



Traditional versus Structural Viva Voce, a Better Tool of Oral Assessment in Biochemistry: An Educational Interventional Study

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Abstract

Background & Aims: An oral examination is an essential tool of assessment of depth of knowledge and the communication skill of medical students. There are many shortcomings like examiner bias, improper time distribution, gender bias, and many more. Therefore, in the present study we structured oral examination as an assessment tool for Phase -I Bachelor of Medicine, Bachelor of Surgery (MBBS) students in Biochemistry, along with the examiner's feedback to abate biases.

Materials & Methods: Structural viva voce (SVV) was implemented during 2nd formative assessment, in the Department of Biochemistry. 150 participants (146 students & 4 faculties/ examiners) were contributed. Participants were sensitized and trained about SVV. All the participants were simultaneously assessed with traditional and structured oral examination without intermixing. Feedback form (based on 4-point Likert scale) via a Google form was collected for both types of the viva, from the participants. Apposite statistical analysis was done.

Results: Analysis of the study depicted the optimistic response of the participant towards the SVV. Statistically significant differences ($p < 0.00001$) were observed in the marks obtained, stress, time allotment, etc. Examiners also acknowledged that SVV was a better way of taking the oral examination as it reduced the bias and brings uniformity of questions.

Conclusion: Although before implementing any new tool in assessment, it is necessary to develop the infrastructure accordingly, sensitization and training of the participants and preparation of the module prior to the examination, but the results of the current study indicated that SVV should be tried in other subjects of medical education and with the majority of medical colleges of other states.

Keywords: Oral examination, Structured viva voce, Traditional viva voce, Students, Examiners

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Introduction

Assessment is an important part of the teaching-learning process. It enhances the quality and facilitates learning among the medical undergraduates and helps to meet the demands of the society (1). In addition, it

monitors the teacher, student's efforts in learning and imparting knowledge, and helps in progressive learning (2). There are various kinds and combinations of assessment techniques used in medical education evaluation based on the requirements such as written

examinations, short answer questions/short essay questions, bedside clinical examinations, mini-clinical examinations (Mini-Cex), objective structural clinical/practical examination (OSCE/ OSPE), multi-source (360 degrees) assessment, self-assessment, peer assessment, tutor reports, students' portfolios, short case assessment, long case assessment, students' logbook, trainer's report, student's audit, simulated patient surgeries, video assessment, Central Superior Service (CSS), standardized patients, skill-based assessment and viva-voce/oral (VV) examinations (3). Assessment and learning are connected by the ways of assessment; they could reorient and connect students with the subject more deeply. There is plenty of research and implementation that has been done in assessment methods, from traditional assessment to the objective structured theory examinations (OSTEs), from simple discussion to the case-based learning, problem-based learning, and evidence-based learning, and from traditional practical examination to the OSCEs/OSPEs (4). This transformation has been done to make assessment more learner-centric and enhance their performance and active participation in their learning.

Presently, the assessment pattern which is being adopted by the institute is as per the NMC norms. The 3 formatives and one summative assessment to be followed by 4 practical examinations. The 4 sets of evaluations facilitate the assessment of the higher level of the learner's cognitive domain; however, the practical examination is designed to assess the psychomotor domain of the students. The viva voce is especially intended to examine the student's attitude, skill, and communication, which is difficult to be evaluated via theory examinations (5). On the other hand, the focus of the oral examination remains the theory course itself. Therefore, the primary objective that is problem-solving and higher-order learning domains assessment has not been properly justified. Additionally, there are some flaws in traditional viva voce. Among them are subjectivity, variation due to the variability of examiners, and the preference of their subject contents. This variations bring biases in the

assessments. To eliminate such biases, the concepts of objective structured viva examination (OSVE) that was introduced by Harden RM et al. in the year 1975 for assessment in clinical subjects can be used as a reliable instrument in assessment (6). OSVE allows covering the entire syllabus, keeping in mind the difficulty levels, and maintaining uniformity among all the examiners, which may not be possible in traditional viva voce. The study was aimed to moderately assess the traditional viva voce concerning structured viva voce in phase I, MBBS students.

Materials & Methods

This study was conducted during the second sessional examination/formative assessment of MBBS Phase-I students between 23 September 2021 to 29 September 2021, in the Department of Biochemistry, L. N. Medical College & RC, Bhopal. A total of 146 out of 150 students participated in the study.

The viva-voce/ oral examination for 146 students was conducted by the same examiners for 3 days to eliminate the teacher-teacher bias.

The 146 students were divided into 3 batches. Each batch were further divided into 4 groups namely Group A (n=12), B (n=12), C (n=12) and D (n=12). The students were distributed among four groups based on the lottery system, where the students and examiners both were unaware of the group name written inside the lottery picked by the students. All the four groups (A, B, C, and D) with the same set of topics, were assessed by both structured and traditional viva voce methods. Group A and B were evaluated by structured whereas groups C and D by traditional viva voce. Subsequently, a cross-over was done, and the participants of groups A and B were further assessed by traditional viva voce and, groups C and D gave structured viva voce. The 4 faculties of Biochemistry played the role of examiners for all four groups. An evaluation of the scoring and variation in scoring was done. The perception was recorded from both the faculties and students via a Google form, on the same day. The examiner-I, assessed group A and in crossover Group C, via structured viva voce, whereas

the examiner-II had taken the structured viva voce on Group B and in crossover took structured viva voce on Group D. The examiner-III used traditional viva voce as a tool for evaluation of Group C and in crossover Group A, and the examiner-IV took traditional viva voce on Group D and in crossover took traditional viva voce on Group B. Feedback was collected from both the students and the faculties based on 5-point Likert scale questionnaires (i.e., strongly agree, agree, neutral, disagree and strongly disagree).

For the Structured viva voce, 20 same-colored cards were made each containing 20 equitable queries. The participants were asked to sit in front of the examiner/faculty and select one card out of the shambled lot. In the lot, each card was kept facing downward. It was a double-blinded process where neither the examiner nor the students were aware of the card/set of questions. On the contrary, the traditional/unstructured viva voce was planned where each question was divided into the two-part initial query and leading questions. The topics (organ function test, metabolism, nutrition, enzymes, genetics/molecular biology) were the same as mentioned in the structured viva voce. A total of 40 marks had been assigned for oral examination (40 marks for structured viva voce and 20 marks for traditional viva voce marks).

The designing of the structural viva voce begins by splitting the essay type descriptive into small single questions (SSQ) where marks have been allotted to each SSQ, depending on the weightage questions contains. We split the essay-type questions into one-line answer questions/very small questions, and they were assigned a separate mark (e.g. $1 \times 20 = 20$ marks). Each card contained 5 separate sets of four questions ($4 \times 5 = 20$ questions) therefore trying to cover 5 core topics of Biochemistry (organ function test, metabolism, nutrition, enzymes, genetics/ molecular biology). The four questions of each set were further split into two parts ($0.5 \times 2 = 1$ marks), where the second part had the leading question of the first part. The questions were arranged with the increased level of the cognitive domain, according to Bloom's taxonomy. A

separate checklist sheet of all students was prepared and kept veiled from the other students. Only those boxes were ticked against the correct answers of the students. At the end of the examination, the final calculation was made to remove further prospects of biases.

The set of the questions and its arrangement was validated by the all faculty members of the Department of Biochemistry and subject experts. An average of 7-9 minutes was given to each student-teacher communication.

The sum of marks had been done by adding the marks of structural viva voce and traditional viva voce and divided by 4 as final grand viva voce marks out of 10.

The approval for this study was obtained from L.N. Medical College Institutional Ethical Committee (IEC), Bhopal, Madhya Pradesh, and consent was provided by the students.

Results

145 out of 150 students of the MBBS Phase-I participated in the study. Out of 146 students, 137 (95%), believe that the Structured Viva-voce will lead to a constructive change in their execution in an oral examination. 98% of students believe that the structured viva voce improved their communication skills. In the present study, 79% of students strongly acknowledged that structured viva voce is uniform, in a similar findings pattern that was noted by Shenwal et al. (53%) (7). 83% of students believe that Structured Viva voce was comprehensive and therefore covers all topics presented by Shah H.K. et al. (where 84% of students were agreed) (8). They also proposed that prior sensitization, as it had been done in this study, also helps to make it a more hassle-free environment, which improvises their performance. The same has been reflected in their outcome as well. In the structured viva voce, the performance of the students was remarkably better as compared to traditional viva voce. The students have scored higher marks in structured viva voce compared to traditional oral examinations. On the perception collected from

students, 92% of students agreed that structural viva voce is more scoring compared to traditional viva voce.

Approximately 93% of students proposed that structured viva voce reduced their oral examination-related anxiety. In addition to this, approximately 98% of students considered that structured viva voce is a bias-free method of an oral examination, compared to traditional viva voce.

Many of the examiners believe that structured viva voce had given the prospect to cover many of the core topics of Biochemistry in the oral examination which generally enduring in traditional viva voce, and had

allowed justifying the marking based on the weightage of the topics. The examiners also accepted that due to prior sensitization about the structural viva voce, the students were well organized and their performance was better in their structural viva voce as compared to traditional viva voce. The examiners also accepted that those students who were not prepared were unable to accomplish well in their oral examinations, and majority of the examiners believed that the structural viva voce was a time-saving technique that allowed fast and unbiased marking (Table 1,2,3).

Table 1. Comparison of marks obtained in the structured viva voce and traditional viva voce

Oral examination	No. of students	Mean of marks obtained out of 20	Standard deviation	t value	pValue
Structured viva voce	146	13.0411	1.830307	8.2372	<0.00001
Traditional viva voce	146	11.03425	2.305658		

Table 2. The perception of students towards structural viva voce in Biochemistry and their approximate frequencies

S.No.	Student's perception	Frequency in percentage			
		strongly agreed	agreed	neutral	disagreed
1.	Experienced stress during traditional viva voce.	78%	18%	2%	2%
2.	Experienced stress during Structured viva voce.	26%	2%	2%	70%
3.	Traditional viva voce was comprehensive & covers all topics	4%	8%	4%	82%
4.	Structural viva voce was comprehensive & covers all topics	83%	3%	2%	12%
5.	Structural viva voce is a convenient method compared to traditional viva voce.	48%	5%	22%	25%
6.	The structural viva voce pattern of examination was uniform.	79%	3%	5%	21%
7.	Examiner mainly focused on one topic of his/her interest during traditional viva voce.	64%	18%	8%	10%
8.	Examiner mainly focused on one topic of his/her interest during structural viva voce.	---	4%	18%	78%
9.	Structural viva voce allows one-to-one interaction.	87%	7%	2%	4%
10.	Structural viva voce reduces the examiner bias and variability compared to traditional	92%	6%	---	2%

viva voce.					
11.	Structural viva voce is a beneficial tool for scoring marks in an oral examination.	93%	5%	----	2%
12.	Overall satisfaction in traditional viva voce.	22%	12%	3%	63%
13.	Overall satisfaction in structural viva voce.	92%	6%	25%	---
14.	Structural viva voce is a satisfactory and helpful initiative.	90%	5%	1%	4%
15.	Recommend structural viva voce as an oral assessment tool in Biochemistry.	48%	8%	12%	29%

Table 3. The perception of faculties towards structural viva voce in Biochemistry and their approximate frequencies

S.No.	Examiners' perception	Frequency in percentage			
		strongly agreed	agreed	neutral	disagreed
16.	Consider the structural viva voce is convenient method compared to traditional viva voce	50%	25%	---	25%
17.	Consider structural viva voce is flexible and time-saving.	50%	50%	---	---
18.	Structural viva voce has allowed covering most of the content from the syllabus knowledge for Biochemistry	75%	25%	---	---
19.	Structural viva voce has allowed assessing the higher level of the cognitive domain (knowledge) for Biochemistry	75%	25%	---	---
20.	Missing opportunity to ask sudden questions.	25%	25%	25%	25%

Discussion

Medical education is a penance to earn mastery in multiple competencies. The student who aspires to be a physician/consultant must do this penance and achieve the mastery of multiple competencies. Each competency has been initiated step by step in such a way that every discipline of the medical education system is completely involved. A corresponding teaching-learning method as well as assessment tools are required for evaluating each educational objective of the competencies. In Indian medical institutions, the competencies have been evaluated via the written and oral examinations of the students. The written examinations are designed to especially evaluate the higher-order cognitive domain and at another hand, the oral examinations are dedicated to assess attitude and

communication skills. However, oral examinations have their limitations in the form of lesser reliability. The students those having less anxiety or those who are good orators manage to score well in their oral examinations, raising questions about its variability. Therefore, this study was aimed to assess the reliability of structured viva voce as a better assessment tool of oral examinations.

The results show that the students have secured better marks in the structural viva voce as compared to traditional viva voce, which confirms that the structural viva voce has more reliability and facilitates the students to score better marks in a hassle-free environment. Many students' and examiners' perceptions gave humongous support for using the structural viva voce as a tool of the oral examination.

The implementation of structured patterns in the traditional examination would be able to have a reliable, unbiased assessment of student's competence, rather than an accidental better performance (9). Implementation of structural viva voce in the formative assessment will help to orient the students and in their preparation for the final oral examination to achieve better results. The findings of this study are supported by another study that described that reliability and validity of the test could be amplified by providing organizing training of the students and examiners and using structured oral examinations (10). The study also highlighted that the students were completely satisfied by the structured viva voce compared to traditional viva voce. The examiners depicted that the process of structural viva voce was more feasible and time-saving, and reduced biases and minimized the luck factor.

As mentioned earlier, the medical curriculum is vast so one type of examination may not be sufficient to evaluate the level of expertise a student achieved and therefore, the other forums such as structured viva voce should correlate with written exercises.

It has been proposed that each domain of learning is important but is indispensable/obligatory to the other domains. Combining the structured pattern with the traditional examination help to do so. Therefore, in the present study, percentage variance has used an intergroup as well as intragroup data comparison for cognitive, and psychomotor domains of learning

Limitation:

This study was unable to counter the faculty's issues. One of them is that it is a troublesome and time-consuming process of assessment. Designing a structured viva voce/module is an intense process and required the support of the staff. The implementation of SVV needs training of the examiners and examinees for enhancing their communication skills decreasing stress during examinations, overall better performance. Another research question leading attention is whether the performance in the oral examinations will be improved with the level of training.

Future Recommendations:

Further research is required to justify and support the technique by using more candidates. Validity and reliability of assessment need larger group studies. The viva voce examination is more apt for in-depth questioning to discriminate among higher-achieving students by assessing advanced cognitive skills.

Conclusion

As compared to the traditional viva voce, the structured viva voce is a better assessment tool for oral examination in the subject of Biochemistry. It has been observed that students were less hassled and more confident and organized about their oral examination which has improved their performance and communication skills as well. We also believe that this process brings more subjectivity and eliminates biases and variabilities of the examiners. On the other hand, faculties faced difficulties in preparing the module for structured viva voce but they also agree that the performance of the students had been improved in structured viva voce compared to the traditional viva voce.

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Conflict of interest

The authors have no conflict of interest in this study.

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