ROLE AND CHARACTERISTICS OF ASSESSMENT PROCTORING SYSTEMS

Learning Unit 1: Main Components of an Effective Proctoring System

Definition

Online proctoring (OP), sometimes called remote proctoring, generally refers to proctors monitoring an exam over the Internet through a webcam. Online proctoring involves the use of virtual tools for monitoring learner activities during assessment activity. These tools (as they continue to overcome their limitations) have the potential for learners to take an online exam at a remote location while ensuring the integrity (security and trustworthiness) and reliability of the online exam.

Online proctoring using human proctors in an effective way was first introduced and championed by a private testing service in 2006.

In the US, the term *proctoring* is used to describe the oversight and checking of learners and their credentials for an examination. In the UK and other English-speaking countries, this is referred to as *invigilation*.

Reasons to use online proctoring

It enables learners to take exams securely in a remote location away from a physical exam room. With secure online proctoring, exams can now for example be taken at home.

OP is expected to prevent cheating, collusion and/or fraudulently acquiring answers to test during the examination process. Possibilities for cheating can be identified at various stages and phases of the examination process, comprising in general (1) prior sight of exam questions, (2) unfair retaking or grade changing for assessments and (3) unauthorized help (impersonation, illegal assistance, illegal resources) during the assessment. With online proctoring, phase 3, which is unauthorized help, specifically is subject of scrutiny.

It is expected that a future secure level of online proctoring will contribute to increasing access to higher education (HE) for various groups of (prospective) learners.

OP is expected to increase the opportunity for ‘anytime, anyplace’ examination processes once security and privacy issues have been resolved to the satisfaction of the HE institution (HEI) and the student.

Main components of an effective proctoring system

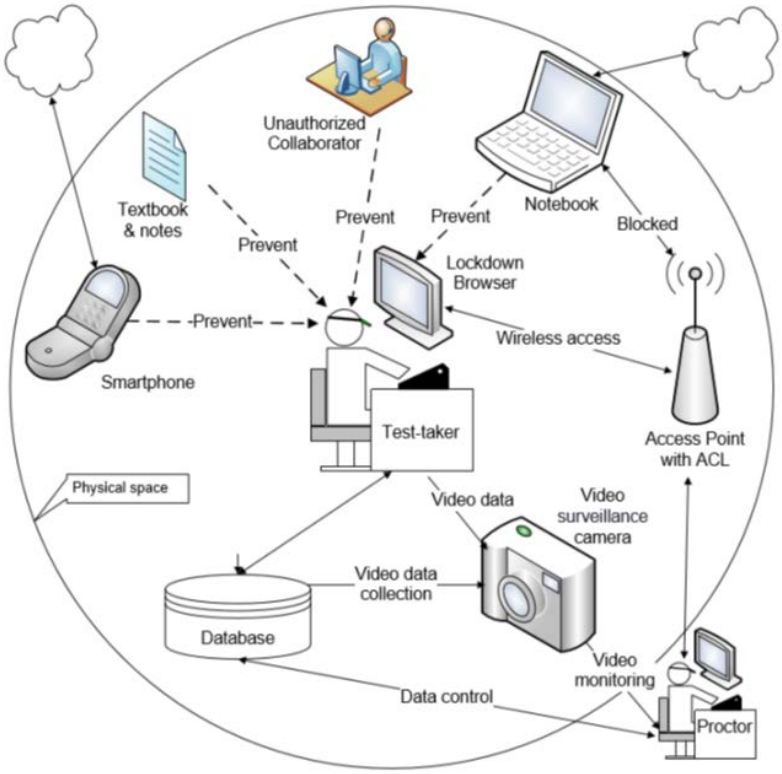
Online proctoring system focuses on three major components. The first one is *authentication*. Authentication refers to the process of making sure that the person beginning the exam—and remaining at the exam workstation until it is finished (excluding planned breaks)—is the person who is supposed to be there. Authentication in traditional testing models is the responsibility of the proctor or test administrator, often the same person. However, with technology-based testing, that responsibility can switch to automated processes. Authentication may be handled well automatically by the testing system without the involvement of the human proctor. Most of these online proctoring organizations record the testing session through the webcam and store the information for later review. It is possible to use a review of the stored video to supplement the authentication process or at least evaluate whether the examinee remained

throughout the exam. The traditional methods for one-time authentication at the beginning of the exam are used in face-to-face exams, but one-time authentication is not adequate for a secure OP. In OP, a test-taker may need to be re-authenticated continuously or periodically throughout the examination to detect a proxy impersonation.

The second component is *the use of a web camera* for recording the video of the learner appearing for the exam which can be later on viewed by the examiner/proctor. All online proctoring systems rely on a webcam with an integrated microphone. The webcam with microphone is primarily used to monitor, to chat with and to record the behavior of the examinee during the exam but may also be used in the authentication process. For the authentication process, it may be used to facilitate facial recognition software, to capture/compare a photograph of the examinee, to capture a spoken phrase for voice recognition, or to take a picture of a government-issued ID.

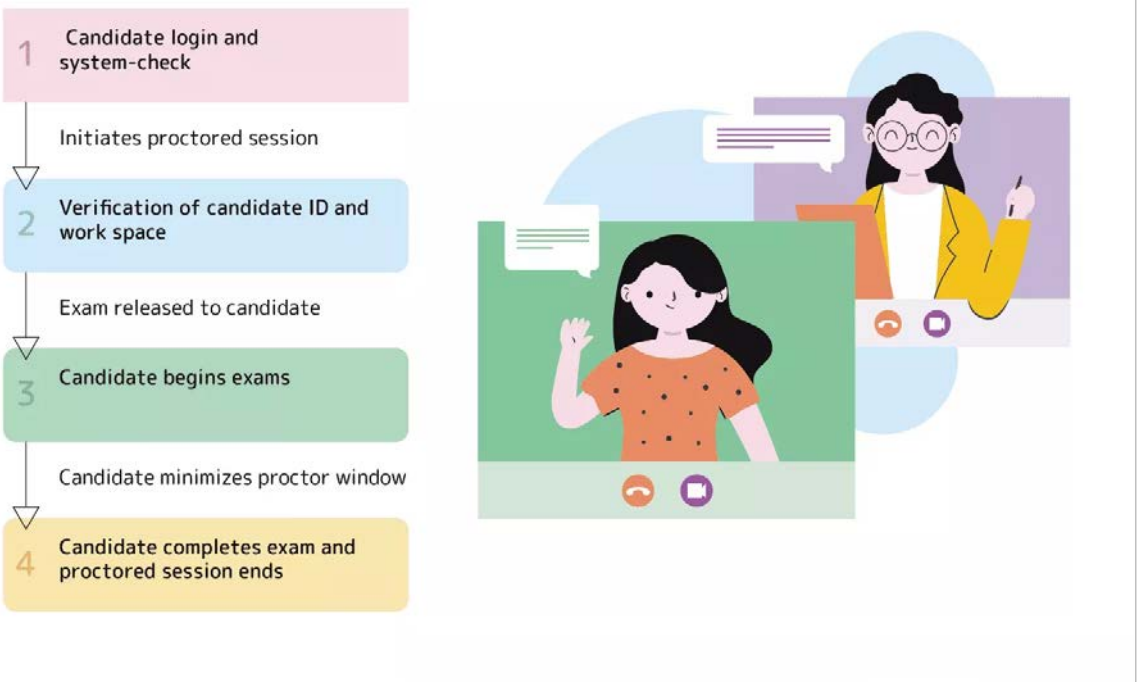
The third component is locking which prevents learners from opening other tabs in the web browsers. It is also known as Computer or Browser *Lockdown*. Lockdown may refer simply to locking down a browser, not allowing the test taker to access other URL's. Or it may mean taking control over the examinee's computer, controlling the operating system, detecting the use of peripheral devices or the various computer ports. It may also entail the use of more proactive security efforts such as detecting inappropriate keystrokes or function invocations.

The following figure shows an online proctoring system. This figure demonstrates users (test-taker, proctor, and unauthorized collaborator), unauthorized information resources, wireless communication, computing devices and data storage.



Online proctoring system (Slusky, 2020)

The graph below shows how online proctoring works. Online proctoring process starts with



Types of Online Proctoring

Live proctoring: This is real-time proctoring taking place during the exam with a human proctor monitoring/supervising the exam virtually, online. This requires the exams to be scheduled at a specific time depending on the availability of the proctor on a given date and time. This has equal human involvement as traditional offline exam supervision. However, unlike live proctoring, online proctoring will require competence in the use of technology.

Recorded proctoring: This involves the video recording of camera images and logs of the learner taking an online proctored exam. In recorded proctoring, the proctor reviews the recording at a later time and assesses the integrity of the exam. This allows learners to take an exam at any time hence allowing multiple exams to take place simultaneously. But, this too requires human intervention for reviewing the recordings, and that can be expensive and difficult to scale as well.

Automated proctoring: In automated proctoring – human proctors do not monitor (or review) the entire exam, instead, the proctoring system identifies key events of possible fraud or cheating. The proctor is alerted to review these events to determine if fraud or cheating has been committed by the student. This form of online proctoring is generally considered more convenient for the learners because they are not required to arrange live proctors for their tests and exams, as there is no schedule, location and human proctor constraints. It is also very scalable as the human component is replaced by artificial intelligence or algorithms. Hence, it is considered more cost-effective.

The categories of control

The online proctoring systems use three categories of controls to meet security objectives – administrative, physical and technical controls.

Administrative controls include plagiarism policies, examination procedures, practices and rules. Penalties for noncompliance with legal regulations can be high. A college providing online education needs to show a proof for accreditation agencies that its online courses meet academic integrity requirements.

The primary objective of *physical control* is to establish a spatial control, i.e., the ability to monitor objects located in physical areas close to a test-taker, understand the vulnerabilities that these objects may bring to the confidentiality and integrity of the exam, and the relationships between them and the student.

Technical security controls are essential for exam confidentiality and integrity. They are applied to computers, networks, data sources, software, and physical space. Technical controls of online exam proctoring can be classified as static and dynamic. Static controls do not undergo any significant changes and remain approximately the same throughout an examination, such as user biometric profile, data encryption and secure browser. Dynamic controls are related to the processes and change significantly throughout the examination such as capturing live images and logging of detailed data for a variety of activities.