2025 European Quality Assurance Forum

QA in times of crises – Ensuring stability,
autonomy and international cooperation in higher education

Hosted by Corvinus University of Budapest, Hungary
12-14 November 2025

ISSN: 1375-3797

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Paper

Title: Implementation of Virtual Objective Structured Clinical Examination at Tbilisi State Medical University

Abstract

Background: The COVID-19 pandemic triggered a rapid transformation in medical education, pushing institutions to adopt digital tools not only for teaching but also for high-stakes clinical assessments. Amid this disruption, quality assurance (QA) systems will serve as essential mechanisms to uphold educational standards and drive institutional resilience. At Tbilisi State Medical University (TSMU), the QA department plays a key role in supporting innovative, evidence-informed responses to challenges through the structured evaluation of digital assessment initiatives.

Summary of Work: In response to restricted access to clinical environments, TSMU is working on implementation of a Virtual Objective Structured Clinical Examination (vOSCE) as the final exam in obstetrics/gynecology and pediatrics for 7th- and 8th-semester students. This digital assessment, delivered via Moodle, focuses on evaluating analytical and clinical reasoning skills. To complement this, a *mini-OSCE* will be implemented during formative assessments to address hands-on skill gaps within the 60-point internal evaluation system. The QA department is responsible for assessing the educational effectiveness and stakeholder experience of this hybrid model. Structured questionnaires will be developed and administered to both students and faculty.

Summary of Results: Initial findings show that vOSCE successfully measures students' analytical and decision-making competencies, but falls short in assessing practical skills. Insights from QA-led evaluations will be used to refine digital assessment strategies and inform the University to plan future developments.

Take-home Messages:

- Quality assurance guides responsible integration of digital learning tools in medical education
- vOSCE offers effective interim solution for assessing clinical reasoning but cannot replace hands-on assessment
- Blended assessment models and agile QA processes are critical for maintaining educational integrity
- Faculty development and ongoing technical support are essential for successful implementation

Keywords: Virtual OSCE, Moodle platform, medical education, quality assurance, clinical assessment, faculty perceptions, digital transformation, COVID-19

Introduction

Since the 1970s, the Objective Structured Clinical Examination (OSCE) has been our gold standard for assessing clinical competencies [9]. The traditional format involves face-to-face encounters between students, standardized patients, and examiners [10]. COVID-19 accelerated what had already been a gradual shift toward digital methods [13], prompting many institutions to develop virtual OSCEs that preserve core principles while leveraging online platforms [1,2].

During rapid educational change, quality assurance becomes particularly critical [18]. While QA systems need flexibility during crises, they cannot sacrifice educational quality. Effective QA does more than monitor compliance - it actively facilitates evidence-based innovation.

TSMU Clinical Skills and Multidisciplinary Simulation Department

Over the past two decades, Tbilisi State Medical University has built substantial clinical education infrastructure. Our Clinical Skills Laboratory, established in 2004, evolved into the Clinical Skills and

Multidisciplinary Simulation Center (CSMDSC) by 2018. The center joined the international SIM Center Directory in 2017.

The CSMDSC offers immersive simulation training with task trainers and high-fidelity manikins. We align our activities with National Sectoral Benchmarks derived from World Federation for Medical Education standards [19] and AMEE guidelines [10].

Our OSCE experience runs deep. We started conducting OSCEs in Obstetrics and Gynecology in 2014. Graduated OSCEs in Pediatrics and Internal Medicine followed in 2018. Multi-disciplinary integrated OSCEs began in 2022, and we introduced Objective Structured Practical Examinations (OSPE) in 2024. This background gave us a solid foundation for adapting to virtual formats.

Rationale for Virtual OSCE

International research demonstrates that virtual OSCEs can work as viable alternatives, with several studies showing comparable validity when properly designed [3,5]. However, systematic reviews consistently point to limitations, especially for physical examination skills [6,12].

Still, vOSCE has distinct advantages: lower logistical burden and costs, better accessibility for geographically dispersed participants, and opportunities to assess telemedicine competencies [15]. Learning management systems like Moodle enable standardized delivery, automated scoring, and detailed analytics [4].

With our CSMDSC infrastructure, multi-disciplinary OSCE experience, and institutional QA commitment, TSMU was reasonably well-positioned for vOSCE implementation. But we knew success would hinge on faculty preparation - both technical platform skills and pedagogical understanding of effective vOSCE design [20].

We designed this study to examine faculty perspectives after specialized training in vOSCE case development and Moodle use. Our goals were to describe the preparation process, evaluate experiences with case preparation and the platform, identify perceived advantages and challenges, assess views on effectiveness and future viability, and develop evidence-based recommendations.

Methods

Study Design

We conducted a cross-sectional study of faculty experiences after vOSCE training workshops at TSMU between Spring and Fall 2024. The TSMU Institutional Review Board approved the study protocol. All participants provided informed consent.

Training Program

The QA Department and CSMDSC organized training workshops led by Professor Víctor Manuel Arce Vázquez (Head of the Chair of Medical Education at the University of Santiago de Compostela and Member of the Steering Committee of the Spanish Conference of Medical Schools for OSCE organization). Spring 2024 training included faculty from Pediatrics, Obstetrics and Gynecology, Family Medicine, Surgery, Internal Medicine, and Clinical Skills departments. All participants had traditional OSCE experience.

Training covered four domains: principles of virtual clinical assessment, case development for vOSCE [20], technical instruction on Moodle, and quality assurance principles [18]. We blended didactic presentations with interactive workshops, hands-on practice, and collaborative exercises.

Participants

All 20 faculty members who attended the training comprised our study population, representing various academic ranks and specialties. All had prior traditional OSCE experience.

Data Collection

After training completion and initial case development, the QA Department distributed an anonymous online questionnaire with five sections:

Section 1: Background Information

1. Please indicate your specialty:
    - Pediatrics
    - Obstetrics & Gynecology
    - Other (please specify)
2. What is your current academic position?
    - Assistant Professor
    - Associate Professor
    - Professor
    - Other (please specify)
3. Have you had prior experience in developing OSCE or vOSCE cases before this project?
    - Yes
    - No

Section 2: Experience with Case Preparation

4. How would you rate the clarity of instructions provided for preparing vOSCE cases?
    - Very clear
    - Clear
    - Neutral
    - Unclear
    - Very unclear
5. How difficult was it for you to prepare a clinical scenario for vOSCE?
    - Very difficult
    - Difficult
    - Moderate
    - Easy

- Very easy

6. Which aspects of case preparation did you find most challenging? (Select all that apply)

   - Designing clinical content
   - Formatting the case for Moodle
   - Technical aspects of uploading
   - Time management
   - Other (please specify)

7. Which aspects did you find most beneficial for your own teaching development?

Section 3: Experience with Moodle Platform

8. How would you evaluate your experience using Moodle for uploading vOSCE cases?

   - Excellent
   - Good
   - Satisfactory
   - Poor
   - Very poor

9. Did you receive sufficient technical and methodological support during the process?

   - Yes, fully
   - Partially
   - No

10. What additional support or resources would have made the process easier for you?

Section 4: Perceptions and Future Perspectives (Likert-scale items)

Please indicate your level of agreement with the following statements: (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

11. Preparing vOSCE cases improved my own teaching and assessment skills.
12. The Moodle platform was user-friendly for uploading and managing vOSCE cases.
13. Technical and methodological support was sufficient throughout the process.
14. vOSCE is an effective tool for assessing residents' clinical competencies.
15. vOSCE can complement or even replace some aspects of traditional OSCE.
16. Simulation of clinical scenarios in vOSCE reflects real-life clinical practice adequately.
17. vOSCE encourages standardization and fairness in assessment.
18. I would be willing to prepare and contribute more vOSCE cases in the future.

Section 5: Open-Ended Questions

19. What are the main advantages of vOSCE in your view?
20. What are the main challenges or limitations of vOSCE from a faculty perspective?

Data Analysis

We analyzed quantitative data using descriptive statistics. Two independent researchers performed thematic analysis of qualitative data, identifying themes, coding responses, and resolving discrepancies through discussion.

Results

Participant Characteristics

All 20 faculty members completed the questionnaire (100% response rate), representing six departments with various academic ranks. All had prior traditional OSCE experience.

Experience with Case Preparation

Faculty had mixed experiences with case preparation. While we provided basic guidelines, many found translating clinical cases into Moodle format challenging. One respondent captured the difficulty: "The transfer of clinical cases into Moodle proved to be the most challenging aspect, as it required consideration of numerous details, an area in which I lacked prior experience."

Most faculty struggled with designing clinical content for virtual delivery. Formatting cases for Moodle presented difficulties, technical upload aspects created problems, and time management proved challenging. Several commented on the substantial intellectual effort required to translate clinical encounters into structured digital formats. Despite these challenges, faculty saw potential: "It is expected that the platform will ultimately facilitate the creation of a robust collection of assessments, thereby enhancing objectivity."

Moodle Platform Experience

Faculty rated the platform from satisfactory to good, with several noting "considerable potential." However, most indicated support was only "partial" or insufficient. One stated: "The training provided was insufficient for developing examination materials of appropriate quality." Many preferred in-person training.

Technical challenges included: the system couldn't effectively handle open-ended questions, procedures for multi-step cases weren't clear (restricting backward navigation), inadequate guidance on advanced features, and limited exposure to complex question types.

Faculty recommendations included: on-site hands-on training by system administrators, advance notice of training dates, personalized support sessions, continuous technical support access, demonstrations of complex question types, and development of a unified clinical case database.

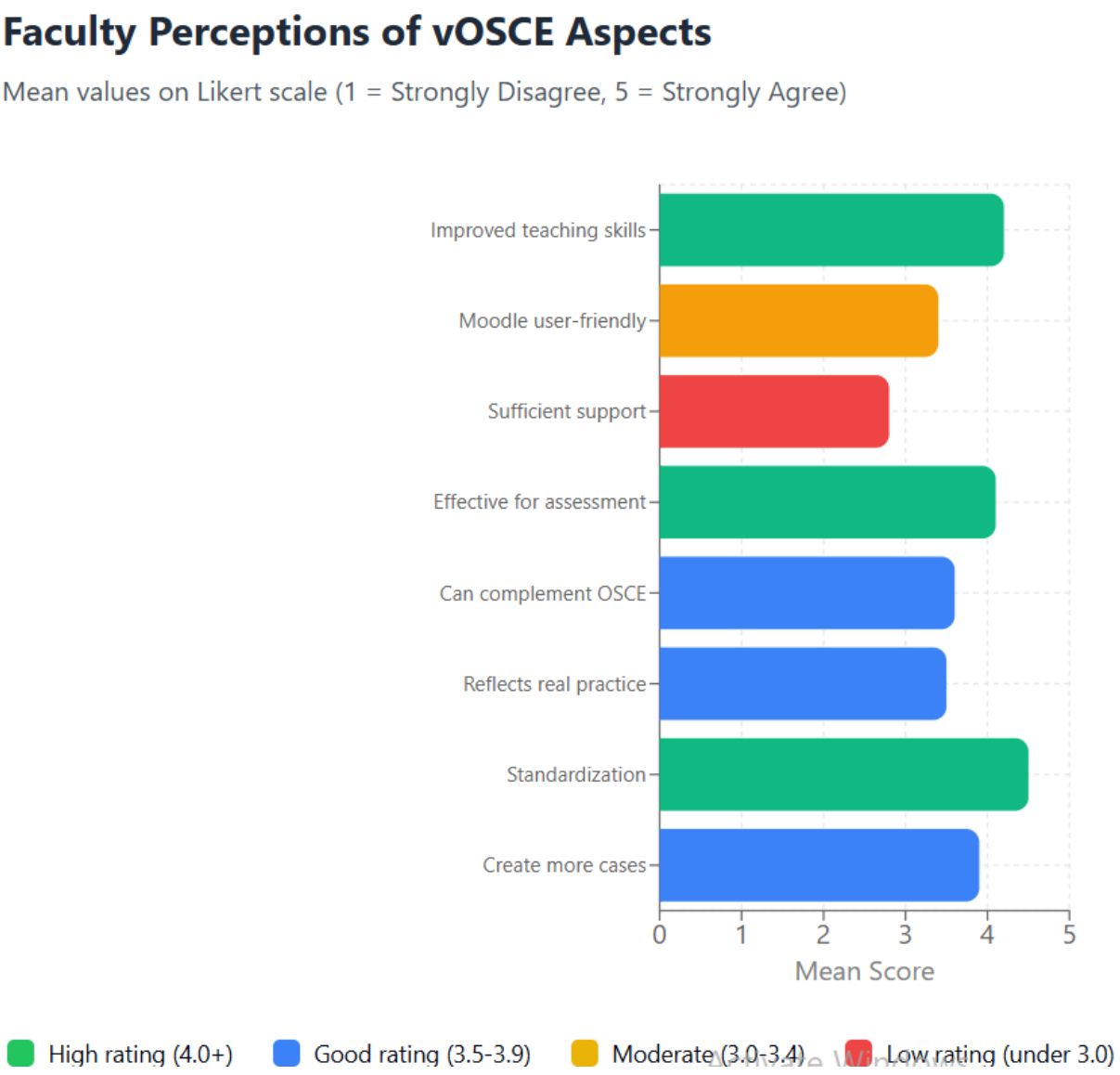
Perceptions and Future Perspectives

Faculty generally felt that preparing vOSCE cases improved their understanding of competency-based assessment, clinical reasoning evaluation, and question design, though the learning curve was steep. Opinions divided on platform user-friendliness—some appreciated organizational capabilities while others found the interface challenging.

Faculty agreed vOSCE effectively assesses analytical thinking, clinical reasoning, and decision-making [11]. However, they recognized that "vOSCE is a powerful tool for evaluating knowledge and clinical reasoning but cannot fully substitute hands-on practical skill training." Most felt vOSCE could

complement but not replace traditional OSCE, particularly because it cannot assess physical examination skills and procedural competencies [12].

Faculty strongly agreed vOSCE encourages standardization and fairness through structured format and automated scoring, reducing evaluator variability [18]. Willingness to prepare additional cases was generally positive, though conditional on adequate support and training.



Note: Data represent mean ratings from 20 TSMU faculty members following vOSCE training (n=20, 100% response rate).

Advantages of vOSCE

Thematic analysis revealed consistent themes:

Standardization and Consistency: Faculty valued how standardized conditions ensure identical scenarios for all students, enhancing fairness and objectivity [18].

Accessibility and Flexibility: Multiple respondents emphasized easy access without specialized spaces. One noted: "Can be conducted during emergencies (e.g., COVID-19 pandemic), saving time and costs" [14].

Resource Efficiency: Faculty appreciated that vOSCE is "fast" and "cost-effective," requiring fewer resources than traditional OSCE [4]. After initial investment, vOSCE can be deployed repeatedly with minimal additional cost.

Recording and Feedback: Recording capability enables detailed review and comprehensive feedback, useful for quality assurance, teaching, and examiner calibration [15].

Digital Competencies: Faculty recognized vOSCE helps students develop digital literacy and telemedicine skills: "Develops digital skills and telemedicine competencies, preparing students for modern practice" [17].

Clinical Reasoning Assessment: Faculty valued how effectively vOSCE assesses higher-order thinking, including analytical reasoning and clinical decision-making [11].

Challenges and Limitations

Faculty identified several challenges:

Technical Infrastructure: The most frequent concern involved strengthening infrastructure, including reliable internet and robust platform functionality [6].

Faculty Training and Support: Strong emphasis on comprehensive training, preferably in-person: "In-person training would be considerably more effective, especially if conducted by individuals directly responsible for constructing and entering tests into the system" [8].

Skill Assessment Limitations: Faculty recognized vOSCE cannot adequately assess physical examination and procedural skills [12].

Platform Limitations: Inadequate open-ended question support, difficulty creating multi-step cases, and limited examples of complex question types [6].

Time and Resource Investment: Initial time investment for platform learning and quality case development is substantial, requiring adequate compensation and recognition [8].

Additional Resources: Creating centralized question banks, developing templates, establishing peer review processes, and providing collaborative development opportunities [20].

Discussion

Our study offers insights into faculty perspectives on vOSCE implementation at TSMU, revealing both opportunities and obstacles that other institutions may find relevant.

Faculty Training Matters More Than We Expected

Perhaps our most striking finding concerns training. Despite bringing in international experts and providing structured workshops, faculty consistently reported that online training wasn't enough. They wanted in-person, hands-on sessions - and this makes sense given what we know about adult learning.

People need to work through problems in real-time with immediate feedback, especially when learning complex technical systems.

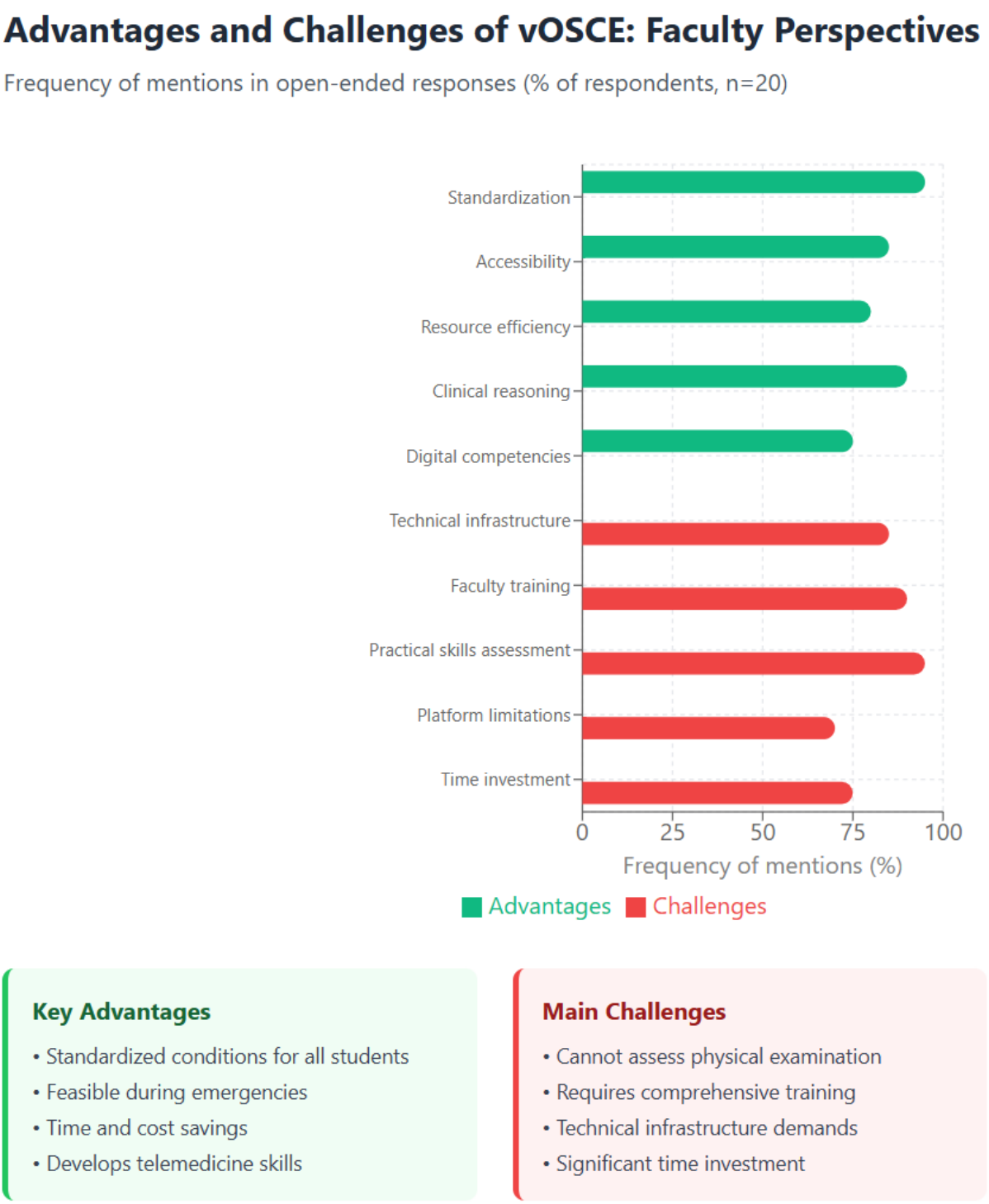
Other institutions report similar experiences. Studies describe comprehensive training combined with mock examinations as essential for smooth implementation [14,15]. The technical challenges we saw reinforce why adequate infrastructure and ongoing support matter so much as faculty develop these competencies.

vOSCE Has Value Beyond Crisis Response

We initially turned to vOSCE because of pandemic restrictions [13], but faculty identified advantages extending well beyond emergency use. Their emphasis on standardization aligns with competency-based education principles [18]. When every student encounters identical scenarios, you reduce measurement error unrelated to actual competence - a persistent problem in traditional OSCEs where station variability affects scores.

Faculty also appreciated resource efficiency, which other institutions document [2]. Research shows virtual OSCEs can maintain validity while reducing costs [5]. A Sudanese study found computer-based examinations save time and resources, with over 80% of students finding digital instructions easier than paper [4].

Interestingly, faculty recognized that vOSCE develops telemedicine competencies. As healthcare increasingly incorporates telehealth, students need opportunities to practice virtual patient interaction and digital communication [17]. Some research suggests vOSCE provides authentic telemedicine experience now essential for practice [7].



Conclusion: *Faculty recognize significant advantages of vOSCE in standardization and clinical reasoning assessment, but emphasize the need for a hybrid approach with traditional OSCE for practical skills evaluation.*

Virtual Formats Have Real Limitations

Faculty demonstrated nuanced understanding of vOSCE limitations, particularly for physical examination skills. This mirrors the literature - virtual formats simply cannot adequately assess hands-on clinical skills [6,12]. Systematic reviews consistently identify inability to evaluate physical

examination, procedural competencies, and certain communication aspects as fundamental limitations [6].

The consensus that vOSCE should complement rather than replace traditional OSCE reflects emerging best practice [7]. Research increasingly suggests hybrid models may be optimal, using vOSCE for clinical reasoning and data interpretation while maintaining traditional stations for hands-on skills [3].

Faculty correctly distinguished that vOSCE assesses "knowing how" rather than "showing how" on Miller's pyramid [11] - a pedagogically sophisticated observation. Students can describe appropriate examination techniques in vOSCE, but this doesn't prove they can actually perform them. This limitation explains our complementary mini-OSCE strategy during formative assessment.

How QA Can Guide Innovation

TSMU's QA Department played a crucial role in this implementation, illustrating how QA can responsibly guide educational innovation [18]. We provided expert-led training, collected structured feedback, and used findings to inform ongoing implementation - demonstrating systematic approaches for managing educational change.

Faculty recommendations about unified clinical case databases deserve attention. Such resources could enhance cross-departmental consistency, facilitate peer review and material refinement, and reduce duplication of effort [20]. Centralized resources might help new faculty learn faster while promoting continuous improvement.

What Other Medical Schools Should Consider

Our findings have several implications for institutions considering vOSCE. Successful implementation appears to require substantial faculty development investment, positioning vOSCE as part of a comprehensive assessment system rather than a replacement, ensuring reliable technological infrastructure, and maintaining strong stakeholder engagement [6,18].

We acknowledge limitations. Our sample is small (20 faculty) from a single institution. We focused only on faculty perspectives, missing student viewpoints [16]. We captured perceptions right after training rather than after live examination experience. We also lack psychometric analysis of actual vOSCE performance data.

Future research should address several questions: How do students experience vOSCE compared to traditional formats? What are the comparative psychometric properties [5]? How do actual performance data compare? How do faculty perspectives evolve with experience?

Conclusion

Our examination of faculty experiences following vOSCE training at TSMU revealed both opportunities worth pursuing and challenges requiring attention.

Faculty identified several advantages: enhanced standardization and fairness, improved accessibility and flexibility, resource efficiency, valuable recording capabilities, telemedicine competency development, and effective clinical reasoning assessment. These suggest vOSCE has roles extending beyond crisis response [1,2,7].

However, substantial challenges remain: faculty need comprehensive training with ongoing support [8], robust technical infrastructure is essential [6], vOSCE cannot adequately assess physical examination skills [12], platform limitations exist, and time investment is substantial.

Faculty consensus that vOSCE should complement rather than replace traditional OSCE represents a balanced perspective [7]. When institutions use vOSCE for competencies it effectively assesses - particularly clinical reasoning and data interpretation - while maintaining face-to-face assessment for hands-on skills, they can create comprehensive systems leveraging advantages of both approaches [3,11].

Based on our findings, we recommend institutions considering vOSCE implementation: invest substantially in faculty development through comprehensive training and ongoing support [8]; develop robust technical infrastructure with reliable platforms and connectivity [6]; use blended assessment approaches employing vOSCE for appropriate competencies while maintaining traditional assessment for hands-on skills [20]; and implement continuous quality improvement through systematic feedback collection and assessment analysis [18].

COVID-19 accelerated virtual learning technology adoption, creating both urgency and opportunity [13]. Our study suggests vOSCE, when carefully implemented with adequate support, can valuably augment medical education assessment practices. While challenges are real, potential benefits-enhanced standardization, improved accessibility, resource efficiency, and alignment with evolving healthcare practices - make continued development worthwhile [1,2,6].

As medical education evolves in an increasingly digital world, assessing clinical competencies in virtual environments becomes progressively more important [19]. By learning from early implementation experiences, addressing identified challenges, and maintaining focus on validity and educational quality, we can develop assessment systems that effectively prepare students for modern clinical practice [18].

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