

ORIGINAL ARTICLE

Come to the dark side- Make your own OSPEs: A pilot study

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ABSTRACT

Background: Physiology for BDS is a tediously long course crammed into one year, students going through this cognitive overlook tend to overlook the clinical aspects and underperform in OSPEs, as they are exerting efforts in learning the core content.

Aim: To develop a learning technique to promote deeper learning of the practical and critical aspects of Physiology and perform better in the OSPE.

Methods: A longitudinal study was conducted with the newly enrolled BDS class of 2018 (n=50), after debriefing and a preliminary OSPE, they were debriefed about the technique of the ROSPE (reverse OSPE) in which they were to make their own questions with answers already provided at the stations. Feedback was provided and reflections of students were recorded and analyzed thematically. After every ROSPE, the test scores of the subsequent OSPEs were compared with the class of the previous year.

Results: Test scores of students who had undergone the ROSPE interventions were remarkably higher as compared to those of the previous batch (p=0.0050, 0.001, 0.001) and results in professional examination were also better. Thematic analysis showed the ROSPE to be a confidence building activity that promoted deeper learning and teamwork.

Conclusion: The ROSPE is a successful intervention to improve practical and clinical skills for the OSPE exam.

Key words: Peer assisted learning, OSPE, practical skills, cognitive load, physiology.

Introduction: The OSCE (Objective Structured Clinical Examination) also known as OSPE (Objective Structured Physical Examination) in pre-clinical years, has been used as one of the most efficient ways to assess clinical skills in medical students (The “shows how” level of the Miller’s pyramid) (Harden, 2015).

OSPE demonstrates practical competencies of the student along with knowledge of the subject matter (Yeates & Sebok-Syer, 2017). They have formally been inculcated as a part of Professional Examinations for undergraduate medical students and all universities follow this pattern.

At University Medical and Dental College, we follow the examination system and syllabi content given by the University of Health Sciences. The prescribed syllabus for BDS Physiology is particularly lengthy and tedious to cover over the time span of a year.

As a result of this increased cognitive load, students tend to end up overlooking the clinical and practical applications of Physiology and focus more on covering the “core content” (Shaifali et al., 2016). This decreases the effectiveness of assessment of practical

modalities such as the OSPE, as well as hampers deep learning.

The purpose of this study was to address this matter and to promote deeper learning of the practical subject matter while fostering more effective teamwork in students. For this we attempted to pilot a new intervention “R-OSPE” – which means to reverse the OSPE technique in which learners take the role of teachers and make their own OSPE stations.

R-OSPE was devised after much deliberation on how to make learning more conducive to assessment of practical skills. We came to the conclusion that an amalgamation of Peer Assisted Learning with a reversal of the traditional OSPE technique, along with on-the-spot feedback would suite our needs the best. This was based on the question formulation technique, in which answer to a problem is given and working is done backwards to formulate the question. This follows the constructivist paradigm.

Other things kept in mind were to introduce learners to the other side of the process- forming effective assessments. It has been reported in many studies that high stakes OSPEs are a source of anxiety and stress for students, so it was hypothesized that if we gave students independence to make their own OSPEs, this fear would also fade.

Another important factor was the importance of peer assisted learning, especially in a syllabus so lengthy and tedious. Peer assisted learning has been proven to be an efficient way of encouraging students to learn via facilitating each other, it encourages critical thinking and a mindset towards lifelong learning (Furmedge et al., 2014; Menezes et al., 2016). This was also inculcated by making groups of students to perform the ROSPE process so that they would help each other out and

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become more adept at attempting OSPEs and other practical examinations.

Methodology: After ethical consent from the Institutional Review Board, this interventional longitudinal study was carried out from December 2017 to January 2019. A purposive sample of 1st year BDS students (n=50) was taken at the start of the academic year, progress of these students was followed throughout the year and compared with that of the previous year. After obtaining consent from all the students to participate in this intervention, attendances at each ROSPE were made mandatory.

OSPE introduction: as the students had just started BDS, 2 OSPEs were conducted at the start of the program to orient students with the proper format and method of OSPE taking.

Debriefing: 3 workshops were conducting explaining to the students what the ROSPE is, the significance of the Miller’s pyramid and how to use Blooms taxonomy to make objectives, they were also provided with rubrics sheets to understand development of answer keys. Students were divided into 10 teams of 5 students each.



Figure 1. The three steps making the ROSPE procedure.

Main concept: the ROSPE is based on three steps, (figure 1) working in a reverse fashion to the OSPE

Step 1: formulate your questions by the answers provided.

Step 2: formulate an OSPE rubric as to how to attempt YOUR question

Step 3: State the objectives of the question you formed.

ROSPE design: “ROSPE” or the “reverse OPSE” was designed of 6 stations, each station addressing a core area tested in OSPE but in reverse, after every 2 stations there was a “feedback center” where an instructor provided necessary feedback on activity of the previous two stations. The time per station was 10 minutes and a group of 5 students rotated at each station. Stations were formulated by the help of content experts and a member from the department of Medical Education, to use only the areas of utmost importance from subject matter to be tested for the sake of brevity (As illustrated in figure 2).

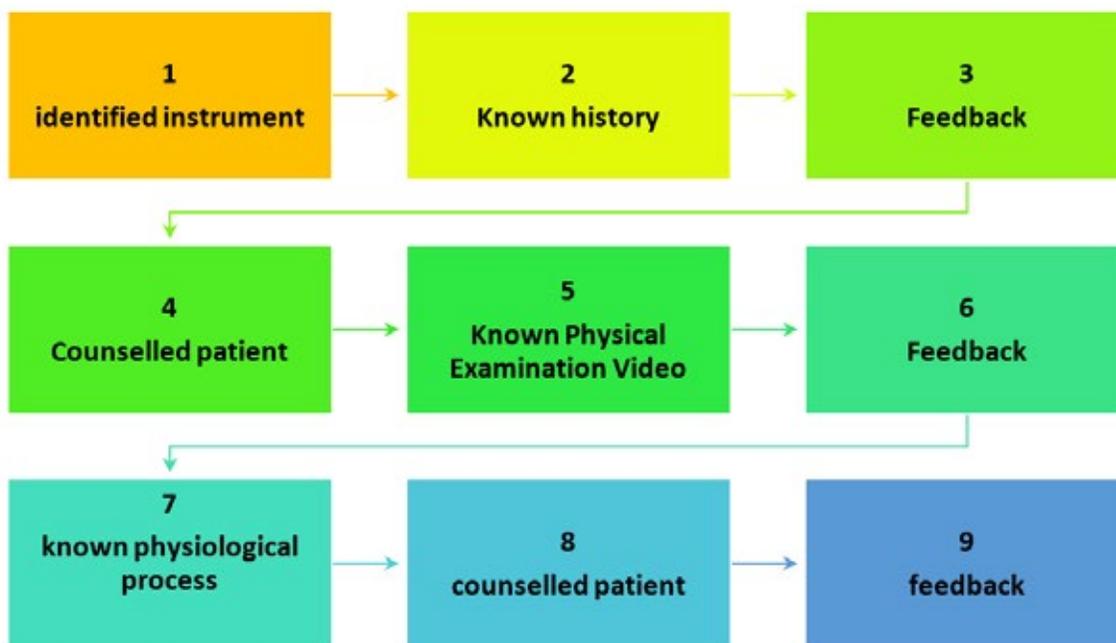


Figure 2. Organization of ROSPE Stations

- 1. Identified instruments:** labelled instruments were placed on this station, students were supposed to formulate questions in relevance to them i.e., their uses, clinical conditions in which they are used etc., instead of the conventional OSPE design in which the objective is to identify the instrument.
- 2. Known History:** at the history taking station, a known history of the patient was presented by the simulated patient, the students were requiring to fit the pieces together to see which disease or pathophysiological condition was this history relating to and then make a question accordingly.
- 3. Known disease:** a disease condition such as “iron deficiency anemia” was presented to the students, along with slides/lab tests, they were required to formulate questions related to the disease along with the answer key and objectives.
- 4. Counselling patient:** a standardized patient who was already counselled regarding a certain disease condition sat at this station, he informed students regarding the things he had been counselled about and they were supposed to identify the disease and frame questions, answers and learning objectives accordingly.
- 5. Known physical examination video:** a video of the steps of a physical exam e.g. blood pressure measurement was shown to the students, they were asked to formulate questions accordingly.
- 6. Known Physiological process:** a known physiological process for example “the clotting cascade” was displayed and properly labeled so students knew what this was. They were asked to study the process and formulate questions

accordingly.

A total of 5 ROSPES were held on the following units, followed by an OSPE examination of the same unit. Units concerned were:

1. Cell, Nerve and Muscle Physiology
2. Blood and Cardiovascular System
3. Neurophysiology
4. Endocrinology and Renal Physiology
5. Gastrointestinal Physiology

Reflections: at the end of the exercise, students were asked to individually reflect upon the activity they had performed in written form.

Routine OSPE: after each ROSPE, routine OSPE examination of that particular topic was also conducted. The results of all the OSPEs conducted after ROSPES were compared with results of OSPEs of the same topics of previous batch (class of 2017) which did not go through the ROSPE process. This was done by Wilcoxon Sign Rank Test in SPSS version 22. P value was held significant if less than or equal to 0.05.

Means of the scores of final professional OSPE of last batch was compared with means of scores of the professional examination OSPE of this batch by descriptive statistics.

The reflections were collected, coded and analyzed for thematic analysis by NVivo 12.

Results: The results of the OSPEs conducted after each ROSPE were compared with the results of the OSPEs of the same subjects from previous year (Fig. 3).

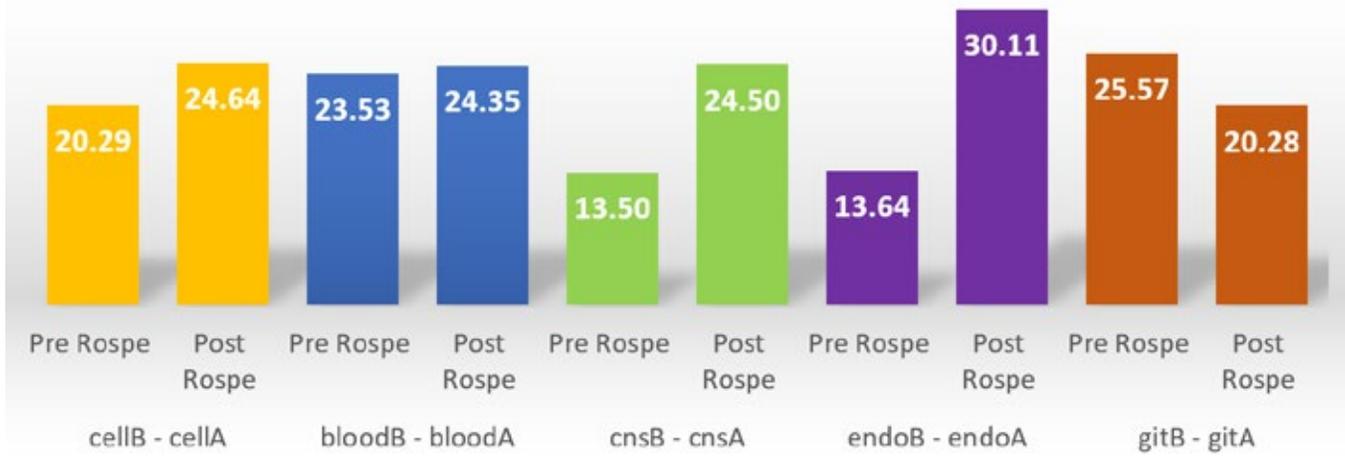


Figure 3. Comparison of mean test scores of OSPES, pre (batch of 2017) and post ROPSE (batch of 2018)

As evident from figure 3 the means of most tests were higher in Post intervention OSPEs except for Gastrointestinal Physiology. Data from figure 3 was tested for normality by Shapiro -Wilks

test, the distribution was not shown to be normal hence to compare the scores a non-parametric test, Wilcoxon’s Sign Rank Test was employed, results are shown in table 1.

Table 1.

Significance of pre and post ROSPE, OSPE test scores in class of 2017 and class of 2018.

	Cell	Blood	CNS	Endocrinology	GIT
Pre ROSPE (Class of 2017)					
p-value	0.051	0.322	0.001	0.001	0.164
Post ROSPE (Class of 2018)					

* p-value is computed by Wilcoxon Sign Rank Test

As evident in the table, the p-values were highly significant for 3(out of 5) topics in OSPE examinations held after a ROSPE of that topic was already conducted, hence showing the ROSPE to be a fairly successful intervention.

The mean scores of 1st Professional examination of BDS class of 2017 (pre-ROSPE) and class of 2018 (post-ROSPE) were also compared (Figure 4).

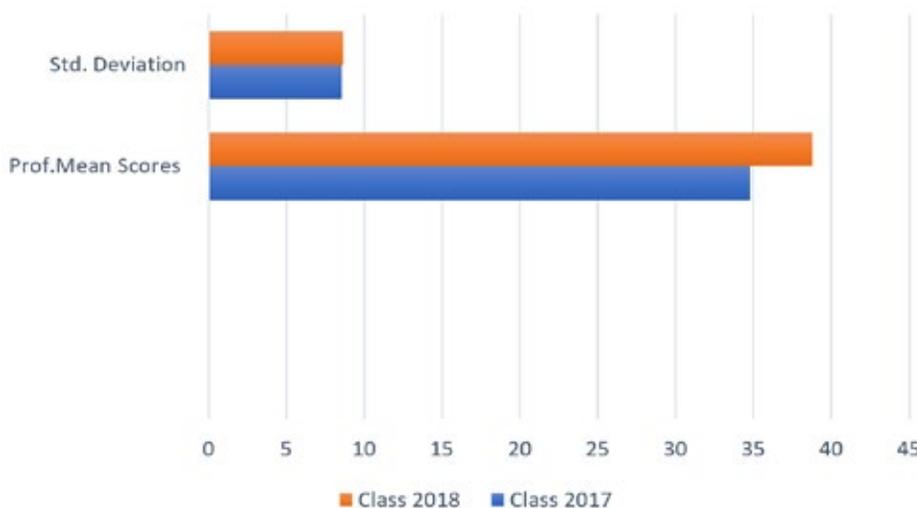


Figure 4. Comparison of BDS 1st professional OSPE mean scores of classes of 2017 (Pre ROSPE) and 2018 (Post ROSPE)

Thematic analysis of all reflections after the total 5 ROPSEs was conducted. The major recurring themes coming up were as described in table 2.

Table 2. Themes Emerging from Student Reflections

Themes emerging from the reflections on the ROSPE	
1.	Confidence building activity
2.	Very useful feedback
3.	Better teamwork
4.	Too lengthy procedure
5.	Grasping/concepts better in less time as compared to conventional method

Mostly positive themes emerged with regards to the process (table 2) however few students found it to be “tedious”, “time consuming” and “hard to come up with”.

Discussion: It is commonly said that “assessment drives learning” (Chahine et al., 2016), however assessment needs to be made propitious enough that learning is actually “driven” into the hearts of the learner, converting it into “life-long learning”. The ROSPE served this purpose well as it inculcated aspects from Peer Assisted Learning (PAL), cognitive load theory and activity based learning.

PAL has been shown to have multiple benefits, it increases individualized learning as peers focus on their own learning while helping others, it also promotes critical thinking and deeper cognitive skills (Young et al., 2014).

Many studies report OSCEs designed with Peer Assisted Learning and mostly results were also favorable (Furmedge et al., 2014; Yusuf et al., 2017). This echoed in our work too as students especially enjoyed the peer-interaction and scores improved considerably after doing so.

Mostly OSPEs have been modified to include formative styles, peer assisted learning or students as patients (Sagdeo et al., 2017; Shaifali et al., 2016), but ours is the first intervention to report a reversal in the OSPE methodology. Being a pilot study, this by no means shows a complete picture of what the ROSPE might have potential of. Also, this being a formative exercise serves as a learning tool, a facilitator rather than a replacement to the OSPE.

Our results show a promising positive trend with improvement in OSPE results, however in gastrointestinal physiology the result came out to be worse than before, this warrants investigation as to maybe the choice of topics for the stations were incorrect or some other constraints were there.

Thematic analysis showed that the ROSPE was a confidence building exercise, interestingly this theme has emerged in most OSPE modifying interventions leading to the question that what can be done to make your regular OSPE less stressful?

Feedback proved to be a very useful tool in this activity, other OSPE studies also show the benefit of effective feedback (Barrett et al., 2015; Shaifali et al., 2016) our study becomes more efficacious as we had immediate feedback at 3 different spots in the ROPSE cycle and also made our students reflect at the end of each ROPSE. This aided us in solidifying the relationship between facilitator and student.

Reflection is one of the core components of medical education. To transition students from superficial to lifelong learners, we must teach them how to reflect properly, so that they transform experiences into genuine learning (Fernsten & Fernsten, 2005). Most studies inculcating reflection into the OSCEs reported higher scores, more learner positivity and greater satisfaction. All these things were present in our work also.

The only intervention that didn't compare much too previous literature was our novel concept of reversing the method of learning via a ROSPE, this seems successful and promising in this pilot, but further studies need to be conducted to streamline the process.

Conclusion: The ROSPE as a method of learning and teaching had game-changing impact on student's views as well their scores in the OSPE examinations conducted throughout the year and also in the final professional this seems a promising concept however much needs to be refined and streamlined to make it a proper study strategy.

Limitations: Bearing this was a pilot study following the progress of one class with a limited sample size, it needs to be further expanded for conclusive results and also tested in various disciplines and subjects.

Secondly, the main limitation we faced was time. Every ROPSE took 60 minutes and 10 minutes were provided per station. Students felt this time was short for developing questions, answers and objectives, however after the first ROSPE they were able to manage pretty well. This needs improvement, maybe we need to modify timetables in such a way as to include assigned timings for this activity which could be longer.

Way forward: The ROSPE proved to be a successful intervention in improving learning of practical skills for OSCE examinations. Being a pilot study, this needs to be investigated and further refined to include other aspects such as communication skills, empathy and resilience, to become a more holistic method of learning practical skills.

Declaration Of Interest:

The authors report no declaration of interest.

Notes On Contributors:

- Komal Atta-Conception, Collection of data and analysis, Manuscript writing

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