

A Comparative Study on Students' Performance Using Two Teaching Methodologies in Practical Classes

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Abstract

The practical demonstration classes are becoming more challenging for the faculty to captivate the attention of all the students. To engage the students in the post lunch session of Physiology practical was felt necessary and also to increase the students attention span and improve their concentration in the post lunch session of Physiology practical classes. The need to sensitize the students to listen to these didactic lectures in the form of introducing Problem based case scenarios (PBL) was felt important. The students were divided into two groups, namely control (traditional teaching) and interactive (PBL) groups. The examinations of cranial nerves were divided into two sessions (Cranial nerve 1-6 and 7-12) as PBL I and PBL II and there was crossing over of groups for the second session in order to avoid selection bias and also that both the groups are exposed to PBL. After each session evaluation was done by OSPE. Feedback was obtained to know about student's perception. Difference in mean score were analysed by paired t test and compared within two groups. The interactive group performed better in the OSPE in the PBL I and PBL II sessions with the mean of 28.8 (SD = 8.4, N=50) and 34.6 (SD = 4.6, N=48) respectively. The two-tailed P value was also significant (.019932) and (<.00001) in both groups respectively. The student feedback on analysis revealed that above 80% of students preferred PBL and motivated towards self-directed learning. Above 90% found it to be interesting.

Keywords: Practical classes, PBL, Cranial Nerves.

Introduction

Teaching and learning are two sides of a coin and both goes in hand⁽¹⁾. The traditional way of teaching in medical education has got less relevance towards practical as well as clinical based medicine⁽²⁾. The physiology practical classes are routinely scheduled in the afternoon where the teacher finds difficulty in captivating the attention of students in post lunch sessions. The demonstration is the usually adopted method in physiology practical classes which is teacher

centred and the students listen, observe and do their practicals.

To engage the students in the post lunch session of Physiology practicals we introduced interactive teaching in the form of Problem based learning (PBL). PBL is been pioneered by McMaster university in Canada where the students are given open ended questions to solve⁽³⁾. PBL is a process where already existing problem is projected to the students with the help of case scenarios to increase their knowledge and understanding⁽⁴⁾. PBL is useful in promoting self-directed learning and problem solving skills⁽⁵⁾. PBL encourages the students to be exposed to variety of learning outcomes⁽⁶⁾ where they are independent and do small group discussion before been to the large group and the tutor does the role of facilitator only. It also enhances the communication skills, team work and every student has a role to play⁽⁷⁾. PBL is an effective method which enhances the students learning abilities^(8,9).

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Every teaching should be followed by an assessment which reflects aim for teaching⁽¹⁰⁾ and also assess the students' knowledge. So post PBL sessions were assessed by conducting OSPE. OSPE and OSCE are the gold standard assessment tool⁽¹¹⁾ where we can assess the specific competency by conducting a structured examination in a planned way to achieve our objectives⁽¹²⁾. OSPE is one of the most common method used to assess practical skills where the main objective is to avoid examiners bias and also to assess the students skill⁽¹³⁾. There are studies showing that multiple sources of feedback (MSF) that is 360° feedback is useful and effective in evaluating our teaching and professionalism⁽¹⁴⁾. The successful of a program depends on the evaluation of the feedback given by the students as well as faculties involved in it which helps to further improve the existing program. So we prepared a feedback questionnaire and rated with the five point Likerts scale and they were analysed in the end.

Materials and Method

This study is done as a part of advance course in medical education (ACME) project in Christian Medical College, Vellore but was conducted in the department of Physiology in Government Vellore Medical college for a period of two weeks. Approval from Institutional Ethical Committee was obtained and the study was preceded after getting the consent from the students. All the first MBBS students were included in the study and the students absent during the study were excluded.

A batch of 100 students divided according to roll numbers into two groups of 50 each, as control and interactive groups, who were exposed to traditional teaching and PBL respectively. The examination of cranial nerves were divided into two PBL sessions with 1-6 and 7 -12 cranial nerves. Crossing over of groups was done in order to reduce selection bias for PBL II session, for the crossed over group the PBL was taken by another faculty not by the principal investigator to avoid bias.

PBL: This study has been carried in the routine practical classes which are scheduled twice weekly. In the first week the first group is the control group underwent routine demonstration for the cranial nerves 1-6 by one of our faculty. The next day students are called half an hour earlier to the practical class and 50 of them were divided into 10 groups of 5 each. Each group selected one student as leader who will get the

case scenario questions on lots basis. About 10 different case scenarios for the cranial nerves 1-6 were given to the students, they were asked to find out which cranial nerve was affected and have to study the nerve course, its examination and applied aspects. The students were given a list of practical and clinical books with authors name and were asked to go the library to do their group task. The librarian was sensitized priorly about the program. One of the faculties accompanied the students to library as facilitator. The role of a leader is to divide the responsibilities to the group members to find out the diagnosis and to bring them back on time for discussion. The students were allotted one hour and thirty minutes, where the first one hour is to search the answers and next thirty minutes is to discuss among themselves about their findings and presentation in large group. After that they were asked to assemble in the demonstration room in the department of physiology and the students according to their lots number were asked to present their case with clinical examination to the large group in front of the principal investigator/Facilitator. If there is any deviation from the topic or they went wrong in their presentation it was corrected there itself.

The next week PBL session II was conducted for the cranial nerves 7-12 where there was crossing over the groups by exposing the first group to the PBL and the whole process was repeated with the other faculty who is neither the principal investigator nor the faculty taken the usual demonstration classes for 1-6 and 7-12 cranial nerves .

Assessment: After each session, the very next day OSPE were kept for both the groups which was informed to the students so that they come prepared for the test. OSPE questions were validated by two faculties from Department of Physiology, Christian medical college, Vellore. Piloting of OSPE stations were done with the help of our faculties of Physiology, Govt. Vellore medical college by running a monk OSPE examination. A total of 7 stations (5OSPE with 2 Rest stations in between) were kept. Each OSPE stations contained both observation and written part testing all the three domains like cognitive, affective and psychomotor. Each station is for three minutes and carries 10 marks with distribution of marks as (1 mark –affective domain,4 marks-cognitive domain,5 marks–psychomotor domain). OSPE test were evaluated by other faculties in the department who were never involved in any of the sessions either for the control group or interactive group.

Fig. 1: Showing the OSPE questions (sample) with mark allotment to different domains

OSPE Questions	Domain Assessed	Marks Allotted
Ayoung patient C/o 1 week of fever, nasal block and unable to perceive any kind of smell		
1. Which cranial nerve is affected?	Cognitive	1
2. Examine the affected cranial nerve.	Affective	1
	Psychomotor	5
3. Whythis patient is unable to perceive any kind of smell ?What could be your diagnosis.	Cognitive	1
4. What is cacosmia?	Cognitive	2
A patient underwent surgery for a swelling in the posterior triangle of neck and was found to have difficulty in shrugging the shoulders and also in head rotation during post operative period		
1. Which cranial nerve is affected?	Cognitive	1
2. Examine the affected cranial nerve.	Affective	1
	Psychomotor	5
3. Patient had difficulty in shrugging the shoulders and also in head rotation in the post operative period .Why?	Cognitive	3

Feedback: Feedback obtained from both the groups were analyzed to know about student’s perception. About eleven questions were evaluated based on 5 point Likerts scale from the participated students, where 1 is strongly disagree and 5 is strongly agree. Quantitative feedback also obtained from the faculties to know positive and negative aspects of the session to improve it further.

Results

The data were analyzed in Microsoft excel. Difference in mean score were analyzed by paired t test and compared with in the Interactive and control groups. The website we used for the T test analysis is <http://www.socscistatistics.com/tests/studentttest/Default2.aspx>. The Interactive group in both the sessions showed better performance than the control group in OSPE as shown in Fig. 2.

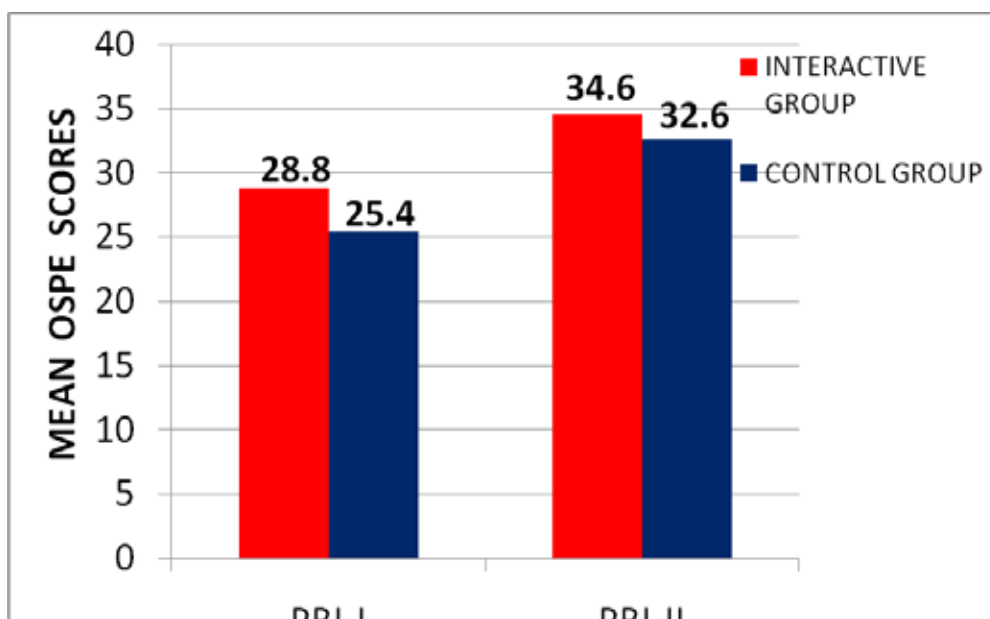


Fig. 2: Showing comparison of mean scores in both groups in both PBL sessions

The interactive group performed better in the OSPE in the PBL I and also in PBL II with significant P value 0.019932 and <.00001 respectively as shown in Table 1.

Table 1: Shows the comparison of mean scores with P value between both groups in both PBL sessions.

	PBL I		PBL II	
	Control	Interactive	Control	Interactive
Mean	25.4±5.8 (N=49)	28.8±8.4 (N=50)	32.6±3.7 (N=48)	34.6±4.6 (N=48)
P value	0.019932		<.00001	

(N = Number of Students participated)

In Fig:3 shows the comparison between the mean scores obtained in cognitive and psychomotor domain in the control and interactive groups of both PBL sessions. The mean scores were quiet high in psychomotor domain

when compared to the cognitive part in both the groups and when compared within the sessions the interactive group had scored more than the control in both cognitive as well as the psychomotor part.

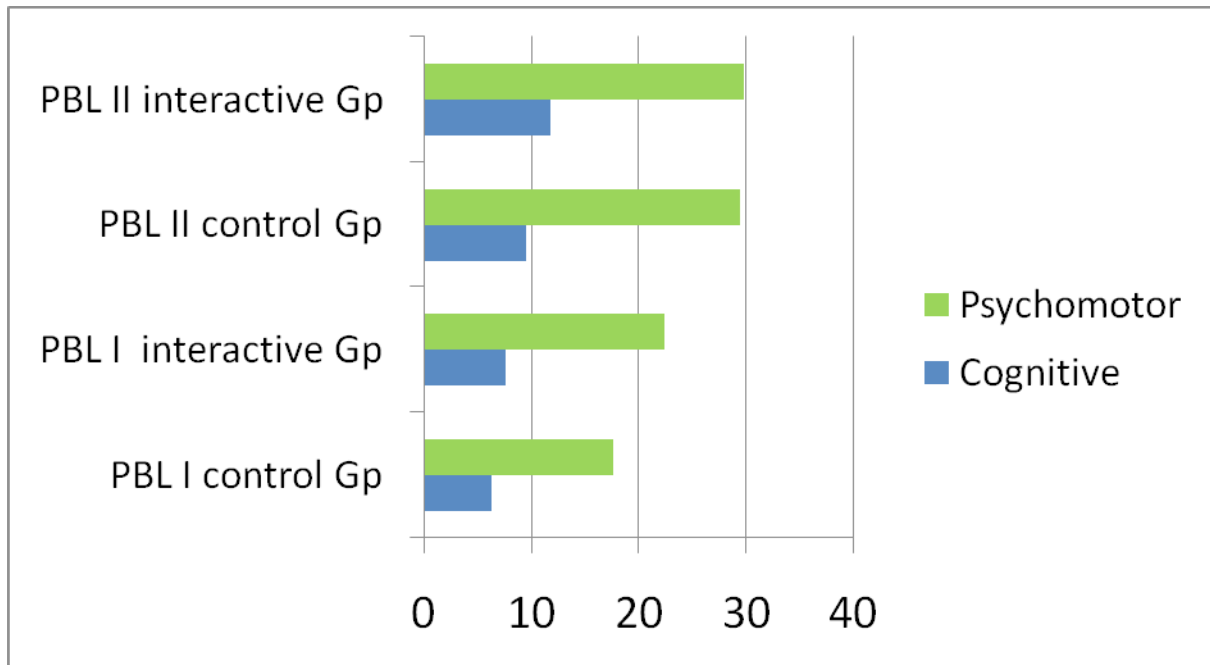


Fig. 3: Showing the comparison between cognitive and psychomotor domain in both the groups and sessions using bar chart.

Fig:4 below shows that the feedback forms obtained from the students which revealed that more than 90%found the PBL sessions to be interesting and most

of them preferred it for further classes and also above 80% of the students felt the importance and use of self-directed learning.

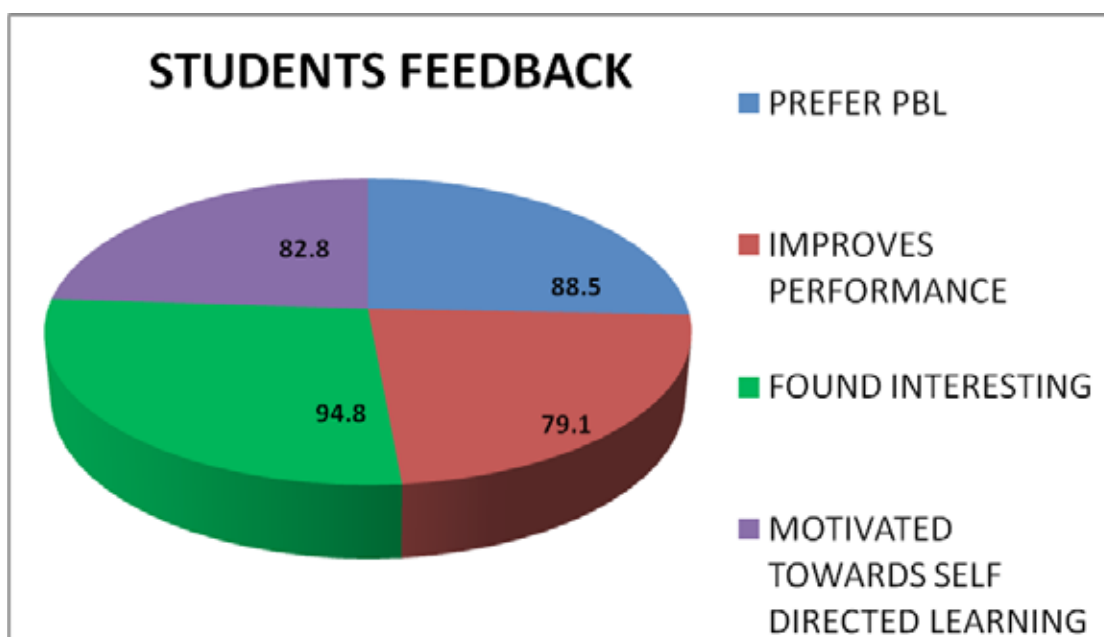


Fig. 4: Showing the analysis of students feedback in a pie chart

Discussion

The PBL is one among the interactive teaching which is useful to engage the students actively in the post lunch session of physiology practical classes. It facilitates the learning through small group discussion and team work by the students.⁽⁷⁾ PBL is an alternative mode of teaching which helps in developing different range of skills in the students especially self-directed learning.^(10,15)

The students were assessed by OSPE, which is found to be the most effective assessment tool than the traditional one. OSPE when used as formative assessment tool has modified teaching and learning strategies where both the teacher and the student both gets the maximum benefit⁽¹³⁾. The mean score obtained in OSPE when compared among the two groups were found to be high in the interactive group with a significant p value showing that the PBL is useful to students in understanding the depth of concepts to perform better in the examination.

The mean scores when compared between the two PBL sessions or with in the same PBL sessions were high for the Psychomotor part than the cognitive part. The cognitive mean scores were quiet high in the interactive groups probably because of the PBL where the students are made to learn by themselves (Self-directed study)

in detail about the cranial nerves from anatomy to the applied aspects. In the PBL II there was not much difference in the mean scores in the Psychomotor part because the students in the control group were already sensitised to PBL in the session I.

Objectives of Feedback should be SMART (Specific, Measurable/Meaningful, Actionable/Accurate, Respectful, Timely) enough to achieve our goals.⁽¹⁶⁾ Feedback is one of the course assessment tool which helps the faculty to get the positive and negative aspects of their teaching and evaluation method^(17,18). The PBL motivates self-directed learning and more over students develop learning skills only when they do the self-learning⁽¹⁵⁾. More than 75% of the students felt the importance of self-directed study which was emphasised by PBL. About more than 80% of the students found it to be interesting, interactive and preferred for the rest of the practical classes. Though the PBL session enhanced the team work, communications skills, leadership qualities but most of the students found it to be time consuming as already mentioned in previous study.⁽¹⁹⁾ In general the students felt PBL to be useful and more relevant to their future clinical postings. The feedback from the faculties revealed that though its time consuming but they used this opportunity to bring out their innovative hidden skills.

Conclusions

Though the practical demo classes are the most widely used method of large group teaching especially in Medical Colleges, Problem based learning when included in the routine practical classes had increased the learning abilities of the students and motivated the students for self-directed learning.

In spite of time constraints and added burden to the faculty members, this method will be useful to capture the attention of students in post lunch practical classes of physiology and will definitely play a role in improving their learning abilities.

The feedback from most of the students showed that they liked and preferred it for the next practical classes too.

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