Online Exams can be Conducted Securely and With Integrity

As universities move to distance learning, there are doubts about whether online exams can be conducted securely and with integrity. Doubts abound and are fueled by the basic logic that if students can cheat in the presence of invigilators in face-to-face exams, how about online when no one is watching? Truth is, when the right online assessment software is used, both software and remote invigilators are watching. And they are watching with eagle eyes and can see much more detail than an invigilator in a face-to-face environment can because of remote monitoring capabilities of software. In fact, good online exam systems are secure and can be trusted because they deploy an array of advanced technologies, coupled with human remote monitoring, to frustrate cheating.

The claim that good online exam systems are as good as face-to-face is based on research. A study conducted by Marshall University shows that 32.1% of respondents admitted to cheating in a face-to-face environment while 32.7% admitted to cheating in an online environment. The difference between these two numbers is insignificant. Many other studies show similar results. So, what is not generally known, and what this articles intends to make known, is that with the right tool, online exams can be conducted securely and with integrity.

What is an online examination?

An online examination is an assessment conducted remotely, via the internet, to test a student's knowledge in a subject or in a wide range of subjects.

How exams can be conducted securely and with integrity

Exams can be conducted securely and with integrity when a good learning management systems (LMS) is used. The best LMSs use advanced technology and psychology to defeat cheating. In addition to other cheating countermeasures, these systems address two of the major concerns regarding online exams, impersonation and copying and pasting answers. Next, establish an online exam control center where remote invigilators can monitor the exam and assist with problems, warn, or remotely stop an exam when cheating is obvious. From the remote control center, one invigilator can monitor hundreds of students. On the invigilator's screen, each student's name, photo and bio data, etc. are displayed. The invigilator does not have to scan through each student to look for infractions because the software does that and raises an exception flag when it suspects cheating so the invigilator can take appropriate action remotely.

Appropriate action is possible because against each student's profile are a set of software-driven indicators that show a normal test environment (green color), potential problem environment (yellow) and serious infractions (red). When proctoring software raises a flag, the invigilator can communicate with the student to find out what is going on. Before an online exam commences, a browser lockdown is enforced to prevent students from copying and pasting. Student identification, via a camera, is established to forestall impersonation. After the initial identification, continuous identification is conducted every few seconds to ensure there is no impersonation. Exam questions are randomly but appropriately generated by the system just before the exam to prevent leakage of questions. Each question is timed to further frustrate cheating.

Technologies that the best learning management systems deploy to frustrate online exam cheating

Good learning management systems use some or all of the following technologies to thwart cheating: Facial recognition software to confirm an online student's identity. Students' faces are checked against their identities stored by the institution. Keystroke analyzers are utilized to recognize keyboard typing patterns. Proctoring software is integrated to enable remote invigilators to monitor and or record test takers or to watch body language, eye movement, or other physical attributes known to indicate suspicious behavior. Just-in-Time Question Paper (JIT-QP) generated from exam question banks, minutes before the exam, are used to prevent leakage. Serialization of exam questions, showing one question at a time prevents students from knowing questions ahead of time and asking others to find answers for them. Timed questions are used to make it difficult to cheat and auto plagiarism detection features are baked into the system to identify plagiarized work.

Why the best online exams systems are as good as face-to-face

To beat a cheat, think like one. To frustrate online cheating, LMS developers have amassed and studied a compendium of cheating behaviors and techniques and have developed advanced proctoring software to neutralize these. They do so by using specific technology or technologies to target specific cheating patterns and known and emerging cheating behaviors and techniques.

How technologies are deployed against cheating behaviors

Impersonating: Online ID authentication such as face ID and biometrics are used to prevent impersonation. Identification is continuous, from beginning to end of the exam session.
Screen sharing or mirroring: This is where students use more than one monitor while doing an online exam. In this scenario, the student uses one monitor to access the exam questions while the other monitor mirrors the contents of the main monitor. An off-screen impersonator then accesses the test questions and comes up with answers. Screen mirroring or sharing is combated by imposing a browser lockdown at the onset of the exam. A browser lockdown prevents students from going outside the exam sandbox and denies them access, for the duration of the exam, to display settings on their device that enable screen sharing.

Cheating with devices: Smartphones and some programmable scientific calculators enable students to store data and formulas and use them during online exams. Students try to escape detection by keeping the device out of the perspective of the monitoring camera. However, proctoring software that records head, keystroke, and eye movement defeats this ploy because it flags eye, head and hand movements that fall outside of the defined normal movement parameters. To fool eye monitoring software, some students wear sunshades. When such violations are noticed, an alert is sent to remote invigilators who then contact the student. When students realize they are closely watched, they usually moderate their behavior. Those who continue to violate the norm will have their exams stopped remotely after three warnings. The ability of the camera to see even slight out of bound movements and report acts as a psychological barrier to cheating.

While some students may use high-tech devices to cheat, others may opt to use low-tech methods such as writing on their palms or cheat sheets. These approaches fail because they depend on the exam questions being leaked which is not the case with Just-in-time questions. If students do not know the questions ahead of time they cannot write the answers on their palms or in a cheat sheet.

Intercepting video feeds: During online exams, the proctoring software relies on a camera to monitor the student's actions and activities that may signal cheating. Some students try to fool the proctoring software by prerecording themselves behaving in a normal way so that when the proctoring software attempts to pull a live feed from the student's camera, the student's software intercepts the proctoring software and provides the prerecorded feed from a virtual webcam.

Searching for answers online: In this scenario, students copy questions and paste them into Google search bar or to websites like Quizlet, Chegg, Brainny, Indiabix or Course Hero to get answers. Browser lockdown thwarts this approach and in cases where the student uses a device that is hidden, the student will consume a lot of time will run afoul of time due to timing of questions. And software will pick up on the student's eye movements and flag it.

Cheating and academic integrity policies

The use of advanced technology and psychological factors go a long way in creating a good online environment. However, clearly defining cheating policies and setting clear expectations for students and staff makes it clear that the institution cares about integrity. In addition to the ethics, policies should clearly outline when devices are allowed and the acceptable parameters for using them in online exams that require the use of devices. It should also define upfront, the prohibition of wearing sunshades during exams. Since the online exam experience is relatively new to a large number of institutions and students, it is a good idea to require students to sign an honor code on admission or prior to their first exam.

Exams are a major component in education. The use of LMSs and the utilization of proctoring technologies to combat several forms of online cheating have made online exams secure and reliable. However, no technology is foolproof. The cat and mouse game between those who test and those who are tested will continue. Some current LMSs use artificial intelligence (AI) to counter online cheating. While AI does an excellent job, it cannot keep up with smarter ways by which students may cheat in the future. For this, newer LMSs are incorporating Machine Learning (ML) algorithms so the machine can learn exam cheating behaviors on its own and to adapt and defeat them.

With these advances, online exam systems will evolve faster and soon be much more secure than face-to-face exam systems. As long as a good LMS is used, online exams can be conducted securely and with integrity today. The secret is, use the right tool and have the right mindset.