents the certificate they received to the examinations board of their institution and requests to be awarded study credits. As an institution, how should you deal with a request of this kind?

Three years later, this question has become less important – at least at Fontys Hogeschool ICT (Fontys University ICT, or FHICT). This may be because students have little awareness of these options. In the Open Educational

Resources department, we recently completed a student survey on the topic of MOOC plans within FHICT. Nearly 80% of the 187 respondents stated that they had never heard of this concept before. A total of 22 people (12%) said that they had started a MOOC outside their course of study. Seven of these had completed the MOOC, and three of these seven individuals had been awarded a certificate.

Incidentally, they believed that the greatest threats to the implementation of MOOCs in education were the already full curriculum (59%), and the independence and discipline that students needed in order to successfully complete a MOOC (49%).

Despite this perception, certifying informal learning through MOOCs remains an issue. What if those three students approached the FHICT examinations board with a request of this kind?

During the masterclass, the panel members were presented with a number of different questions and views. The discussion among the panel members and with the audience demonstrated that the participating institutions did not all follow the same approach. The following considerations were raised regarding whether or not to approve such requests for recognition:

- **Does the MOOC replace a regular module or is it complementary to the curriculum?**

Some courses feature a degree of freedom, i.e. a certain number of study credits that the student can choose for themselves. Based on the panel discussion, it can be cautiously concluded that a MOOC is more likely to be recognised if it complements the course of study than if it acts as a replacement.

One of the panel members referred to article 7.3d of the Dutch Higher Education and Scientific Research Act. This article deals with flexible curricula in scientific education: "A student registered for a course of scientific education may assemble their own curriculum from the educational units offered by the institution, and this curriculum shall be assessed by means of an exam. If necessary, the management of the institution shall appoint an examinations board who will be responsible for the decision referred to in the previous sentence."

The panel members wondered whether we ought to pay more attention to this article, as it represents one of the available resources that provides students with a more flexible option, regardless of whether this is done through MOOCs drawn from elsewhere. It should be noted here that higher education institutions must search for alternative options within the confines of the law.

- **Does the MOOC replace an entire and discrete course, or just part of one?**

MOOCs are more likely to be recognised when they replace a course forming part of a series of courses that build upon each other, and less likely if the module does not lead on to any other courses on the same topic within the curriculum. For example, if a MOOC replaces the course Accounting 1 (and the modules Accounting 2 to 4 build on the material covered in Accounting 1), the assumption is that if recognition proves to be unjustified, the student will run into problems during the subsequent modules.

When the student submits their request, they are made aware the risk of future problems in the event that they have not sufficiently understood the material covered in the exempted module.

- **Is the request made in advance of the MOOC, or after it has been completed?**

Institutions can opt to only consider requests that are submitted in advance. This can be combined with an overview of MOOCs from which students can choose an option.

Issues and practices

When the panel was asked for examples of specific procedures, it became clear that institutions still face a number of questions about, for example, the admissibility of online examinations. However, a few practices were shared that are currently receiving vocal support.

First of all, the panel was asked whether the procedure for recognising competencies acquired elsewhere can be applied in cases where recognition is requested for a MOOC. This appears to be difficult in practice. Many institutions lack such a procedure, or only have an outdated one, which means that the possibility of online testing cannot be taken into account (for example). It may also be the case that a procedure of this kind only applies to part-time offerings. It was also pointed out that a procedure of this kind may work in individual cases, but does not offer enough leverage to be used to deal with large numbers of requests.

The current state of affairs regarding online examinations and the possibility of detecting cheating is described in article[5] 'Online proctoring: how does it work? Who does it? And where is it going?'.Although options for detecting cheating are becoming more numerous, there is still a great deal of reluctance to award study credits for MOOCs in which testing takes place exclusively

online. Unfamiliarity with and a resulting lack of trust in the institution assessing the MOOC (whether it is the educational institution itself or an organisation that provides online examinations) play a role in this. It is worth considering whether exams taken offline actually meet the multitude of requirements placed on exams taken online. Most students and lecturers have experience of undetected irregularities during offline exams.

Regardless of the form of the test, the evaluating authority (generally the examinations board) needs access to all kinds of data about the MOOC in question in order to determine whether it should be recognised or not. This might include the learning objectives, the course level, the workload, the name of the university and lecturer organising the course, and the assessment method. The work of the exam board could be simplified if this data was provided on the issued certificate. A recent article in the New York Times[6] referred to the potential of *online credentials* (such as badges) in order to provide much more information about the course and the results than is currently available.

The panel was also asked whether a centrally managed catalogue of MOOCs containing this data and lecturer opinions might be able to solve this problem of insufficient data. An experiment was carried out to this effect through the VMPass project, which was financed by the European Commission. However, the panel members have serious doubts about the usefulness and feasibility of such a catalogue. There are questions regarding who would manage this catalogue, who would input the data, and who would guarantee the quality of that data. Most of all, however, the fact that it is unclear whether the majority of MOOCs would be repeated – and if so in what form – calls the usefulness of registering these MOOCs into question. The usefulness of registration may increase in future as MOOCs are increasingly made available *on demand*.

Ultimately, all institutions seem to have opted for the same solution: testing the requester in order to evaluate whether or not they have genuinely mastered the material. This method is feasible precisely because the number of requests being made is still very small. However, an efficient procedure has not yet been developed for a scenario in which students make use of this option in large numbers. In that case, institutions may need to have more confidence in the online testing method used in the MOOC.

Source

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[5] *Link to article by Marja Verstelle in this issue*
[6] *See http://www.nytimes.com/2015/03/08/upshot/true-reform-in-higher-education-when-online-degrees-are-seen-as-official.html*

PRIVACY AND ETHICS IN DIGITAL ASSESSMENT

by Nils Siemens

A number of issues relating to privacy and ethics are raised by the decision to use online proctoring. I discuss these issues in relation to three different aspects: the reliability of the proctoring technology, monitoring during the assessment, and the conduct and environment of the student during the assessment. I will then address the consequences of these aspects for the evaluation of undesired actions and situations during the assessment. After all, online proctoring is applied in order to allow assessments to take place reliably.

Nils Siemens (n.siemens@hva.nl) works as a consultant in IT and Education at IT Services at Amsterdam University of Technology and the University of Amsterdam. As an expert in education and training, he specialises in digital assessment and learning analytics, and examines the benefits and issues of these developments from an IT and educational perspective. He has written this contribution in a personal capacity.

Technology

First of all, I will look at the technology behind online proctoring. Online proctoring providers offer products that are as reliable as possible. The suppliers' priority is undoubtedly to ensure that the software meets security standards, and that security is tested by means of *ethical hacking* (testing for weak points). Nonetheless, there remains a risk that the technology cannot cover all possible issues. A student or another party may succeed in adapting their computer or the proctoring software in order to give the proctor a false picture, whether literally or figuratively.

The manipulation of systems is regularly depicted in feature films[7]. Although this is often exaggerated, the possibility of a manipulated system should not be ignored. The fact that the proctor is unable to physically access the computer does not help either.

If a person succeeded in manipulating the system, this would have unpleasant consequences both for the institution and for students wanting to obtain a certificate by honest means. This leads to the difficult question of what to do about tests that are recorded on a system that appears to be vulnerable to manipulation.

Monitoring

Alongside questions regarding the reliability of the technology, online proctoring also raises the ethical question of whether or not educational institutions wish to undertake extensive monitoring on personal computers in

personal environments. The student must be prepared to tolerate the proctoring too, which raises the question as to whether or not students are prepared to permit such monitoring. Thirdly, there is the issue of whether or not institutions should allow proctoring to be implemented with the aid of a system that records all kinds of actions and situations

The institution should initially be cautious in carrying out monitoring, as online proctoring and its associated monitoring intervene in personal situations. It is not easy to determine whether or not students are prepared to accept this monitoring. After all, students do not always have a genuine choice in the matter, as refusing online proctoring often means that they are unable to obtain a certificate.

Finally, there is the question of whether comprehensive monitoring is desirable. There is a clash here between the intrusiveness of online proctoring and students' lack of freedom of choice on the one hand, and the comprehensive monitoring system used on the other. Online proctoring records keystrokes, images of the environment, images of the computer, sounds and other aspects. Students, lecturers and institutions must be aware of this, and for each category of information they must specify whether or not they wish this to be monitored through online proctoring. The software chosen must therefore provide this option.

Personal environment

Students who take tests online often do so in an environment that they cannot (or do not wish to) fully control. Aside from the presence of other students (since not all students live alone), there is also a range of possible situations in which the student would conceivably need to respond to their environment: a courier or charity collector knocking on the door, or a housemate entering the room. Nor does the increasing variety of devices in close proximity to students make it easier to keep the test situation under control. The number of devices with dual functions (watches, glasses and pens, for example) is likely to increase, and this will give rise to more ambiguous situations in online proctoring.

Software and other technology cannot prevent all undesired activity. If online proctoring proves to be unreliable during tests, many students will suffer adverse consequences. For example, cheating students might not be caught out, and well-intentioned students could suffer negative consequences if their efforts are placed under suspicion. Moreover, monitoring via proctoring is often more comprehensive than in an exam hall. This makes it necessary

to evaluate all possible situations in a domestic environment for undesired behaviour in the context of an exam situation. Can this responsibility really be placed on students? Some domestic situations are difficult for students to influence, and as such it is not especially fair to leave the student to deal with this if the test results are called into question or declared invalid as a result.

Students who wish to take tests online are in a position of dependence on the educational institution and the proctors. Partly because of this, they have an interest in balanced monitoring, giving their opinion on the scope of online proctoring, and well-considered decisions being made if a suspicious situation arises. Online proctors should be wary of making naive judgments that result in excessively positive or negative consequences for the student.

It may well be that online proctoring is unable to meet the expectations placed on it – not just due to the technology in question, but also because privacy and the interpretation of test situations prove to be too difficult. These aspects must be clarified through extensive testing and agreements between students, lecturers and other stakeholders. If online proctoring continues to raise too many questions around ethics and privacy, it would make sense to choose different forms of testing in which there is no need to monitor the use of resources during the test.

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THE STUDENT DREAM OF DIGITALISATION

by Yvonne Rouwhorst and Lisanne van Kessel

Yvonne Rouwhorst (rouwhorst@iso.nl) is a board member of Interstedelijk Studenten Overleg (ISO) student organisation, and is responsible for digitalisation and flexibilisation in higher education

Lisanne van Kessel (iso@iso.nl) is a project officer at Interstedelijk Studenten Overleg (ISO). She researches flexibilisation in higher education and assessment & feedback.

During the first edition of 'ISO on tour' (a series of meetings throughout the country in which ISO aims to lead a discussion about the future of education with the involvement of students, lecturers, politicians and education administrators), we pitched our dream of digitalisation. Our dream is high-quality and accessible education that stimulates and motivates students: education that enables us to co-create and work together to increase the value of the learning process. Digitalisation allows us to achieve this goal. Our dream therefore also includes the desire for more active use to be made of the resources that contribute to this. As part of our vision, we believe that digitalisation allows education to better meet the needs of individual students with diverse learning styles. These students will then be more capable of fulfilling their potential and developing their talents as effectively as possible. Existing educational material is freely available in our dream of the future: lecturers do not need to reinvent the wheel over and over again, but can make use of existing high-quality resources. We believe it is logical to share available knowledge: ultimately, every Dutch citizen helps to pay for the possibility to generate that knowledge. The role of the lecturer changes; in our dream, they receive sufficient freedom to improve the quality of education, to innovate, and to optimally fulfil the role of guide and accompany students on their journeys. In this context, we proudly wish to refer to the winner of the first 'Lecturer of the Year' poll organised by ISO this year. Alexandru Iosup makes a distinction between four different learning styles, all of which he has incorporated into a game. Students can choose their own path through this game, but all paths converge on the same final level. This is truly a guide for students to dream about.

Meeting diverse student needs requires not only the selection of different forms of education, but also freedom in forms of assessment. The most important criterion here is that forms of assessment should meet the aim of the course and suit the curriculum. With less complex assessment (such as the testing of knowledge), there are multiple forms that could be used to assess whether students possess the necessary knowledge. Regular assessment does not always have a motivational effect, which means that students do not always put in their best performances. Varying the test formats ensures that students can show that they have mastered the necessary knowledge and/or skills at the end of the module.

Higher education will make more frequent use of digital assessment in future. This comes with a number of important advantages for students. Firstly, students can receive their results immediately in digital assessment. This is beneficial, as the interval between the test being taken and the provision of feedback is currently often too long for the feedback to be effective. By 'result' we refer not only to a score, but above all to how students perform in comparison with others – both in the test as a whole and in individual parts of the test. The provision of a score results in a reduction in the students' need for feedback, meaning that less is done with the feedback received.

Secondly, a review model can be presented online or an online assessment can be made. This online assessment does not necessarily need to be performed by the lecturer. *Peer feedback* will become a more valuable component of the study process thanks to digitalisation. When students at all manner of (international) institutions provide each other with feedback online, lecturers can monitor this digitally and provide guidance where necessary. The ISO is currently carrying out research into the power of effective testing and feedback. Feedback is not just a snapshot, but a continuous process. Learning takes place over time and not just when the test is taken. In our dream, students are motivated and stimulated.

In brief: the benefits offered by digitalisation to students and lecturers in higher education are limitless, just like dreams. The ISO is working to turn this dream into reality and to help the education sector meet the different needs and qualities of students as closely as possible through digitalisation.

ARTICLE

THE FUTURE OF ASSESSMENT

by Marjolein van Trigt

Based on the masterclass 'Online Assessment in MOOCs', three experts in the field of IT and education offer their vision of the future of assessment in online and blended education. What does the perfect test of the future look like? What practical objections must first be overcome? Is the recent dispute involving the occupation of the Maagdenhuis university administration building in Amsterdam a sign that students are in need of change? Experts Ria Jacobi, Jan Haarhuis and Heino Logtenberg are dreaming of adaptive assessment which is better, broader, more personal and more effective.

The occupation of the Maagdenhuis is over, but the campaign led by the students at the University of Amsterdam continues. Dutch higher education institutions are closely following the latest developments. Ria Jacobi of Amsterdam University of Applied Sciences describes the demonstrators' call for less focus on profit as "A clear sign that students need more input regarding how their education is organised and designed." According to Jacobi, the occupiers' demands tie in perfectly with what she and her colleagues are trying to achieve for each other within their own institutions: participation in education, including through greater co-determination and flexibilisation of individual study paths, with much more emphasis on student preferences.

Jacobi is a=project manager in IT for Education and advisor at Amsterdam University of Applied Sciences and a core team member of the Open Education special interest group. "In the future, higher education institutions will function more as learning communities," she says. "Institutions will become platforms where students, lecturers and the professional world can join forces and learn together in a dynamic context. In other words, they reinforce each other." Not all students are in a position to decide what career they want to pursue or what follow-up training they wish to undergo at the age of seventeen or eighteen. This is why the university of the future will continue to offer structured training with legally mandatory and clearly formulated final qualifications. According to Jacobi, "Students put their individual learning paths together based on their personal career interests, existing knowledge and skills and personal circumstances. You can sketch out structured routes through the training courses as an example for students who ask for this kind of structure. But the flexibility is there for students who want to design their own pathways."

Marjolein van Trigt is a freelance writer and journalist. She writes about the influence of technology on our everyday lives, including for the magazine *Vrij Nederland*. She regularly writes articles for SURF on developments in open and online education.

Her interview partners are:

Ria Jacobi (r.k.jacobi@hva.nl) is a senior policy officer and team coordinator for education in Education and Research, or O2 department of Amsterdam University of Applied Sciences. Her policy areas cover the design of blended education, open learning resources and innovation in education, all with the overarching goal of 'strengthening student learning'. She is also a core team member of the Open Education special interest group.

Students who act as "prosumers" opt to embark on a route made up of structured choices, while students who operate as "self-learners" primarily make their own choices. Jacobi's vision of the future more accurately reflects student diversity, and gives students control and ownership of their own learning. This does not mean that the role of the lecturer is obsolete. "Lecturers play a crucial role in the learning community as a source of knowledge, as a guide for students, as a curator of information and as a link between the student and the working world," says Jacobi.

Assessment linked to the learning process

Students who receive greater opportunities to put together their own learning path are in need of insight. Assessment and feedback are linked to the learning process in this vision of the future. According to Jacobi, "Feedback on the results of learning (through testing or evidence in a digital portfolio) helps you to improve accordingly. Are you on the right track? What do you need for the next step? How can the institution help you with this?"

Tests are currently too much of an end point, and little is made of them afterwards. The majority of students make no use of this moment of insight – they receive their score and move on to the next module. Summative assessments should also constitute a form of feedback, in Jacobi's opinion. She would like to see a future in which the point when the test is taken is left up to the student. "Allow students to decide for themselves when they think they have mastered the material. They should also decide when and how often they want to receive feedback. The lecturer can agree to provide this on a weekly basis, for example."

In technical terms, Jacobi asserts that her vision of the future is already possible for the most part. A great example of this is that her ten-year-old niece recently received a typing diploma after following a fully automated course. "Typing speeds, difficult letters, the quantity of typos and so on were all recorded automatically. She decided for herself when she had had enough practice and when she was ready for the final test. She thought the course was great!"

Towards a new mindset

Jacobi is convinced that the biggest challenge is not the technology, but a *change in mindset*. "We have developed a system based on one *size fits all*," she says. "Within that system, tests serve to force students to learn. Students often ask themselves: 'Do we need to know this for the exam?' Curricula are still often designed based on subject-matter knowledge, and too rarely based on issues where the application of knowledge plays a central role. It should be about the circulation of knowledge. Jobs are becoming more heterogeneous and information technology is changing the world of work. Jobs of the future are partially shaped by the students of today. We need to make room for what is possible, instead of asking for a reproduction of specific knowledge and skills."

There are already some prime examples of this change of *mindset* in higher education, such as students helping to develop and improve educational material as part of a module. The digital portfolio - which Amsterdam University of Applied Sciences is currently engaging with intensively - will also contribute to the feeling that students are in control of their own study paths and

Heino Logtenberg (h.a.t.logtenberg@saxion.nl) is a IT for Education programme manager at Saxion University of Applied Sciences. Heino works on practical support for the no-nonsense implementation of e-learning & pedagogy, digital assessment and video use to enrich educational packages. He follows trends such as "open", "learning analytics" and "smart ICT use" closely, and is a great advocate of "sharing".

Jan Haarhuis (J.C.M.Haarhuis@uu.nl) is a programme manager for educational innovation and technology at Utrecht University, working for the university administration service in the Education and Research department. He is responsible for managing the following sub-projects: e-assessment, e-lectures, electronic learning environments and innovation. He is also responsible for setting up programmes relating to the professionalisation of lecturers and training for students, and for conducting evaluations of and academic research into the effects of changes in education.

monitoring their own progress thanks to the feedback from lecturers and fellow students that they collect in their portfolios. "Customised education is based on a growth mindset and not on a closed mindset," says Jacobi. "Instead of a score, you want to know what you can already do well and what you need to do better." According to Jacobi, a study[8] carried out by the LSVb student organisation in 2014 which focused on the 'flexstudent' shows that a large group of students are pushing for greater flexibilisation. The occupation of the Maagdenhuis is a clear signal that they take the issue very seriously. Jacobi believes it is clear that students are ready for major change.

More individual responsibility

But what about the individual responsibility of the protestors? For Jan Haarhuis, Education and IT programme manager at Utrecht University, the occupiers of the Maagdenhuis need to take a close look at their own attitudes too. The student monitor[9] issued by the Dutch Ministry of Education, Culture and Science shows that there is huge variation in the amount of time students devote to their studies. His own students tell him that half of the group turns up to seminars unprepared, meaning that valuable contact time is devoted not to academic dialogue, but to explanation – much to the frustration of those students who have prepared in advance.

"You would expect students to be critical of themselves," says Haarhuis in reference to the Maagdenhuis. "It's easy to point out all the things that are wrong, but it is much more difficult to actually identify the bottlenecks and reflect on your own attitude at the same time." Naturally, he thinks it is positive that activities such as 'Rethink UvA'[10] have resulted in renewed attention for the quality of education. "In recent years, a great deal has been invested in the quality of education at Utrecht University. For example, the Educate-it[11] programme to improve education through innovation and technology is the result of an expansive vision of education and IT, whereby lecturers and students are the owners of the process of change."

Individual student responsibility is at the heart of the pilot project involving digital assessment portfolios introduced in 2010 for Master's students studying at the Faculty of Veterinary Medicine. Students are required to gather feedback in the portfolio, not just from lecturers, but also from fellow students, support staff from clinics and patient owners. The observations are not restricted to the technical/factual part of the course, but also include all manner of other academic skills.

When asked about the ideal assessment of the future, Haarhuis explains that he wishes to explore the possibilities of programmatic assessment across the university in a

similar way as in veterinary medicine. "That means putting into practice what Cees van der Vleuten at the University of Maastricht has been researching and disseminating for years now, namely gaining a clear understanding of the skills that are important for a particular course and enshrining them in the final objectives in a clear manner. You then create a process that enables the student to gain adequate scores in every key skill by the end of the course."

Given that fellow students follow similar educational pathways, students are given the opportunity to test their performance against that of their *peers*. A digital 'spider's web' of competency profiles shows the average group score and the individual student's score for each key skill. "This gives students insight into the areas for improvement that they need to focus on," says Haarhuis. "I think this is the most important aspect of this type of assessment: the fact that students are individually responsible for gathering information about their own development, and that there are indeed opportunities to improve in specific areas."

Down with summative assessments

Haarhuis believes that programmatic assesments makes traditional forms of assessment that focus on the assimilation of facts redundant in the long run. "It is much more interesting to determine whether students are able to apply their knowledge in the right way," he says. "Nowadays, everybody has access to all the facts online at any given moment. When students are presented with situations during the course in which they can apply their knowledge, they learn to solve problems, which is a much more important skill."

Haarhuis would like to see this method of assessment count for one hundred percent of the grade in the three-year Master's course in Veterinary Medicine, but this does not seem feasible at present. Even Haarhuis sometimes has difficulty in achieving a change of mindset among lecturers and students. "It is possible to upload feedback directly with the help of the mobile devices we use," he says. "We would like to get lecturers into the habit of noting down their observations as they make them. For students, receiving feedback should be a structural component of their education, something so natural that everybody does it precisely because everybody does it. It takes persistence to implement educational reform. Over four years after the introduction of programmatic assessment, the results in Veterinary Medicine are now highly positive."

University versus higher professional education

Haarhuis declines to say whether or not there is a difference between university students and students in

higher professional education. "The more significant factor is how motivated and inspired they are." At best, he can imagine that the discussion regarding the imposition of compulsory subjects in higher professional education might be conducted more rigorously. "Our students say themselves that they can see the point of making preparations for seminars a compulsory component at Bachelor's level, for example. 'It's a question of age,' they say. Students in higher professional education are a little younger, on average."

In any case, technology will help to activate students. The availability of digital assessment makes it easy, for example, for lecturers to pick thirty questions out of a database in order to monitor progress. There is also an increasing range of software available to make it easier to provide *peer feedback*. In Jan Haarhuis's vision of the future, digital support and monitoring go hand in hand with individual student responsibility.

Testing at the push of a button

For Heino Logtenberg, programme manager IT in Education at Saxion University of Applied Sciences, new technologies are central to his vision of the future. "Technology will help us to provide automated tests," he predicts. "For all films, documents and discussions that can be found online, you can obtain an automatically generated questionnaire at the push of a button that you can use to check whether or not you have understood the content. Films are automatically subtitled or translated in order to understand the essentials. The tests you take are stored in your portfolio as evidence, and higher professional education students can naturally store all kinds of material from their professional practice here too."

The result of this development, in Logtenberg's view, is that summative assessment is falling by the wayside in favour of tests based on a diagnostic approach. "The summative assessments of the future will be conversations with experts from the professional world and lecturers from different courses. Boundaries between courses will also become more blurred given the range of new jobs being created."

According to Logtenberg, the most problematic stumbling block for higher education institutions is the lack of capacity to develop smart IT tools. As the collaborative IT organisation for Dutch higher education and research, SURF could play a role here by bringing institutions together. "For example, you could put the hundred cleverest students and lecturers together in a sort of innovation space and give them a number of assignments relating to testing." Could questions of this kind also be

something for market operators to address? According to Logtenberg: "I think that the prototypes could come from the innovation centre, but we will generally have to leave the management, maintenance, scaling-up and other development processes to professional operators."

Less talk

The job should be done within 7.5 years on a global level. Logtenberg has already seen the first prototypes being presented at a conference in Asia. As such, there is no point talking to him about the need for a cultural shift or *change of mindset.* "That phrase is used almost on a daily basis here when it comes to something like digital testing. I think that we spend too much time talking about it and not enough time actually taking action." That is why a new strategy was adopted two years ago at Saxion: one of not waiting until the majority of people have come around to new ways of thinking, but encouraging individuals who show enthusiasm in the hope that the flame will then independently spread among lecturers.

"There are certain requirements that must be met in order to achieve this kind of acceleration," says Logtenberg. The support must be properly put into place, just like the infrastructure. The lecturer receives the latest hardware or software that they need, even if this is unusual at the university. We want to avoid any lecturers being stuck with something that they cannot make any progress with. We have a support team, we have education technologists, we bring people together... This is how we succeed."

More say in assessment

The occupation of the Maagdenhuis has also had an effect on Saxion. An advisory group of six hundred students is currently working with the university. The students specify what they are missing and what they would like to see implemented. Logtenberg puts things into perspective: "We refer to this as demand-driven management, but that's just another buzzword. Make sure that you are present at the workplace and look at what is happening. Students know a number of things very well. They also have very little knowledge about a number of other things, especially when it comes to optimal study. That is where the professionals can step back in to offer some help." He believes that the occupation of the Maagdenhuis not only proves that students want to have a greater say in how education is designed, but also that lecturers are gradually beginning to demand more of a say in issues such as the future of assessment. "They are also fed up of having a funnel on their heads where everything gets poured in, so to speak. That time is now well and truly over."

8   http://www.scienceguide.nl/201402/de-flexstudent.aspx
9   http://www.studentenmonitor.nl/
10 http://rethinkuva.org/
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CREDITS

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Authors
- Marjolein van Trigt, freelance writer and journalist
- Marja Verstelle, Leiden University
- Janine Kiers, Delft University of Technology
- Meta Keijzer-de Ruijter, Delft University of Technology
- Robert Schuwer, Fontys University of Applied Sciences
- Natasa Brouwer-Zupancic, University of Amsterdam
- Daniel Haven, ProctorExam
- Nils Siemens, Amsterdam University of Applied Sciences
- Yvonne Rouwhorst, ISO
- Lisanne van Kessel, ISO

Editors
- Marjon Baas, Saxion University of Applied Sciences
- Janina van Hees, SURFnet
- Annette Peet, SURFnet
- Daphne Riksen, Ediction

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- EdTech Stanford University School of Medicine, https://flic.kr/p/9qt2e9 (CC BY-NC-ND)

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