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Video-based assessment of clinical skills in medical education: A mixed-methods study

Selcen Öncü[1], Fulya Torun[2], Hatice Hilal Ülkü[3]

ABSTRACT

Objective: Video-based assessment (VBA) is increasingly used in medical education as a method to evaluate clinical skills objectively and flexibly. However, limited research has focused on students' and faculty members' perceptions regarding its implementation, feasibility and perceived educational value. This study aimed to evaluate the experiences, perceptions, and satisfaction levels of third-year medical students and faculty members regarding the use of VBA in clinical examination skills training.

Methodology: The descriptive mixed-methods study involved 275 third-year medical students at Aydın Adnan Menderes University during a two-week period in May 2025. After participating in a VBA via Google Classroom, students completed a structured questionnaire. Focus groups were conducted with students and faculty evaluators. All participants provided informed consent. Quantitative data were analyzed using descriptive and non-parametric tests, while qualitative data were examined through thematic analysis.

Results: Students generally reported that the VBA supported self-reflection, supported their clinical skills learning and provided flexibility. However, students also expressed concerns about technological barriers and increased stress. Questionnaire item means ranged from 3.09 to 4.11; the mean scores for increased self-confidence, suitability of VBA, and perceived objectivity were 4.08±1.04, 3.76±1.09 and 3.75±1.14, respectively. Faculty appreciated the standardization, asynchronous assessment opportunities, and perceived objectivity of the system. Provide numbers in results

Conclusion: VBA was generally perceived as a valuable approach for clinical skills assessment by students and faculty. Participants reported perceived benefits related to self-reflection, professional development, and assessment flexibility, while technological, logistical, and time-related challenges were also identified.

KEYWORDS: Clinical Competence, Educational Measurement, Education, Medical, Undergraduate, Video-based Assessment; Video Recording.

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INTRODUCTION

Clinical examination skills are fundamental to the development of competent physicians capable of delivering safe and high-quality care, integrating not only technical procedures but also communication, clinical reasoning, and professional behavior. Accordingly, valid and reliable assessment of these skills is critical in undergraduate medical education because it shapes the future quality of care.[1,2]

In recent years, video-based assessment (VBA) has become an important tool, particularly for evaluating clinical skills, by enabling more objective, flexible, and scalable evaluations than traditional face-to-face methods addressing pressures from larger cohorts, limited clinical space, and faculty workload. VBA in medical education is grounded in experiential, observational, and sociocultural learning theories (Kolb, Bandura, Vygotsky), emphasizing reflection,

feedback, and guided peer interaction. It offers a complementary approach to Objective Structured Clinical Examinations (OSCEs), which are widely used but logistically demanding and resource-intensive.[3-7] However, evidence about how students and faculty experience VBA in real-world undergraduate settings remains limited. This study addresses that gap by exploring the experiences and attitudes of third-year medical students and faculty toward VBA.

Improving how examination skills are taught and assessed is essential for patient care. At our faculty, clinical skills progress longitudinally, from basic (first-year) to procedural (second-year) and physical examination skills (third-year). Third-year training is delivered in clinical skills laboratories through structured guides and simulations and is reinforced by hospital rotations. In response to increasing student numbers, rising costs, and faculty workload, we adopted a VBA delivered via a learning management system (Google Classroom) as a complementary method for evaluating examination skills alongside end-of-year OSCEs.

Increasing medical student numbers and the resource demands of conventional clinical skills assessments such as OSCEs create challenges for assessment. VBA may offer a complementary approach through asynchronous evaluation, standardized criteria, and repeated review of performance. However, evidence on its feasibility and student and faculty experiences remains limited. Therefore, evaluating VBA in an authentic educational setting is important for understanding its role alongside existing assessment methods. This study aimed to evaluate the perceived educational value and feasibility of VBA for undergraduate clinical skills assessment.

METHODOLOGY

This study used a descriptive mixed-methods design and was conducted at Aydın Adnan Menderes University Faculty of Medicine during a two-week period in May 2025. The study followed implementation of a six-step clinical skills VBA (Fig.1) in the third-year clinical skills module.

Ethical approval: The study was approved by the Non-Interventional Ethics Committee of Aydın Adnan Menderes University Faculty of Medicine (Prot. No: 2024/195; December 20, 2024). All participants provided informed consent. Confidentiality and anonymity were maintained, and all procedures complied with institutional and ethical guidelines.

Participants: The study included 275 voluntary third-year medical students (112 females, 163 males; mean age 21.6±1.2 years) out of a total of 300 who participated in the video-based clinical skills assessment. Twelve faculty members from related specialties served as evaluators. All were experienced clinical educators responsible for

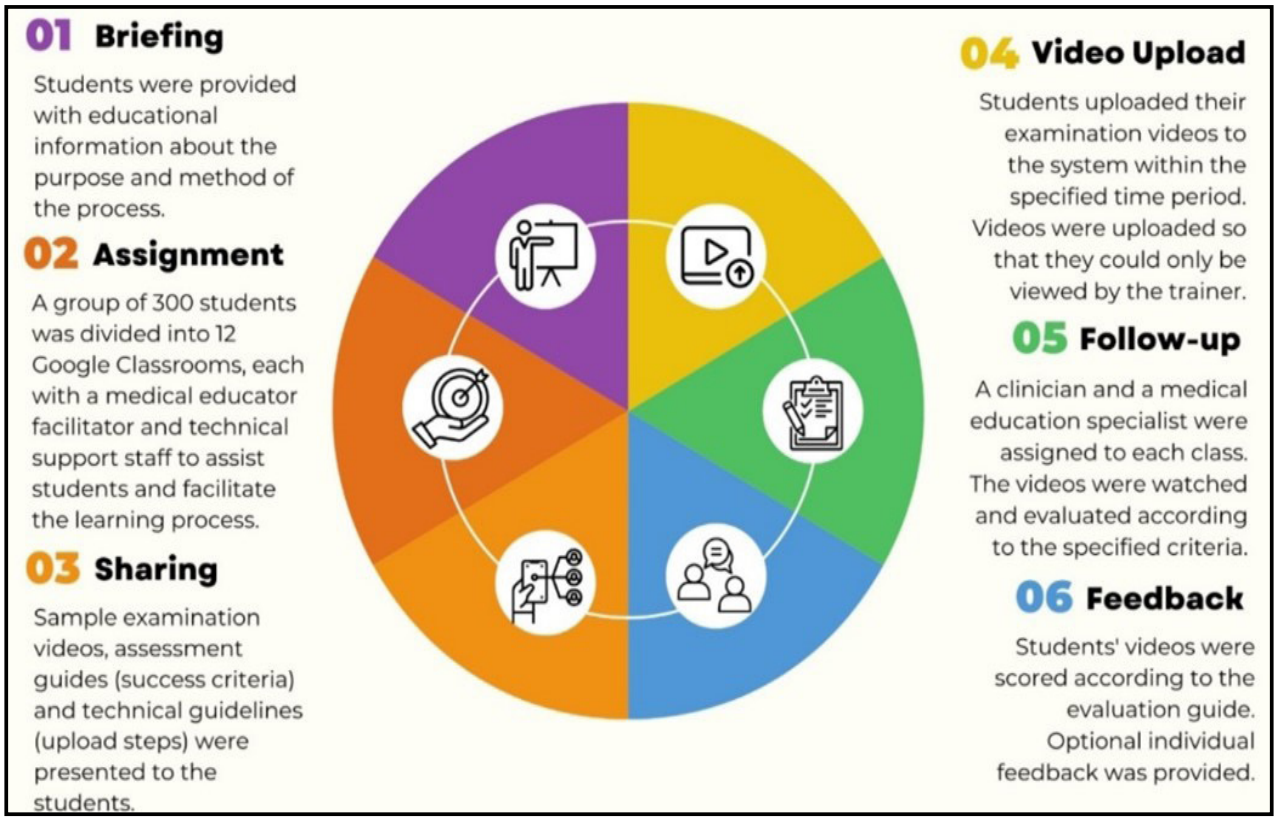

Fig.1: Video-based clinical skills assessment process.

observing, rating, and providing structured feedback on students' examination videos using standardized checklists aligned with institutional criteria.

Process and data collection: The VBA was conducted near the end of the third year to assess physical examination skills taught in the Clinical Skills curriculum. Students were allocated to 12 Google Classroom groups and received instructions on recording and submission. Four clinical skills laboratories were available for two weeks through an appointment system. Students recorded their assigned examination performance using mannequins/ models or peers and uploaded the videos to Google Classroom. Twelve clinicians served as evaluators, with one assigned to each group. Performances were assessed using standardized stepwise clinical skills guides, and individual feedback was provided. One medical educator coordinated the process across all groups, reviewed submissions for procedural issues, and communicated with students when necessary. Technical support was available throughout the process (Fig.1).

After the completion of VBA, a structured questionnaire was administered to students via Google Forms. Then, qualitative data were collected through two focus group discussions: one with students (n=12, representing each of the 12 classroom groups) and another with evaluators (n=12). These sessions explored participants' experiences, perceptions, challenges, and suggestions regarding the VBA process.

The questionnaire was developed by the researchers based on relevant literature and finalized through expert review and a pilot study. It comprised two sections: the first gathered demographic information, and the second included 27 five-point Likert-scale items assessing satisfaction, effectiveness, and feasibility of VBA, along with three open-ended questions eliciting students' qualitative feedback and suggestions.

Data analysis: *Quantitative analysis:* Questionnaire data were analyzed using descriptive statistics. As the data were not normally distributed, Mann–Whitney U and Kruskal–Wallis H tests compared perceptions by gender, academic achievement, class attendance, and clinical practice interest. Spearman's correlation assessed relationships between grade point averages, clinical practice grades, and questionnaire scores.

Qualitative analysis: Open-ended responses and focus group data were analyzed thematically using MAXQDA. Coding identified themes related to participants' experiences, challenges, improvement suggestions, and alternative assessment preferences. Quotes were labeled S1, S2…for students and E1, E2… for evaluators.

RESULTS

The distribution of questionnaire item scores is presented in Appendix Table-I; mean scores ranged from 3.09–4.11. Overall, students reported favorable perceptions, with higher ratings for instructors' competence, the perceived effectiveness of VBA, and professional identity development.

No significant differences were found by gender (U=8230.5, p=0.166) or self-perceived academic success (H=1.600, p=0.449). In contrast, significant differences emerged in relation to class attendance (H=9.573, p=0.008; U=5608.5, p=0.002), as students attending all sessions scored higher than those attending only compulsory ones. Similarly, clinical practice interest was associated with higher scores (U=4882.5, p=0.001; H=11.805, p=0.003) (Table-I).

Table-I: Questionnaire scores by gender, academic success, and class attendance

Variable	*Groups*	*N*	*Mean rank*	*Test*	*U/H value*	*df / Z*	*p-value*
Gender	Female	112	146.01	MWU	8230.5	Z= -1.386	0.166
	Male	163	132.49				
Academic Success	Poor	6	133.25	KWH	1.600	df = 2	0.449
	Moderate	187	134.07				
	Good	82	147.30				
Class Attendance	Irregular (low)	3	115.67	KWH	9.573	df = 2	0.008*
	Only compulsory	75	114.39	MWU	5608.5	-	0.002*
	Regular (all)	197	147.33				
	Interested, all tasks	209	147.12	MWU	4882.5	Z= -3.425	0.001*
Clinical Practice Interest	Interested, not all tasks	65	108.42				
	Uninterested/non-attended	1	155.00	KWH	-11.805	–	0.003*

MWU: Mann-Whitney U, KWH: Kruskal-Wallis H.

Table-II: Correlation analysis.

Variable1	*Variable 2*	*Correlation Coefficient (r)*	*Significance (p)*
Mean Questionnaire Score	Overall GPA	0.445	<0.001 *
Mean Questionnaire Score	Clinical Practice Score	0.373	<0.001 *
Overall GPA	Clinical Practice Score	0.373	<0.001 *

*All correlations were statistically significant at the p<0.001 level (Spearman's rank correlation test).

Correlation between academic performance and questionnaire scores: Students' grade point averages showed a moderate, positive correlation with questionnaire scores (Spearman's rho=0.445, p<0.001). Clinical practice scores were also positively and significantly correlated with questionnaire scores (Spearman's rho=0.373, p<0.001) (Table-II).

Qualitative results: Thematic analysis of qualitative data revealed four main themes for students (Fig.2) and three for evaluator faculty members. Representative quotations illustrating key ideas are provided below the themes.

Themes from students:

Theme 1–Positive experiences related to clinical skills training: Students widely perceived VBA as valuable for reinforcing learning, confidence, and motivation. Recording and reviewing their own performances contributed to deeper understanding, while a few expressed concerns about full objectivity. "*It greatly contributed to my medical practice and helped me manage my professional excitement.*" (S36) "*Recording videos helped me retain knowledge and feel more prepared for the fourth year. Feedback from instructors supported further improvement.*" (S12)

Theme 2–Challenges encountered during the process: Students reported time pressure, limited access to clinical skills laboratories, and technical issues as major challenges. "*The time allocated for the exam was short and increased stress.*"(S17) "*There were not enough rooms for recording, so we often had to wait or postpone our turns.*" (S08)

Theme 3–Suggestions for improvement: Students recommended improving infrastructure and redesigning the assessment schedule to allow more practice opportunities and balanced workload. "*Videos could be requested for each committee to enhance engagement and motivation throughout the year.*" (S02)

Theme 4–Preferred alternative assessment methods: While most valued VBA, some students preferred live examinations for immediate feedback and interaction with instructors. "*It would have been better to perform the examination live in front of the instructor to receive instant feedback and correct mistakes.*" (S25).

Themes from evaluators:

Theme 1–Perceived educational value and professional development: Faculty perceived VBA as supporting professionalism, communication, and clinical preparedness. "*Students' introductions, patient communication, and explanations for informed consent were excellent.*" (E6) "*They demonstrated professionalism and confidence in performing examination techniques.*" (E7)

Theme 2–Objectivity, standardization, and assessment quality: Educators valued video replay and standardized checklists as supporting consistency and objectivity. "*I could behave more objectively by rewatching the videos.*" (E5) "*Using checklists and time limits helped maintain standardization.*" (E3)

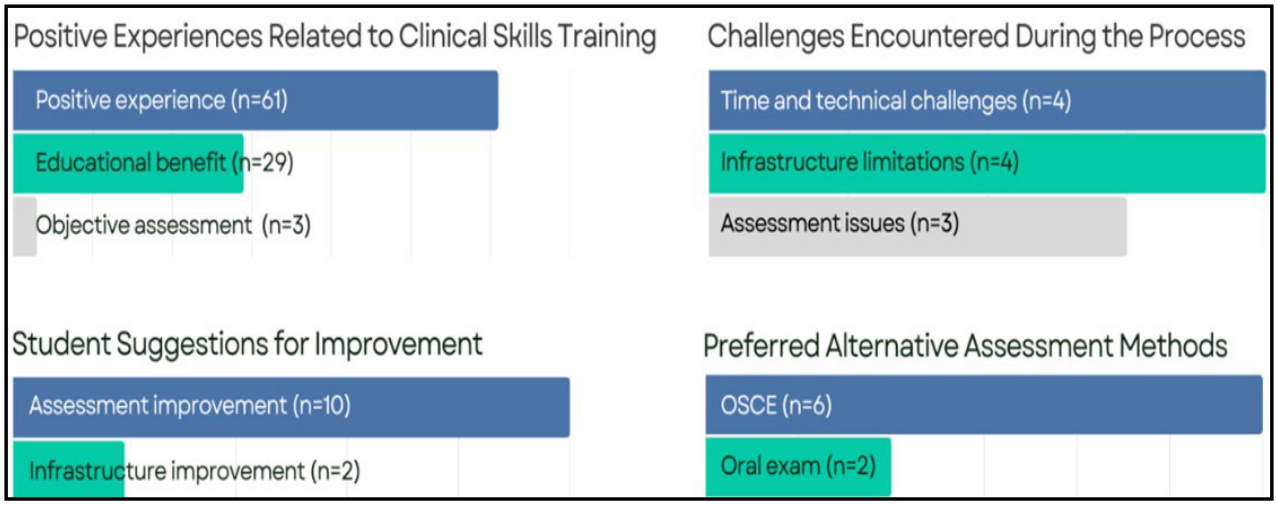

Fig.2: Themes and codes according to the students' opinions.

APPENDIX

Appendix Table 1. Mean scores of questionnaire items (Mean ± SD)	
Item	*Mean ± SD*
Our instructors were competent in their subject matter during clinical skills training	4.11 ± 1.07
Being able to perform the learned examination skill independently increased my self-confidence	4.08 ± 1.04
I realized the importance of obtaining patient consent during the exam	4.04 ± 1.07
Watching the examination video I recorded made me feel like a physician	4.03 ± 1.09
I benefited from the assessment guides uploaded for the exam	4.02 ± 1.08
I believe I fully learned the examination I performed in the video exam	4.02 ± 1.05
The video exam increased my desire to become a physician	4.01 ± 1.09
Preparing for the exam through collaboration with my peers facilitated my learning	3.99 ± 1.10
I believe I improved my patient communication skills during the exam	3.98 ± 1.08
Watching examination videos for the exam positively affected my learning	3.97 ± 1.14
I watched examination videos for the exam	3.92 ± 1.11
The instructions and information provided for the exam were clear	3.92 ± 1.07
I found the contribution of the video exam to the final exam sufficient	3.89 ± 1.15
I was able to communicate easily with our instructors during clinical skills training	3.86 ± 1.13
The exam was well organized	3.85 ± 1.11
Video-based assessment was a suitable method for me	3.76 ± 1.09
I think the exam was objective	3.75 ± 1.14
Demonstration practices facilitated my learning in clinical skills training	3.74 ± 1.02
Our clinical practices were productive	3.72 ± 1.09
Knowing that instructors watched the videos made me feel nervous	3.70 ± 1.20
Our clinical skills practices were productive	3.69 ± 1.09
I had the opportunity to watch examination videos during the year	3.67 ± 1.15
The time allocated for clinical skills training was sufficient for my learning	3.63 ± 1.21
Mannequins and models contributed to my learning in clinical skills training	3.60 ± 1.12
I was able to demonstrate my real performance in the video exam	3.58 ± 1.10
Before the exam, I had the chance to perform examinations on my own	3.53 ± 1.21
I would have preferred to be assessed face-to-face by the instructor rather than by video	3.09 ± 1.28

Note: Items are listed in descending order of mean scores. Likert scale:1=Strongly Disagree, 5 = Strongly Agree.

Theme 3–Practical advantages and complementarity with OSCE: While acknowledging the continued value of in-person OSCEs, faculty recognized that VBA reduced scheduling pressure and provided flexibility in evaluation. "*Evaluating independently of time and place was very convenient*." (E11).

DISCUSSION

This study evaluated an LMS-supported VBA of clinical skills for third-year medical students and found generally favorable perceptions. Quantitative and qualitative findings indicated perceived benefits related to *professionalism* and *self-assessment*, *alongside time* and *infrastructure constraints*. *Higher attendance*

and *participation* were associated with more favourable questionnaire scores, suggesting that engagement with clinical skills training may influence students' perceptions of VBA. Thus, while participants generally perceived VBA favorably, refinements in scheduling and infrastructure are needed. Effective assessment also guides students' learning and informs curriculum quality.[8,9]

Although a few students preferred traditional OSCEs, most valued VBA. VBA allows performance at one's own pace and in lower-pressure conditions, potentially reducing anxiety and supporting authentic demonstrations.[10]

In the context of increasing student numbers and faculty workload, VBA may offer a flexible complementary approach to conventional clinical skills assessment. Our findings are consistent with previous studies indicating that video-supported OSCEs can enhance learning and provide logistical flexibility.[6,11] Although evidence regarding user experience and practical implementation has remained limited[12], previous studies have also reported the feasibility of video-assisted clinical skills assessment in undergraduate and postgraduate settings.[13,14] Our findings similarly support the perceived feasibility of VBA while highlighting the need for institutional support and clear implementation procedures.

VBA also reflects experiential, social-cognitive, and sociocultural learning principles through reflection, observation and peer support.[15,16] Previous studies have similarly reported benefits of video-based methods for motivation, engagement, knowledge, and operational flexibility.[17,18]

Use of an LMS facilitated submission management and structured feedback, while asynchronous access provided greater flexibility in scheduling evaluations around faculty clinical and teaching responsibilities. The ability to replay specific segments of a performance also enabled evaluators to reconsider uncertain observations against standardized checklists, potentially supporting more consistent and objective scoring. This supports prior evidence that digital platforms can foster continuous assessment and personalized feedback.[19,20] These findings suggest that VBA may be integrated as a structured complement to OSCEs, provided that adequate scheduling, laboratory access, coordination, and technical support are available.

Strengths: A major strength of this study is that VBA was evaluated within a routine undergraduate medical education setting involving 275 third-year students. The mixed-methods design incorporated both student and faculty evaluator perspectives. Standardized checklists, centralized coordination, and technical support helped maintain consistency across groups, while asynchronous review and replay of performances allowed flexible evaluation and reconsideration of uncertain observations. Importantly, VBA was used as a complementary approach rather than a replacement for OSCEs.

Limitations: This single-center study involving third-year students may limit generalizability. Appointment-based lab access and time constraints could have introduced stress and affected performance.

CONCLUSIONS

This study found generally favourable student and faculty perceptions of VBA as a practical and flexible approach to clinical skills assessment. Students reported perceived benefits for self-confidence and self-reflection, while faculty evaluators valued the use of standardized checklists, flexible evaluation times, and the opportunity to review videos. These findings suggest that VBA may serve as a complementary approach to existing clinical skills assessment methods, including OSCEs, particularly in settings with large student cohorts and faculty workload constraints.

Future directions: Future studies should investigate long-term educational outcomes, transfer of video-assessed skills to real clinical settings, and hybrid OSCE–VBA models across institutions. Artificial intelligence may also be explored for automated analysis and formative feedback while maintaining human oversight.

Declaration of AI Use: ChatGPT (OpenAI) was used to assist with English language editing, wording, and improving clarity. No AI tools were used for data analysis or interpretation of the findings. All AI-assisted revisions were critically reviewed and approved by the authors.

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Authors' Contribution:

SÖ: Conception, study design, data collection, data analysis, manuscript writing, overall supervision and responsible and accountable for the accuracy and integrity of all aspects of the work.
FT: Technical support, quantitative data analysis, qualitative data analysis, manuscript writing, critical review.
HHÜ: Qualitative data analysis, manuscript writing, critical review.