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Virtual Objective Structured Clinical Examinations for Independent and Supplementary Prescribing Trainees: redeveloping a high-stakes assessment

Mary-Claire Kennedy, Ph.D. MRPharmS, Rebecca Dickinson, Ph.D., David Alldred, Ph.D. FRPharmS, Helen Bradbury, FRPharmS, Claire Easthall, Ph.D. MRPharmS, Dan Greer, MRPharmS, Sumrah Shaffiq, MRPharmS, Barry Strickland-Hodge, Ph.D. FRPharmS

School of Healthcare, Faculty of Medicine and Health, University of Leeds, Leeds, UK

Abstract

The Independent and Supplementary Prescribing programme has been offered by the University of Leeds since 2002. Upon completion of the programme pharmacists, nurses, midwives, physiotherapists, and paramedics register as prescribers with their professional regulator. Trainees attend teaching sessions over a 3-month period followed by a period of supervision in practice. All trainees undertook an objective structured clinical examination (OSCE) at the end of the 3-month period. Usually, the OSCE takes place on the university campus over one day. With the onset of the COVID-19 pandemic, the OSCE had to be restructured so that it could take place virtually, while maintaining the validity and reliability of the assessment. Microsoft Teams® was identified as the most appropriate platform for conducting the Virtual-OSCE (V-OSCE). Overall, the V-OSCEs we ran were a success; trainees, assessors and simulated patients reported that the assessment was seamless. However, further improvements could be made to improve the efficiency of the process if this approach were to become commonplace within the programme.

Keywords: independent prescribing, objective structured clinical examination, online assessment.

INTRODUCTION

Objective Structured Clinical Examinations (OSCEs) are widely used as an assessment instrument for undergraduate and postgraduate healthcare professionals (HCPs).[1] Appropriately designed, resourced, and operationalised OSCEs are robust and reliable assessments. They are an effective method of determining clinical competence, corresponding with the 'Shows How' level of Miller's conceptual framework.[2] The literature on OSCEs primarily relates to them being conducted in a face-to-face format. The COVID-19 pandemic has forced education programmes internationally to rapidly revise their approach to face-to-face assessments, including OSCEs. This rapid transition reflects the sudden and unforeseen move to online teaching and assessment necessitated by public health guidance. Recent publications have described the adaptation of OSCEs to Virtual-OSCEs (V-OSCEs) for undergraduate programmes.[3–8] These papers noted that while V-OSCEs are feasible as an approach to assessment, there are challenges associated with validity and the workload associated with preparation and delivery.[3,8] This paper will describe the development and implementation of V-OSCEs for an Independent and Supplementary Prescribing Programme at a UK Higher Education Institution (HEI). We will outline the practical considerations involved in developing and co-ordinating V-OSCEs. We will reflect on the merits and limitations of V-OSCEs and whether this change in assessment practice should become permanently embedded within our programme.

In the UK, pharmacists, nurses, midwives and many groups of allied health professionals (AHPs) can become independent prescribers following the completion of an accredited course with an HEI and registering this qualification with their professional regulator.[9] Independent and supplementary prescribers are integral to healthcare teams in primary and secondary care, they are known to be safe and effective practitioners and can alleviate pressures on doctors.[10] During the COVID-19 pandemic, primary and secondary care teams were dealing with a

*Address for correspondence: School of Healthcare, Faculty of Medicine and Health, University of Leeds, Leeds, LS2 9JT, UK.
E-mail: m.c.kennedy@leeds.ac.uk

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greatly increased workload and many HCPs were absent due to being unwell, self-isolating or shielding. It was therefore particularly important that HEIs continued to support trainee prescribers to complete their programme of study during the COVID-19 pandemic, given the level of absence in healthcare teams and the clear benefits of having qualified prescribers working as part of a healthcare team.

The University of Leeds accepts two cohorts of trainee prescribers each year (January and September), and they are required to complete 26 days of blended learning. Trainee prescribers are also required to complete 90 h gaining experience in prescribing within their clinical specialty under the supervision of a Designated Prescribing Practitioner. Following the 26 days of blended learning, trainee prescribers complete a series of assessments including an OSCE. OSCE stations focus on clinical skills, communication skills and prescribing decision-making. During the COVID-19 pandemic, all teaching sessions and assessments were moved online in accordance with public health guidance. Despite the change in the mode of delivery, the content and focus of teaching and assessment remained the same to satisfy the educational standards of the professional regulators.

ADAPTING OSCES TO V-OSCES

Assessments must be soundly constructed and sufficiently robust to reflect the level of clinical responsibility afforded to these HCPs upon completion of the programme. They must capture the complexity of the prescribing process which demands that the HCP has a thorough understanding of cases, from diagnosis to ongoing management.[11] Three OSCE stations focus on safe and effective prescribing primarily relating to drug interactions, adverse drug reactions and adherence to medications. Pharmacists are required to complete three additional stations focusing on clinical skills, including measurement of blood pressure, pulse and respiration and a general physical assessment. These are generic clinical assessment skills that all Independent and Supplementary Prescribers should possess, regardless of their particular specialty. All OSCE stations are blueprinted to the syllabus and the learning outcomes defined by each of the professional regulators. Prior to the COVID-19 pandemic, these OSCEs were conducted within a suite of rooms on our university campus with actors playing the role of the patient (also known as simulated patients (SPs)). A number of these rooms are fitted to resemble adult, paediatric and critical care hospital wards, closely resembling the setting in which the trainee will practice and thereby enhancing the authenticity of the assessment.[12]

With the transition from an OSCE to a V-OSCE, it was essential that the assessment continued to align to the learning outcomes and syllabus, thereby continuing to satisfy the requirements of the professional regulators. Therefore, the combination of stations pertaining to prescribing decision-making and clinical skills, as outlined above, were retained. The major change was the way in which the assessment was conducted, and the processes required to ensure a valid, reliable and fair assessment.

While V-OSCEs remove the necessity to occupy a physical space, it is essential that they are conducted using an online platform that is secure and accessible to assessors, trainees, and SPs. Technology that supports audio-visual engagement is essential and the assessment should be undertaken in an environment free from disruption or distractions. All trainees involved in our assessment had access to personal laptops, university provided or workplace computers to participate in our assessment. Trainees could elect to complete the assessment in a setting of their own choosing provided it was free of distractions, at home or at work. Microsoft (MS) Teams® was used to conduct the V-OSCE and was selected as our university supports the use of this platform for learning and teaching, with staff and students having automatic access to the platform. In addition, MS Teams® has many features that were necessary for this assessment, including the ability to 'dial-in' individuals when required and the option for any party in the meeting to share their screen if necessary.

The time permitted for each station was increased from 10 min (the time for face-to-face stations) to 15 min, to allow for the more artificial nature of conducting consultations using an online platform. For example, non-visual cues are more difficult to identify and interpret in an online environment sometimes leading to a disjointed flow of conversation. Trainees were advised to expect a call from a named assessor at a particular time. When the call began, the assessor introduced themselves and the SP, the assessor then started the timer to allow the trainee to commence the station. At the conclusion of the station, the trainee exited the call and awaited a call from the next assessor at the next allocated time. There was a gap of approximately 2 min between each station.

The clinical skills stations were modified to facilitate the transition to online assessment. These V-OSCE stations adopted a *viva voce* style of questioning about the theory and application of the clinical skill including demonstration of the skill by the trainee using a prop. Visual prompts in the form of pictures of clinical equipment, such as a sphygmomanometer or stethoscope, were provided. The trainees were advised to use these

to support a detailed explanation of how the skill should be performed. These could be used by the trainee either by printing the images or sharing the images on MS Teams®. Only the assessor and trainee were required for these clinical skills stations, an SP was not required: the assessor was responsible for timekeeping, completing the marksheet and questioning the trainee. For these stations, the trainee and the assessor had their cameras and microphones live throughout. It was important for cameras and microphones to be working for all parties involved as they were essential for the assessment.

For the prescribing focused stations, the trainee prescriber, an SP and an assessor were required. Trainee prescribers were divided into four groups, each consisting of approximately nine students. Each group completed a rotation through a set of V-OSCE stations, these stations were then retired, and the next group completed a new set of stations. As there were nine assessors and SPs, all trainees were engaged simultaneously, leaving no scope for communication with parties external to the station. This preserved the integrity of the assessment. 'Student briefs' were released to trainee prescribers 48 h in advance. This differed to the approach taken for OSCEs, when the briefs are shown to trainees around one minute in advance of the station commencing. The V-OSCE briefs included basic sociodemographic and clinical information about the patient in the scenario and a brief description of the reason the patient had presented. The decision to share these briefs in advance of the V-OSCE was made to avoid inadvertent delays at each station which would occur if the assessor had to share the brief with each trainee using the screen-share function. The information provided was such that a trainee could not pre-empt the focus of each station. The SP and the trainee were required to keep their camera and microphone on throughout the station. After the initial introductions to the stations, the assessor turned off their cameras to minimise distractions. Trainees were permitted to use the online or paper British National Formulary (BNF) or the online app to assist them with the V-OSCE. These resources are also permitted during the OSCE. An electronic folder was created for each assessor, this contained individual marksheets, within Excel® spreadsheets, for each trainee. Assessors were able to complete marksheets in an unobtrusive and efficient manner by highlighting the appropriate marks and annotating the marksheet with any additional information relating to the performance or feedback for the trainee. Assessors were responsible for audio-recording each trainee, these recordings could be accessed after the V-OSCE for moderation purposes by the programme team and for review by the external examiner.

The validity and equity of the assessment is of utmost importance to all stakeholders: trainees, HEIs, employers and professional regulators. We sought support from an educational psychometrician in the planning stages to ensure that the assessment was conducted to the highest standards. The use of different sets of stations standard-set by the modified Angoff-method helps to uphold these important features of the assessment while maintaining the integrity of the assessment. Although each group of students completed a different set of stations, the stations were standard-set to ensure the pass mark reflected the relative difficulty of the stations. Due to limitations in the technology available to us, we were unable to check what resources trainees were accessing, nor were we able to be completely assured that they were alone during assessment. However, as these individuals are registered HCPs, a finding of dishonesty during assessment processes, including collusion and cheating, could have significant and serious consequences for their ongoing professional registration.

The resource intensive nature of OSCEs has long been identified as a limitation of this assessment and V-OSCEs are no different in this regard.[13] Based on our experience, the time required for planning and preparing V-OSCEs was almost twice that of OSCEs. This was primarily due to the need to, conceive, write and standard-set a greater number of stations in addition to ensuring that the online environment is prepared to facilitate the assessment. Equally, setting-up the physical space for an OSCE is labour-intensive, often necessitating the movement of furniture and ensuring that hard-copies of briefs and marksheets are appropriately distributed. However, there are distinct advantages to using a physical space for OSCEs, minor issues, such as changing batteries in recording equipment or providing additional writing materials to the trainee or assessor are easily addressed. By contrast, deeper levels of planning and safety-nets need to be in place for V-OSCEs to ensure that all assessors respond in a similar manner when there are issues with technology or similarly unforeseen issues during the assessment. We were confident as to the trainees' and assessors' ability to participate in the V-OSCE as these individuals had successfully attended or delivered teaching sessions online for many months prior to the assessment. We had encouraged trainees to establish where their internet connection was strongest, at times this was in their place of work rather than their homes. Similarly, we met with the SPs several hours in advance of the assessment, to ensure that they had a clear understanding of their briefs and to determine the quality of their internet connection, camera, and microphone. We had substitute SPs booked in the event of significant issues that could not

Table 1 Comparing and contrasting OSCEs and V-OSCEs

OSCEs	V-OSCEs
Before assessment	
OSCE writing and standard setting	
Six stations required as isolating trainees in a holding room during the assessment was possible.	12–15 (3–5 sets prescribing stations; clinical skills stations do not change) stations required to ensure integrity of assessment. Number of sets depends on number of assessors and Simulated Patients (SPs) available which limits number of students assessed at one time.
Preparation of environment	
Physical set up, sometimes of multiple sites. Assistance sometimes required from external parties to configure rooms.	Building a secure online assessment environment is a complex and time-consuming process. Each assessor requires access to specific marksheets for trainees rotating through stations.
During assessment	
Examination length	
Stations of 10 min duration. Performance of trainees indicating this was sufficient.	Stations of 15 min duration to accommodate altered environment. Performance of trainees indicating that this time was required.
Environment and equipment required for trainees, assessors and SPs	
University-owned laptops required to allow trainees to access online BNF if necessary. Audio recorders also required. Assessment environment managed by co-ordinator and marshals.	Access to laptop/personal computer/tablet with microphone and camera. Responsibility of trainee, assessor and SP to ensure that assessment environment free of disruptions and distractions.
Assessors and simulated patients	
Briefing of assessors and SPs usually on the day of assessment. As individuals are physically present, we can be confident that all parties are in the right place at the right time.	Briefing of assessors and SPs many hours or days prior to assessment, allowing time to address concerns and resolve problems. Requires that station briefs and marksheets are disseminated in advance.
Preparing the trainees	
3–5 h timetabled to practise OSCEs. Face-to-face consultations closely resembles clinical practice of all trainees. Consultation stye more familiar to trainees necessitating less time to practise.	In addition to usual time to practise OSCEs, trainees require additional support to prepare for online environment and understand logistics of assessment process. 5–7 h timetabled to prepare trainees for assessment.
Integrity of assessment	
Operating a system of holding rooms guarantees trainees are unable to collude with those who have completed assessment.	Retiring a set of OSCE stations after a group of trainees optimises integrity. All trainees occupied during assessment process thus minimising opportunities for communication.
Troubleshooting	
Problems easily and quickly resolved by co-ordinator.	Problems more difficult to resolve as requires co-ordinator to make contact with assessor/SP/trainee. Multiple co-ordinators required due to complexity.
After assessment	
Handling marksheets	
Paper based marksheets requires physically collating multiple marksheets sometimes from different sites. Scope for error such as misplacing marksheets. Marks calculated manually.	Marksheets in MS Excel ensures that they cannot be misplaced and accessible only to markers, moderators, co-ordinators and external examiners. Marks calculated electronically.
Debriefing assessors and SPs	
Takes place immediately after assessment before leaving the venue.	Multiple dedicated meetings might need to be set-up to capture feedback from assessors and SPs.

be rectified in time for the V-OSCE. Unstable internet connections did present a challenge for a small number of trainees and SPs during the V-OSCE. The V-OSCE co-ordinator was alerted to these problems immediately by the assessor and dialled-into the station to oversee the resolution. If this was a temporary issue, the timing for the station was paused until the problem was overcome. If the issue could not be resolved for the SP or the assessor, a substitute was immediately dialled into the station. There would then be a private discussion between the assessor, the SP and the co-ordinator to determine the progress on the station, the trainee was then dialled back into the station and the timing resumed. If the trainee themselves was experiencing an issue that meant that they could not continue with the station any further, we had prepared a set of reserve V-OSCE stations that the trainee would complete once the connection issues were resolved. Fortunately, this was not required for any of our trainees. Table 1 summarises the key differences between OSCEs and V-OSCEs, comparing the pre, intra and post stages of assessment.

1. Consult educational technologists and educational psychometricians during the planning and development stages.
2. Consider if all learning outcomes can and should be assessed in an online setting. Alternative assessment strategies might need to be considered, for example workplace based assessments.
3. Select an appropriate audio-visual communication platform to support the assessment. This might be the platform that is supported by the Higher Education Institution or body responsible for the assessment for which support and training is available.
4. Give trainees an opportunity to complete a formative assessment prior to the summative assessment. Build in time for debriefing students following the formative assessment to address any concerns or queries.
5. Brief all parties involved in the V-OSCE, assessors, simulated patients and trainees. This should be completed prior to the assessment to allow sufficient time for technical problems to be rectified.
6. Provide materials such as student briefs in advance of the V-OSCE. This minimises the requirement to share these materials with the candidate during the assessment which might lead to inadvertent delays.
7. Carefully consider the equity and validity of the V-OSCE. Different sets of stations might need to be developed for each group of students and retired immediately. Marking schemes should seek to assess the consultation skills required to conduct an online interaction with a patient. These are likely to be slightly different skills to that of a face-to-face assessment.
8. Ensure a detailed plan is in place in the event of technical failure for the assessor, trainee or simulated patient. Identify an appropriate platform for the V-OSCE co-ordinator to communicate with assessors in a quick and confidential manner. Ensure that trainees are aware how important information will be communicated to them during the V-OSCE.
9. Consider how V-OSCE stations will be moderated or reviewed for quality assurance purposes. There should be scope for assessors to make additional notes on the marking scheme in a confidential and efficient manner. Audio-visual recordings might also be required, these should available only to the assessors for the station, the V-OSCE co-ordinator and other parties involved in quality assurance such as the external examiner.
10. Seek feedback from all stakeholders including assessors, simulated patients, trainees and clinical supervisors as to their experience or perceptions of the V-OSCE.

Figure 1 Top tips for developing and co-ordinating V-OSCES.

IMPLICATIONS

With the eventual resumption of face-to-face teaching and assessment, the merits and limitations of online assessments should be evaluated to determine if they should be retained. This would require engagement with key stakeholders including trainees, employers, and professional regulators to determine if there is widespread support and acceptance of a move to an online assessment process. Our approach to V-OSCEs appeared to be well received by trainees, assessors and SPs based on verbal feedback received following the assessments. However, this feedback was informal and written feedback was not sought from participants.

Online approaches to teaching and assessment can expand accessibility to educational programmes to larger numbers of busy clinicians, who otherwise might struggle to engage due to geographical distance from the course provider or due to time pressures. It is therefore worth considering if aspects of V-OSCEs can be further developed to enhance the assessment experience for students and become embedded in educational programmes. From our experience of co-ordinating V-OSCEs on five occasions over an 18-month period, involving around 100 students, we believe that we have identified some key learning points that will be of interest to clinical educators who are responsible for these types of assessments, these are summarised in Figure 1.

OSCEs are a resource- and labour-intensive assessment for educators.[13] V-OSCEs are commensurate with or indeed more burdensome in terms of their workload to OSCEs. Additional time needs to be spent briefing staff, trainees, and SPs to ensure that all parties are aware of the logistics, are comfortable with using the technology and are aware of steps that should be taken in the event of the unplanned or unexpected. It might be necessary to involve staff such as educational technologists or educational psychometricians during the planning and execution stages to ensure that the technological environment and assessment is sound and fit for purpose, perhaps another demand on resources. The need for staff members to devote more time on the planning and preparation stages, or the need to engage external experts, may not be seen as a cost-effective method of running assessment for HEIs.

We sought to minimise assessment anxiety by organising a formative assessment and providing plentiful briefing materials in advance of the V-OSCE. The briefing materials were provided in written and audio-visual format to accommodate trainees' preferences for engaging with these materials. It is unclear whether the assessment anxiety experienced by the trainee was diminished by being able to undertake the assessment in familiar surroundings, or indeed if the potential pitfalls associated with the use of technology added further to the anxiety. This highlights the need for specific research exploring the student's experience of V-OSCEs, which are potentially different to online proctored exams, for example.

Remote consultations and consequently remote prescribing have been features of practice prior to the pandemic but have since become more widespread and embedded in practice.[14] From this viewpoint, the V-OSCE is an authentic assessment that is of clear benefit to the developing professional practice of the trainee. However, marking schemes may need to be adapted and tested to ensure that they are appropriate for online consultations. We made minor changes to our marking schemes to better suit an online method of consultation. For example, there was less emphasis on eye-contact as this can be difficult to assess in an online forum, and greater importance placed on verbal responses from the trainee. Our decision to collate marks through individual Excel sheets for each trainee resulted in a considerable workload following the V-OSCE due to tallying of scores and collating results. Using an electronic marksheet, for example Microsoft Forms®, would have lessened this workload, however, this would also have necessitated training of all assessors, and was unfortunately, not feasible within our timeframe.

In transitioning from a physical assessment to an online assessment, it is necessary to consider if there is an associated shift in the overall aim of the OSCE, that is to determine the competence of a trainee independent prescriber. Considering the stations pertaining to medical history taking and clinical decision making, 'the prescribing stations', regardless of the means by which these stations are assessed, physically or online, both approaches are suitable in efficiently meeting the learning outcomes. However, conducting V-OSCE stations relating to clinical assessment skills perhaps dilutes the practical application of the skill. Assessing these skills as part of Workplace Based Assessments (WPBAs) would be both achievable in the context of this particular programme of study while also maintaining authenticity of the assessment. This approach is not without its own challenges, which may include training of workplace assessors to ensure reliability and equity in the assessment process, in addition to placing further responsibilities on clinical workers who are already under significant pressure.

CONCLUSION

V-OSCEs are likely to be a more common feature of educational programmes in the future. This approach to assessment offers many benefits, including enhanced accessibility to educational programmes for HCPs and a resemblance to virtual consultations in clinical practice. However, it is not simply a case of replicating the face-to-face assessment in an online setting. Many modifications and adaptations are required to ensure the validity, reliability and integrity of the assessment. Educators are advised to consult widely with educational technologists, psychometricians, students and clinical practitioners when considering a transition to V-OSCEs.

CONFLICTS OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest and no financial interests to declare.

AUTHORSHIP STATEMENT

All listed authors comply with the Journal's authorship policy.

ETHICS STATEMENT

Ethical approval was not required for this study.

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