BRIEF

Students’ Perceptions of a New Learning Tool for Objective Structured Clinical Examination (OSCE) Virtual Experience

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Objective. Objective Structured Clinical Examination (OSCE) practice sessions are logistically challenging and resource demanding. Our objective was to examine pharmacy students’ OSCE performance and perceptions about an interactive online learning module (Monash OSCE Virtual Experience (MOVE).

Methods. MOVE online module consists of twenty pharmacy case scenarios with virtual patients. It was piloted with our final year pharmacy students at Monash University campuses in Australia (Parkville) and Malaysia (Sunway). A mixed methods approach consisting of: (1) reviewing user attempts and grade comparison, (2) self-administered questionnaires, and (3) focus groups was used to examine students’ perception and performance.

Results. More than 99% of all students attempted at least one online case scenario in preparation for their final OSCE. 81% attempted all twenty scenarios two or more times. 90% of Sunway students and 70% of Parkville students reported MOVE to be a helpful study tool for their OSCE preparation. However, raw comparison of user attempts and OSCE marks showed no direct correlation between online module attempts and assessment grades. Self-administered questionnaire and focus group results indicated that MOVE prepared students for targeted and time-bound history taking and problem-solving skills. Overall, students perceived MOVE to be a useful learning tool and less overwhelming learning experience than face to face sessions. Nevertheless, students still preferred face-to-face OSCE practice with simulated patients than online practice with virtual patients.

Conclusion. MOVE was perceived by our students as a flexible and useful online learning aid for their final year OSCE preparation.

Keywords: pharmacy, OSCE, virtual patients, simulation, online learning

INTRODUCTION

Objective Structured Clinical Examinations (OSCEs) have been the gold standard for evaluation of clinical skills in health care worldwide.1,2 OSCEs have the advantage of assessing students’ clinical knowledge, communication and problem solving skills in a time sensitive, simulated environment, making the examination more rigorous than written exams. In the pharmacy education context, OSCEs are increasingly popular method to assess knowledge and skills of pharmacy students for registration, licensing, and certification.2-7 OSCEs can be summative or formative; formative OSCEs can help orient students to the OSCE process and allow them to practice their skills in a low-stakes environment prior to completing a summative version of the real assessment.8 The balance between managing resourcing for OSCEs and allowing for enough opportunity for practice has been a constant struggle. Use of online learning resources has also been shown to assist student learning and enhance performance, reduce staff workload and cost.9,10 Virtual patients in online case scenarios have been used successfully in recent years in medical,11 nursing12, occupational therapy,13 and pharmacy training to help prepare students for working with simulated patients in the real OSCE.7,10,14-18 In particular, upskilling pharmacy students in conducting clinic visits,19 history taking, developing pharmaceutical care plans and clinical problem solving.20 Simulated patients are individuals (commonly professional actors) who are trained to portray a patient with a specific condition in a standardized, realistic way so that students can be tested in a controlled environment such as an OSCE.21 Substituting well-designed virtual patients in place of live simulated patients in order to prepare students for OSCEs has the advantage of providing students with the opportunity for access, flexibility and repeated practice, an approach that would be costly and difficult to implement in face-to-face sessions. Repeated exposure to online case scenarios using virtual patients can provide a means to increase students’ confidence in their performance.19 Using virtual patients also allows for standardized situations,22 giving each student the same consistent practice and responses, which is challenging in face-to-face practice.

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At our institution, we have two pharmacy campuses which run the same curriculum simultaneously; Melbourne, Australia and Sunway, Malaysia. OSCEs are used as formative and summative measures throughout the 4-year Bachelor of Pharmacy course in both campuses. Summative OSCEs are conducted at the end of every year and are embedded in a unit and are a hurdle assessment for that particular unit. There is a graduated approach in terms of how many stations and the level of OSCE difficulty (moving from one OSCE station on a fixed particular content area to 4 OSCE stations on any content area). In years 1 and 2, formative OSCEs (practice attempts with feedback) are run as small group face to face tutorials with a 1:4 staff to student ratio, allowing for personalized feedback, but has shown to be very resource demanding. Due to these constraints, Years 3 and 4 formative OSCEs are held in large classes, whereby only the small number of students who volunteer to role-play with the facilitator would receive feedback from the lecturer and peers in the class.

With the advantages of online training and virtual patients in mind, we sought a more sustainable OSCE preparation approach particularly for final year (year 4) students who have already had several opportunities to participate in formative and summative OSCEs and are already familiar with the structure and process, however, may still benefit form more learning and practice opportunities involving a variety of topics covered across the 4-year course. Our objective in this study was to develop and pilot the student acceptability of an online learning module, Monash OSCE Virtual Experience (MOVE), which includes virtual patients with scenarios similar to that of actual OSCE scenarios as a means to provide students with a consistent and accessible learning tool, in preparation for their final OSCE.

METHODS
MOVE is an online learning module developed using Articulate Storyline software at our institution in 2017. MOVE consists of twenty pharmacy-based scenarios role played by virtual patients, each consisting of medication related problems in relation to classes of medicines featured in the chapters of the Australian Medicines Handbook, 2017.23 Students navigate through MOVE cases by clicking on a standard set of history taking questions to communicate with the virtual patient or doctor who responds to their questions via pre-recorded video clips. For each scenario, students are given a set time limit (7 minutes as per real OSCE) to elicit patient information, identify medication-related problems and recommend management options and counselling points via a textbox. Once the time has lapsed, a checklist of model answer is automatically released for student feedback.

In this study, a mixed methods approach was used to assess student perception of MOVE and its impact on students’ OSCE performance. Three types of data collection methods were used: (1) user practice attempt comparison with OSCE assessment mark; (2) a paper-based user evaluation questionnaire and (3) focus group interviews (n = 20 volunteers; 10 from Australia and 10 from Malaysia campus). Participation in survey and focus group was voluntary and anonymous. The survey and semi-structured focus group questions were related to student general OSCE preparation process and student perception and experience with using MOVE for the OSCE preparation. The interview conversations were audio-recorded, transcribed verbatim and coding of the transcripts into themes was performed using NVivo (QSR International, Cambridge, MA). The data analysis for the interviews was broken down into rounds with the first round being to establish nodes based on questions posed to students in the focus groups. In the second round, a thematic analysis following the principles of Braun and Clarke24 was used to identify themes that emerged with each node, then a peer review process from an independent reviewer was conducted to add rigor to the data analysis process.25 Ethics approval: This project was approved by the Monash University Human Research and Ethics Committee (Project ID: #9939).

RESULTS
User practice attempts and comparison with assessment performance
More than 99% of all students (n=193/195; 99% in Australia and n=40/40; 100% in Malaysia) completed at least one of the online case scenarios and 81% of students attempted all twenty scenarios. More than 7000 attempts were documented across both campuses with usage data increased substantially during the last 2 weeks preceding the OSCE. Raw comparison of individual user attempts and final OSCE marks of the whole cohort showed there was no direct correlation between student’s online practice attempt and assessment performance (Figure 1).

User questionnaire
A total of 120 students (response rate: 50.8%) completed the student’s perception questionnaire. Table 1 shows student’s perception on the usefulness of MOVE for OSCE preparation. MOVE was ranked the most used method of OSCE preparation by Parkville students and second most used method of preparation by Sunway students. Approximately 90% of Sunway students and 70% of Parkville students reported MOVE to be helpful for their OSCE preparation. Lack of time and being unsure of how an online module could help with OSCE as the main reasons by
those who didn’t access MOVE. The topic students felt most prepared for the OSCE, correlated well with Moodle analytics of student attempts of the topic in the final 2 weeks before the exam.

**User focus groups:**

Ten students recruited by convenience sampling from each campus participated in each focus group. Six emergent themes arose from the two focus groups across both campuses. Key quotes and results are presented in table 2.

**DISCUSSION**

The design and delivery of MOVE was well received by our students, and they found it useful for OSCE preparation. Having a set time limit to interact with virtual patients to identify and manage medication related problems, students appreciated the value of targeted questioning technique and time management using this online learning tool. Students also found the MOVE feedback tool useful for reflection and identifying gaps in their clinical and product knowledge which they needed to pay attention to prior to the real OSCE. Allowance for repeated practice with virtual patients increased confidence in tackling complex case problems; consistent with other studies where pharmacists showed they were more likely to use a medication therapy management program after completing various virtual cases.10

In this study, students indicated that virtual simulation tool such as MOVE could serve as an additional resource to face to face OSCE practice session which they preferred. Similar to our findings, Al-Dahit et al.18 reported pharmacy students in their study rated the traditional face-to-face facilitator-led environment favorably compared to the self-directed virtual learning environment. Limitations of MOVE suggested by the students included inability to give one on one feedback on their oral and non-oral communication skills (eg, empathy), and lack of interaction with a real-life person.

Another limitation of MOVE was the bulk release, which may have influenced the limited number of cases accessed prior to the exam. Maier et al. has shown releasing cases periodically through the year has led to more balanced usage rather than releasing all the cases at the same time.29 Recommendations to other institutions who like to use an online learning tool like MOVE for OSCE preparation would be to release small blocks of exercises after relevant content have been taught, over a number of weeks to allow for more time to access.

Students in our study also felt that the short-time allocation of online scenarios and face to face sessions27 could not effectively assess their abilities and skills.28 Another limitation of using virtual patients is the potential for less empathetic learners.20 The majority of respondents in our study was female consistent with the enrollment gender statistics. Females have been showed to find virtual patients more beneficial than males which may be attributed to their perceived heightened sensitivity.30 The two campuses; Malaysia and Australia are culturally different but we did not find their perceptions of MOVE to differ significantly.

Raw comparison of students’ online practice attempts with OSCE assessment scores for the whole cohort showed no significant correlation indicating virtual learning engagement alone could not sufficiently impact student’s OSCE performance in real-life. In this regard, user survey questionnaire and focus group interview results showed, students used a variety of OSCE preparation methods in addition to online module attempts, including recruitment of MOVE cases for live practice role play with friends. Nevertheless, students from both Australia and Malaysia campuses felt that online practice attempts helped them better prepared for OSCE, in particular, history taking, problem solving and time management skills. Similar to our finding, Tarileri et al.19 reported that pharmacy students access to virtual patient activities prior to mock clinical visits improved student performance in real-life. Practice with virtual patients provided additional learning opportunities and positive outcomes for pharmacy students.

While virtual patients and online simulation cannot completely duplicate the experience of a real-life human interactions, MOVE provided a controllable, secure, and safe learning environment with an opportunity for unlimited access and learning attempts outside time and spaces.22 A lack of easy access to technology has been suggested to be one of the barriers of virtual patient technology as well as the ability to engage with online learning materials which may be also challenging for some students.6

Lastly, we listed the online cases in alphabetical order and we found the most accessed cases were the ones starting with A such as Allergy and some of the last cases were missed (data not shown). We suggest to use a portal where students are randomly allocated a case (hospital, community, prescription, drug chart, product request) to practice each time, then once they have attempted all cases, they’ll have the opportunity to re-do any case. It may be beneficial to go over a number of example cases in a face to face session to enhance student engagement, learning experience and outcomes.

In summary, the use of virtual patients and simulated scenarios can be a feasible and effective way of providing student-centred learning.31 It is still however a supplementary tool and does not replace the spontaneity of human interaction with real-life simulated patients. Future directions include looking into incorporating authentic communication practice.
CONCLUSION

MOVE was well received as an online learning tool to aid students in preparation for OSCE. An important note is that this online learning tool can be used to supplement, not to replace real human interaction with simulated patients portraying the role of patients or physicians as the case with real OSCE. Additional work is required to integrate a more authentic communication practice, and to be more comparable to face-to-face live practice.

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REFERENCES


Figure 1. Comparison of Students’ OSCE marks with their online module attempts
Table 1. User Survey Questionnaire Results Showing Student’s Perception of OSCE Readiness and Usefulness of MOVE in OSCE preparation and Student OSCE Preparation Methods

<table>
<thead>
<tr>
<th>Method of preparation for OSCE</th>
<th>Sunway Students Number (%)</th>
<th>Parkville Students Number (%)</th>
</tr>
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<tbody>
<tr>
<td>Familiarized themselves with pharmacy textbooks and online resources</td>
<td>35 (97.2)</td>
<td>63 (69.2)</td>
</tr>
<tr>
<td>MOVE</td>
<td>30 (76.9)</td>
<td>67 (73.6)</td>
</tr>
<tr>
<td>Revised lecture notes</td>
<td>27 (69.2)</td>
<td>39 (42.9)</td>
</tr>
<tr>
<td>Practiced with friends</td>
<td>35 (89.7)</td>
<td>49 (53.8)</td>
</tr>
<tr>
<td>Spoke to previous final year students</td>
<td>10 (25.6)</td>
<td>32 (35.2)</td>
</tr>
<tr>
<td>Revised with library staff</td>
<td>0 (0.0)</td>
<td>1 (1.1)</td>
</tr>
<tr>
<td>Did not prepare</td>
<td>0 (0.0)</td>
<td>2 (2.2)</td>
</tr>
</tbody>
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| “I felt prepared for OSCE”                                                        |                            |                               |
| Strongly Disagree                                                                  | 0 (0.0)                    | 4 (4.8)                       |
| Disagree                                                                           | 5 (13.9)                   | 21 (25.0)                     |
| Neutral                                                                            | 20 (55.6)                  | 31 (36.9)                     |
| Agree                                                                              | 10 (27.8)                  | 22 (26.2)                     |
| Strongly Agree                                                                     | 1 (2.8)                    | 2 (2.4)                       |

| “I found MOVE helpful” for those who completed MOVE                                  |                            |                               |
| Very Helpful                                                                       | 13 (46.4)                  | 22 (30.1)                     |
| Somewhat Helpful                                                                   | 13 (46.4)                  | 28 (38.3)                     |
| Slightly Helpful                                                                   | 2 (7.1)                    | 19 (26.0)                     |
| Made no difference to my learning                                                  | 0 (0.0)                    | 4 (5.5)                       |

OSCE=Objective Structured Clinical Examination; MOVE=Monash OSCE Virtual Experience
### Table 2. Focus Group Results

<table>
<thead>
<tr>
<th>Theme</th>
<th>Key results</th>
<th>Exemplar comments</th>
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<tr>
<td><strong>1. MOVE compliments the general OSCE preparation process</strong></td>
<td>Students value MOVE as an OSCE practice tool but felt could not rely on it solely for the exam preparation. Students indicated they recruited MOVE scenarios for face to face practice with peers.</td>
<td>“I used MOVE, I went through each one and I tested the answers on a Word document, just to see what the right responses were, like what you actually wanted to hear, then I practiced with my friends.” <em>Parkville student</em>  &lt;br&gt;“for the hospital cases, I think it prepares us to familiarize ourselves with the resources we would have to reply on…” <em>Parkville student</em>  &lt;br&gt;“(recommending study techniques for the OSCEs) Use the MOVE module, practice with your friends, if you don’t have a job already, get one as soon as possible, and then obviously you should revise all your integrated stuff, like revise on everything, but that’s not really realistic, especially when we’re trying to learn new things to pass this semester. That’s why you need to keep up to date with the study across the 4 years.” <em>Parkville student</em>  &lt;br&gt;“we actually found it very useful, and split them to ten questions each and familiarized ourselves with those MOVE cases before we practiced with other people…so you can then provide more solid feedback to your friends” <em>Sunway student</em></td>
</tr>
<tr>
<td><strong>2. MOVE prepares students for the real OSCE</strong></td>
<td>Students questioned whether virtual patients authentically prepared them for the real OSCE with simulated patients. MOVE, unlike in a face-to-face session, used standardized answers provided by a virtual patient in a video clip which students felt was not mimicking a real-life exam situation. Nevertheless, students also indicated a practice opportunity with a virtual patient was a less daunting situation compared with the challenge of face-to-face interaction with a simulated patient. On the other hand, some students found virtual interaction challenging as they couldn’t express their non-verbal and empathy skills.</td>
<td>“It’s less daunting looking at someone on the screen, knowing that they can’t see you as well. And like it’s not scary at all, but if that same person was right next to me and I know they’re marking me, I think just for myself I’d get scared.” <em>Parkville student</em>  &lt;br&gt;“it doesn’t help much with communication, just questioning…right management…and time management, it’s really important to have friends to practice with…because everyone speaks to the patient differently” <em>Parkville student</em>  &lt;br&gt;““after going through MOVE, we will also practice on each other with the same cases” <em>Sunway student</em></td>
</tr>
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Students reported other OSCE preparation strategies such as revising lecture notes, familiarizing themselves with reference books and practicing with friends, which aligned with the responses from the questionnaires. Students also stated that working part-time in a pharmacy as a significant advantage over other preparation methods for the OSCE.

“Familiarize yourself with the AMH (Australian Medicines Handbook)…I usually just look up drugs but in front of each drug there’s a section and it tells you how the treatments work, the sorts of things you learn at university, it’s all condensed there…I didn’t know it existed in the AMH.” Parkville student

“it makes a very big difference if you’re working in the community pharmacy…you get to see more when you’re working rather than just practising with friends” Parkville student

“if you’re not working in a community pharmacy, it’s really hard to even practice with your own friends” Parkville student

Students conveyed that they found it helpful that each case scenario in MOVE had a logical and consistent set of patient interview questions in combination with the fixed timing for history taking, which helped guide their questioning technique and avoid asking unnecessary questions.

“It think MOVE actually helps you to know what kind of questions to ask, because sometimes when you just think it off the top of your head then it’s kind of difficult and you forget some questions, but then because they have a list there, so then if you keep practicing that then in the real scenario you can sort of just remember that there’s an extra question like are you pregnant or something like that and then you can ask that. So I think that’s what helped the most” Parkville student

“it makes you think about what you’re actually going to say rather than like press every single question and asking a male are you pregnant just in case” Parkville student

“it taught me not to forget those little questions like are you pregnant or breastfeeding because sometimes I do forget to ask that” Parkville student

“from the online teaching OSCE…I made a list of you know what kind of questions I could ask if I was struggling with the case” Parkville student

Students felt MOVE had a higher difficulty level for the hospital pharmacy-based scenarios than the community pharmacy scenarios. Students indicated that this could be because most had limited exposure and work experience in hospitals.

“the MOVE cases were harder than the actual OSCE” Parkville student

“…after completing the MOVE cases, I felt quite well prepared for community cases” Parkville student

“the hospital cases were a lot harder…” Sunway student
6. The comparison between MOVE and a face to face practice session

Students still preferred live face-to-face practice as they could get individualized feedback from the facilitator acting as the simulated patient compared with the generic feedback of item checklist received from the online module.

“the MOVE responses is in a perfect world…it’s not reflective of what would happen really in real life.” Parkville student

“you can also like not do it properly because…I would waste like 6 minutes looking at stuff, and then the last one minute you can just write whatever and then click submit and then all the answers will come up” Parkville student

“by the time you finish asking all the questions and checking everything, all your time’s up already, and then you have type out everything you want to say as well, that takes even longer” Parkville student

“Like questions you want to ask you can’t ask” Parkville Student

“the MOVE module is difficult because there is a time limit, so even when you have not finished asking all the questions the time is up. It’s difficult…but it was good practice to ask just the specific questions.” Sunway student

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