COMMENTARY

Protecting the Integrity of the Virtual Objective Structured Clinical Examination

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INTRODUCTION

Objective structured clinical examinations (OSCEs) are a common approach to summative assessment of learner performance in Doctor of Pharmacy curricula.1 OSCEs involve student rotation through multiple standardized stations designed to assess performance on clinical tasks.1 OSCEs consist of both active and passive stations. In active stations, students interact with a standardized participant (SP) such as a patient, caregiver, or provider in order to complete the station. In passive stations, students are asked to complete a task which requires them to provide information or answer questions.

In March 2020, the novel severe acute respiratory syndrome coronavirus 2 (COVID-19) was declared a pandemic and shifted all, or a majority of face-to-face instruction to a remote platform. This challenged many pharmacy educators to either design new, virtual OSCEs to assess skills that were previously assessed face-to-face, or convert their existing OSCEs to a remote platform. Given this shift to remote instruction and assessment, the importance of maintaining integrity of the OSCE has been raised as a critical issue. Herein we discuss the approach by three colleges of pharmacy to maintain the integrity of the virtual OSCE. Strategies, opportunities and barriers to protecting the integrity of the virtual OSCE are also discussed.

Maintaining OSCE Integrity

Academic integrity remains a cornerstone of higher education.2 According to the Accreditation Council for Pharmacy Education, the validity of student assessment should take place under circumstances which minimize violations of academic integrity.3 Several mitigation strategies have been utilized to detect and deter academic dishonesty for conventional examinations such as browser lockdown tools, plagiarism detection tools, time restrictions, and question randomization.4 However, strategies to maintain academic integrity for virtual OSCEs have not been well studied or reported in the literature,5 despite the protection of OSCE integrity being noted as a best practice.6 Guidance for maintaining OSCE integrity may be translated from what is known about online courses or from other health disciplines. Although virtual OSCEs may be proctored, feedback should be withheld until all students have completed the examination. Additionally, generating a variety of case scenarios to reduce discussions among students and limiting the examination administration time may help maintain the OSCE integrity. As a performance-based summative assessment and gold-standard of clinical skills assessment, learners often find the subject matter within OSCEs meaningful as demonstration of their progress towards professional goals.7, 8 This stance, coupled with an academic honesty statement prior to OSCE administration, may set the tone for protecting integrity of the examination.

Approach to Protecting OSCE Integrity

A summary of the characteristics of three Doctor of Pharmacy programs, as well as OSCE characteristics of each program pre- and post- COVID-19 pandemic can be found in table 1.

Purdue University College of Pharmacy

At the Purdue University College of Pharmacy, OSCEs are high-stakes in that students are required to pass each station in order to progress in the Doctor of Pharmacy curriculum. Prior to COVID-19, each OSCE consisted of 2-3
stations, one of which was an active encounter with one student and one SP. Multiple faculty served as evaluators for all stations, and active encounters were recorded for purposes of reflection, instruction, and re-evaluation, where applicable. Passive stations were monitored by faculty and staff to aid in integrity. Due to class size and course schedules, OSCEs were administered Monday through Friday for each class. Because of the opportunity to share information as the OSCE week progressed, different cases were used each day.

Due to COVID-19, all six OSCE stations planned for April 2020 were transitioned to remote platforms. Active encounters were conducted using Cisco WebEx and were recorded. As a result of limited time to recruit virtual SPs, faculty served as both patients and evaluators. Some active stations were reformatted to follow the structure of telehealth encounters, and supplies used in the encounters (e.g., inhalers) were mailed to faculty for use during the encounter. A live practice opportunity for each active station was required of all students prior to the summative OSCE. While the intent of the practice opportunity was to provide students with formative feedback on the skills they would be assessed on during the summative OSCE, the opportunity served as a trial run with the remote platform technology. Faculty served as SPs for the practice as they did in the summative, remote OSCEs, and cases different from the summative OSCE, but similar in structure and objectives, were used. Passive stations were implemented online using ExamSoft and the Blackboard Learn learning management system (LMS). To comply with University regulations, windows of time in which students could complete the passive stations were allotted. To protect integrity of banked cases for future use, fewer cases were used throughout the week for both active and passive stations.

University of Florida College of Pharmacy

At the University of Florida College of Pharmacy, OSCEs prior to the COVID-19 pandemic consisted of twelve stations. All of our OSCEs are high stakes, in that students are required to pass them in order to continue progression through the curriculum. Six of the stations were active encounters with a student and SP, and six were passive post-encounter stations where the student completed activities at a computer station. A checklist was used to assess the student's performance on the active stations, which consisted of observable tasks and skills the assessment team felt the student should complete during the station. Global checklist items assessed the student's communication skills, organization of thought, and empathy during the interaction. These items remained consistent for each active station.

Our SPs are actors trained to play the role and also assess each student. In terms of maintaining integrity, each station was actively monitored and recorded by a video team. Faculty also viewed and listened to encounters real-time. Based on class size, it took up to one week to cycle all students through the OSCE. Students signed an honor code and faculty reviewed overall performance from day to day and have not noticed any significant change in grades throughout the week. Our post-OSCE assessments include analyzing grades by campus as well as by day of the exam. However, there was the opportunity for sharing of information as the stations were not changed through the week.

Due to COVID-19, the first year OSCE, which was scheduled for May 2020, was modified to ensure the students were able to complete the required course. Each student completed four active encounters with a SP via Zoom breakout rooms. The encounters were completed sequentially and were recorded for quality assurance. After all of the students completed the active encounters, they were given a break. Then all students completed the passive encounters together at the same time, and each station was completed sequentially one after the other. The passive encounters were built as multiple-choice quizzes in the e-learning LMS using Honorlock.

University of South Florida Taneja College of Pharmacy

At the University of South Florida Taneja College of Pharmacy, OSCEs are high-stakes and require students to pass in order to progress to the next professional year in the curriculum. Prior to COVID-19, the OSCEs took place in a simulation center on campus with SPs. Each OSCE typically consisted of one case with multiple components to be addressed within 2-3 stations. The encounters were recorded to allow opportunity for self-reflection. Faculty graded live during the examination via a rubric built into ExamSoft, and course coordinators could review and re-evaluate the recording, if needed. For each didactic year, the OSCE was administered within one day and students were assigned a specific time to complete the examination. This allowed for some protection of examination integrity, although students who completed the OSCE earlier in the day may have been able to discuss the case with their peers scheduled later in the day. However, cases were also cycled throughout the day, so students did not know which case they would have until arriving at the simulation center.

Due to COVID-19, the OSCEs administered during the 2019-2020 academic year were converted to remote platforms. Faculty utilized Blackboard Collaborate Ultra (BBCU) in the first and third years, and Microsoft Teams in the second year to successfully deliver the OSCEs. SPs were still used, but sessions were not recorded. In order to make the transition to deliver the virtual OSCEs as smooth as possible, only one case was used in each year of the OSCE. Since some of the case documents had to be posted or shared with students electronically, there was potential for them to have
taken a screenshot or photo. Integrity may have been compromised and, therefore, these cases will not be used in the future.

Best Practices for Overcoming Barriers/Challenges with Virtual OSCEs

Several challenges have been identified in protecting the integrity of the virtual OSCE. Although time is often a limiting factor, purposeful planning early in the development stage may lend to a seamless process. Those interested in implementing virtual OSCEs within a pharmacy curriculum should consider the overall advantages and disadvantages (Table 2). We have found the following considerations to be helpful.

- **Allow time to train faculty, students, and SPs on new technology and examination structure.** Faculty are becoming increasingly creative with the utilization of various LMS and meeting platforms. However, these platforms may frequently change their technology requirements, functionality, capabilities, and overall design. As such, multiple issues may arise that lead to confusion or uncertainty, thereby compromising examination integrity as students and instructors scramble to rectify these problems. Issues such as selecting a compatible/supported internet browser, utilization and etiquette surrounding cameras and microphones, or contingency planning in the event of unstable internet connection must also be considered. For these reasons, it would be prudent to conduct a practice session prior to the examination in order to address concerns regarding access and troubleshoot any problems in advance of the virtual OSCE. Additionally, development of a resource document, revised rubrics, and how to access materials on the day of the examination may be helpful to alleviate stress with virtual OSCEs.

- **Potential for involvement of instructional designers.** The expertise of instructional designers is helpful in evaluating the structure of an OSCE and transitioning the examination for remote delivery by highlighting underutilized aspects of learning management systems. For example, they may offer practical suggestions to sequentially roll-out of case scenarios to groups of students based on the exam schedule in order to maintain integrity of the examination. Additionally, since certain physical assessment techniques may not be feasibly assessed in a virtual format, alternative approaches such as virtual reality technology, may be utilized. Instructional designers may also be involved with integration of technology, revision of rubrics, and alignment of learning outcomes with the adapted examination.

- **Utilization of breakout rooms.** Multiple programs exist for virtual OSCE delivery, each with various capabilities to ensure students complete the examination individually and avoid sharing of information between students. Some programs may feature large classroom settings as well as smaller “breakout rooms” for small group discussions or individual examinations. These can either be managed by faculty or examination proctors to move students to their designated rooms. Alternatively, students can be assigned to specific times to log in, allowing them to move themselves to various breakout rooms. While the former requires more time and strain on the faculty, the latter has led to overlap among students as they may enter their breakout room before their designated time while the previous student is in the room. This can compromise examination integrity if the student overhears a portion of the exam. Other programs may involve scheduling multiple individual meetings while inviting those involved during the designated session. This eliminates the issue of students entering the breakout room before their designated time and is one way to maintain integrity. However, this is more time intensive to set up.

- **Video monitoring of examinations.** Proctoring of OSCEs may be addressed by monitoring student videos during the session. While OSCEs assess both verbal and non-verbal cues, these may be difficult to observe through video conferencing depending on how the camera and microphone are set up for the encounter. For this reason, setting clear expectations for both passive and active stations, including visual frame and volume, can preemptively address this challenge. Additionally, repeated observations of multiple exam-takers can be taxing. To avoid missed information, video recording of the session is currently available in many programs, and may be advantageous. The recording option may also be useful for remediation purposes, self-reflection, or to review grading. The recording feature may not be available in the individual breakout rooms depending on the program. This should be considered in the planning phase to protect the integrity of the virtual OSCE.

- **Utilization of mock-devices.** OSCES often incorporate the use of medical devices (ie, nasal sprays, inhalers, glucometers, blood pressure cuffs, or insulin pens) during active stations. When feasible, it may be acceptable to lend these devices to students through an organized process to allow them the opportunity to continue to utilize these devices to teach important skills, and allow for an accurate assessment of the learners’ competency. Alternatively, or if supplies are limited, medical devices can be lent to SPs for use during active stations. Although the use of mock-devices may not affect the integrity of the OSCE, it is still an important component to consider when planning the exam.
CONCLUSION
Maintaining integrity of the virtual OSCE remains an important topic for academicians. Many lessons have been learned, though several unknowns remain. Further discussions within the academy may elucidate best practices for virtual delivery of both formative and summative assessments with emphasis on protecting examination integrity. Future research should consider measuring the effectiveness of interventions and the best practices mentioned herein on OSCE integrity. In the meantime, our programs are preparing enhancements to modify the virtual OSCEs, or are developing new stations for subsequent academic years.

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Table 1. Doctor of Pharmacy Program and OSCE Characteristics

|                                      | Purdue University College of Pharmacy | University of Florida College of Pharmacy | University of South Florida Taneja College of Pharmacy |
|--------------------------------------|---------------------------------------|------------------------------------------|--------------------------------------------------------|
| Doctor of Pharmacy Program Characteristics                                   |                                        |                                          |                                                        |
| Curriculum                           | 4 years                               | 4 years                                  | 4 years                                                |
| Enrollment                           | ~600                                  | ~1,000                                   | ~400                                                   |
| Single or multi-campus               | Single                                | Multi (3)                                | Single                                                 |
| Affiliated with academic health center | No                                    | Yes                                      | Yes                                                    |
| OSCE Mapping                         | College outcomes, PPCP, EPAs          | EPAs                                     | College-specific PCEOs (align with EPAs), College-specific strategic plan |
| OSCE Occurrence                      | Each semester of 1st, 2nd and 3rd year | End of 1st, 3rd and 4th year            | End of 1st, 2nd and 3rd year                           |

OSCE Characteristics Pre- and Post-COVID-19

| Pre-                        | Post-                       | Pre-                        | Post-                       | Pre-                        | Post-                       |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Use of Simulation Center / Remote Platform | Use of SPs | Recorded |
|-------------------------------------------|-----------|---------|
| Simulation center not used for OSCEs Cisco WebEX, ExamSoft, Blackboard LMS | Yes | No |
| One simulation center, Simulation IQ | Yes | Yes |
| Zoom and Honorlock | Yes | Yes |
| Two simulation centers | Yes | Yes |
| Microsoft Teams, BBCU, and Canvas LMS | Yes | No |

Abbreviations: BBCU, blackboard collaborate ultra; COVID-19, Coronavirus disease 2019; EPAs, entrustable professional activities; LMS, learning management software; OSCE, objective structured clinical examination; PCEO, professional competencies and educational outcomes; PPCP, pharmacist patient care process; SP, standardized participant

### Table 2. Future Considerations for Virtual OSCEs

| Advantages | Disadvantages |
|------------|---------------|
| OSCE focusing on telehealth | Inability to demonstrate a technique or device as effectively (manual BP, glucometer, insulin injection, etc.) |
| Programs that do not have a simulation center or space available can still implement an OSCE remotely | May not be able to record sessions depending on functionality of the remote platform utilized |
| SPs can still be used | Technology issues (internet down, no service, microphone cutting in and out, camera not working, etc.) |
| Broader pool of SPs may be available (eg, programs sharing SPs and SP resources) | Can be more difficult to maintain integrity |
| Students, SPs, and/or evaluators can participate from any location | Additional technology training and costs |

Abbreviations: BP, blood pressure; OSCE, objective structured clinical examination; SP, standardized participant