

## E-LEARNING INTEGRATED WITH STRUCTURED FEEDBACK- A CLINICAL PHYSIOLOGY TEACHING TOOL

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DOI: [10.5281/zenodo.13779925](https://doi.org/10.5281/zenodo.13779925)

### Abstract

**Background:** The present study aims to investigate student's experiences of E-learning using OSCE videos integrated with feedback to learn clinical skills. There is growing emphasis on improving the teaching and learning of clinical skills in CBME curriculum [1]. To achieve this purpose, previous research shows that E-learning is effective in imparting clinical education. There is paucity of studies to evaluate clinical skills learnt using OSCE based E-learning videos integrated with feedback among Phase I MBBS students. More exploration is needed on evaluation of effectiveness of Clinical lab sessions in Physiology department for Phase I MBBS students **Methodology:** Prospective, non-randomized, interventional study was conducted among 250 Phase I MBBS students in Physiology lab. Physiology faculty members were sensitised to uniform teach clinical skills using OSCE checklist based video modules. Students were asked to perform the clinical skills learnt using OSCE checklist based E-learning videos. This was immediately followed with 1:1 feedback on performance. Following this, OSCE sessions in the same topics were evaluated after 3 weeks. OSCE scores were recorded in both sessions. Validated feedback questionnaires were administered to the students and faculties and feedback was collected. **Results:** 86% of the students felt convinced with the structured points of the feedback given by the faculties ( p-value = 0.03271, significant, Table-1, 2). 74% of the students also agreed that the learning gaps that have to be addressed is more clearer to them after learning and performance, based on OSCE video sessions followed by feedback. There was significant increase in the OSCE scores of Phase I MBBS students after demonstration of clinical skills learnt using OSCE based E-learning videos followed by 1:1 structured feedback. **Conclusion:** It is therefore concluded that OSCE Video instructions, as a form of E-learning, followed by practice in clinical sessions integrated with feedback sessions can be an effective teaching-learning tool for both the students and faculties.

**Keywords:** E-learning, Objective Structured Clinical Examination (OSCE), Formative Feedback, Competency Based Medical Education (CBME), Clinical Video Modules.

### INTRODUCTION

Students acquiring adequate competency in basic clinical skills is an important goal of Competency Based Medical Education (CBME). Therefore lot of emphasis and importance is being laid on the teaching and learning of clinical skills in CBME curriculum [1]. To achieve this purpose previous research shows that E-learning is effective in imparting clinical education. Multimedia instructions has been an important means to learn effectively, and they are of significant relevance for medical education [2]. It has been found that moving images of Educational videos are effective to teach procedures of skilled techniques[3]. There has been significant improvement of learning of clinical skills using video demonstrations of clinical skills [3]. In spite of various methods of clinical skill instructions, there have been challenges in medical colleges in teaching and learning of clinical skills. The challenge is increased when

first year Medical students in the initial Phase I Medical curriculum have to learn Clinical skills in Physiology Clinical labs.

One of the standard methods to evaluate various learners' skills such as communication, proficiency in clinical examination and application is Objective structured clinical examination (OSCE), introduced by Harden and Gleeson [4]. OSCEs can be used for both formative and summative assessments. Formative feedback is defined as information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning [5]. It can effectively promote positive and desirable development with respect to previous performance. It is known that Feedback is more effective when it focuses on tasks, is specific and suggests areas of improvement [6, 7]. Analysis of previous studies show that evaluation on teaching-learning of clinical skills among medical students have been done in various clinical setups. But there is paucity of studies to evaluate clinical skills learnt using OSCE based E-learning videos integrated with feedback among Phase I MBBS students. There is more exploration needed on evaluation of effectiveness of Clinical lab sessions in Physiology department for Phase I MBBS students. It was observed that inclusion of direct observation and feedback on performance for clinical examination was needed for both the faculties and students. Moreover the gaps in content and clinical skill performance of students in Clinical lab sessions were not being fully assessed and evaluated in our Physiology department.

The present study aims to investigate student's experiences of E-learning using OSCE videos integrated with feedback to learn clinical skills.

The aim of our study was to evaluate the effectiveness of OSCE based E-learning videos integrated with 1:1 structured feedback among Phase I MBBS students. OSCE based E-learning videos integrated with feedback on clinical skill performance as a teaching tool in Physiology department needs to be explored further.

It is hypothesised that 1:1 structured feedback integrated with demonstration of clinical skills, learnt using OSCE based E-learning videos would be an effective teaching-learning tool for imparting clinical skills in Physiology Clinical labs.

## **METHODOLOGY**

Prospective, non-randomized, interventional study was conducted on 250 Phase I MBBS students between March to November, 2021. Venue of the study was Physiology Clinical lab, School of Medical Sciences and Research, Sharda University. Permission of institutional Ethical Committee was obtained. Informed consent was obtained.

9 Physiology faculty members were sensitised to teach clinical skills using OSCE checklist based video modules to 250 phase I MBBS students. Topics for OSCE video modules were identified. OSCE based teaching video modules were peer expert validated.

250 MBBS students were sensitised to clinical skill performance using OSCE video modules during the practical sessions. Students were asked to perform the clinical skills learnt using OSCE checklist based E-learning videos. 12 OSCE stations for General system and Cardiovascular system examination were finalised. Student-teacher ratio in each OSCE station for feedback on performance was 1:1. Following

this, OSCE sessions in the same topics were evaluated after 3 weeks. OSCE scores were recorded in both sessions.

Feedback survey questionnaires to assess the perceptions of Phase I MBBS students and the involved faculties on the feedback program were designed and peer expert validated. Validated feedback questionnaires were administered to the students and faculties and feedback was collected.

After data entry, SPSS software was used for analysis of the quantitative data. Likert scale analysis was done. Paired “T” test was done for comparison of OSCE scores.

## RESULTS

**Table 1: Perception of Phase I MBBS students about E-learning and performance integrated with feedback session**

Quest ions	Statement	Strongly Agree – (%)	Agree - (%)	Neither agree nor disagree- (%)	Disagree - (%)	Strongly Disagree - (%)	Total
1.	My interest in performing clinical skills has improved following learning through OSCE video modules followed by feedback sessions on performance	72	23	5	0	0	250
2.	I have more clarity on my strengths and limitations of learning clinical skills using OSCE video modules followed by feedback sessions on performance.	82	13	5	0	0	250
3.	I am convinced with 1:1 feedback given by the faculties on my clinical skill performance	86	9	4	0	0	250
4.	In my opinion Feedback sessions for clinical skills should be regularly included in OSCE stations of Physiology labs.	75	23	2	0	0	250
5.	The learning gaps that I have to address is more clear to me after performance, based on OSCE video sessions followed by feedback	74	23	3	0	0	250
6.	The Learning Objectives were clearly mentioned and followed in OSCE video sessions	85	5	5	5	0	250
7.	I am confident of performing clinical system examination after the OSCE sessions followed by feedback.	84	14	2	0	0	250

OVER ALL RATING: \_\_\_\_\_(Based on 5 point Likert scale where 1= very poor, 2= poor, 3=Average, 4=good and 5=excellent)

**Table 2: Likert scale Analysis (Student Feedback Questionnaire)**

Questions	T value	Total students	p-value	Significance
Q1	t = 1.3112	n = 250	p-value = 0.1693	Less significant
Q2	t = 2.2633	n = 250	p-value = 0.0235	Significant
Q3	t = 2.1662	n = 250	p-value = 0.03271	Significant
Q4	t = 4.7502	n = 250	p-value = 1.35e-05	Not Significant
Q5	t = 3.8569	n =250	p-value = 0.0001466	Not Significant
Q6	t = -0.9864	n = 250	p-value = 0.2626	Not Significant
Q7	t = 3.5673,	n = 250	p-value = 0.0006428	Significant

86% of the students felt convinced with the structured points of the feedback given by the faculties (p-value = 0.03271, significant, Table-1, 2).

74% of the students also agreed that the learning gaps that have to be addressed is more clearer to them after learning from OSCE video sessions and performance followed by feedback.

Majority of the students have also expressed that feedback sessions for clinical skills should be regularly included in OSCE stations of Physiology labs. (Table-1).

**Table 3: Student's OSCE Scores Before and After E-learning integrated with clinical performance and feedback session**

OSCE Scores Before Feedback (Mean ± S.D)	OSCE Scores After Feedback (Mean ± S.D)	p-value
25.14341683 ± 3.0441	45.38614 ± 2.9801	P ≤0.05, 0.02314 significant

There was significant increase in the OSCE sores of Phase I MBBS students after demonstration of clinical skills learnt using OSCE based E-learning videos followed by 1:1 structured feedback.

**Table 4: Perception of the faculties about the feedback session**

S. No	Questions	Strongly Disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly Agree %
1.	My confidence to give structured feedback to students has increased after using OSCE based E-learning videos and formative assessment feedback sessions	0	0	0	52	48
2.	I am confident that student's learning gaps can be bridged well with OSCE based E- learning videos and formative assessment feedback sessions	0	0	0	47	53
3.	OSCE based E-learning videos and formative assessment feedback sessions can be included as effective teaching tool by other Clinical departments.	0	0	0	60	40
4.	OSCE based E-learning videos and formative assessment with feedback sessions can improve my clinical examination teaching skills.	0	0	0	58	42
5.	It is easier to achieve the learning objectives of OSCE based E-learning videos and formative assessment with feedback sessions.	0	0	0	45	55

**Table 5: Likert scale Analysis (Faculty Feedback Questionnaire)**

S. No	Questions	T value	p-value	Significance
1.	My confidence to give structured feedback to students has increased after teaching with OSCE based E-learning videos and formative assessment feedback sessions	t = 2.5658	p-value = 0.03224	Significant
2.	I am confident that learning gaps can be bridged well with OSCE based E-learning videos and formative assessment feedback sessions	t = 2.0583	p-value = 0.0687	Less significant
3.	OSCE based E-learning videos and formative assessment feedback sessions can be included as effective teaching tool by other Clinical departments.	t = 2.0585	p-value = 0.0687	Less significant
4.	OSCE based E-learning videos and formative assessment with feedback sessions can improve my clinical examination teaching skills.	t = -2	p-value = 0.3615	Not significant
5.	It is easier to achieve the learning objectives of OSCE based E-learning videos and formative assessment with feedback sessions.	t = 2.5658	p-value = 0.03224	Significant

## DISCUSSION

As per Competency Based Medical Education Undergraduate curriculum, clinical examination teaching sessions begins in the inception of first year of MBBS curriculum in Physiology department. During this phase, Medical students are very naïve about human system examination [1]. Therefore it becomes immense responsibility and challenge to the Physiology faculties to effectively handle these sessions.

To address such limitations, E-Learning is gaining importance in medical education and is becoming an integral part of Medical education [3]. It has also been found that population of learners are not responding to E-learning as expected [8].

Therefore to assess the application of E-learning, the purpose of our study was to evaluate the effectiveness of OSCE based E-learning videos for teaching-learning of Clinical skills integrated with feedback after Clinical skill performance.

The students' perception of importance and effectiveness of E-learning OSCE sessions and feedback were evaluated using feedback questionnaires, and comparison of OSCE scores. The faculties' perception about the applicability and relevance of the E-learning OSCE video modules were also evaluated using feedback questionnaires.

In the present study 82% of the students have agreed that they have more clarity on their strengths and limitations of learning clinical skills using OSCE video sessions followed by

Feedback (p-value = 0.0235, significant, Table-1, 2). 84% of the students felt that they are confident of performing clinical system examination after the OSCE video sessions and performance followed by feedback. Majority of the students also agreed that their interest in these topics has improved and their knowledge gaps in performing clinical system examination have been bridged well.

There was significant improvement in the OSCE scores of phase I MBBS students after learning clinical skills using OSCE video modules followed by performance and feedback (Table-3,  $p \leq 0.05$ ). Previous studies on Video instruction, as a form of E-learning and teaching have shown varied and conflicting results.

Study by Weeks and Horan, 2013 et al. found that clinical videos have been positively received by students and also positively impacted their performance [9].

Karoglu et al., 2014 has found that clinical videos promote flexible and equitable learning opportunities with minimal increase in staff workload [10].

Previous research by Barratt et al., Chan et al. have found that Video instruction, as a form of E-learning, can transgress the traditional boundaries of the classroom and can effectively involve students in learning [11, 12]

On the contrary, Kelly et al., 2009 has concluded that videos can be used to provide exemplars which encourage active learning and promote development of student's reflection on understanding of clinical skills. Though in study of blended learning activities, clinical videos were positively received by the students, it was found not to affect the desired student outcomes. Video instruction, as a form of e-learning, were found to be valuable adjunct and not a substitute to live clinical demonstrations [13].

Kim et al. also found that clinical videos only demonstrate the procedures of patient encounters but are insufficient to provide information on the knowledge and skills underlying them [14]. Previous studies have shown that although e-learning is an effective and successful method for enhancing clinical performance, it is incomplete without practice in regular clinical and lab sessions. For effectiveness of such sessions, receiving feedback on his or her clinical performance should be an integral part of the sessions [15].

Our present study has addressed the limitations of previous studies and has incorporated the feedback component for effective E learning.

E learning for learning and practice of clinical skills followed by feedback has been overlooked among Medical students during the inception of MBBS Clinical curriculum.

In initial formative skill assessment session followed by 1:1 structured feedback, the faculty members could capitulate the salient points with students for the student's better understanding and the application of background knowledge as demonstrated by the videos. The feedback sessions also provided information on the skills and knowledge underlying them. Both students and faculties viewed OSCE Video Modules integrated with feedback as an effective method for teaching clinical skills in Physiology labs. It is therefore concluded that OSCE Video Modules, as a form of E-learning, followed by clinical examination sessions integrated with formative feedback can be an effective teaching-learning method for both the students and the faculties.

**Limitations:** All systemic examination topics could not be included in the OSCE video module study. Follow up of long term performance in Summative Assessment could not be done.

**Conflict of Interest:** None

**Acknowledgement:** We thank the technicians and all staff of Physiology department of School of Medical Sciences and Research, Sharda University.



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