

Being Evaluator of Peer in Physiology Practical - Does it Improve Academic Performance of Students? – A Pilot Study

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ABSTRACT

Introduction: In Physiology practical examination, students often don't realize what is lacking in their answers. This pilot study makes students, the evaluator for their own peers, with guidance of key, helping them realize shortcomings in answers of peers and in the process help to improve their own performance.

Material and methods: Consenting first MBBS students at Government T.D. Medical College, Alappuzha, attended the questionnaire based sessions; 3 Pretests each for Haematology and Clinical experiments. Ten questions were answered as pretest by students, key discussed by investigator, alongside students evaluated answer papers of their peers, later evaluated by teacher also. Post tests were conducted and evaluated by teacher alone.

Results: The average Pretest scores of students remained significantly higher than teacher, in spite of guidance using provided key with marks distribution (Paired t test, $p < 0.001$). Different students had attended different sessions so comparisons for improvement from Pre test to Post test were inconclusive. Depending on session attended by student, either initial (end of section) or later (end of study) Post test or average of both was taken as Post test score. This when compared with Pretest score of Teacher/ Student, showed no significant improvement.

Conclusion: Peer evaluation scores by student are higher, though under guidance. As same students did not attend all the successive pretest sessions, actual comparisons were inconclusive and the expected improvement was not seen in post test scores. So before and after comparison for each session, is recommended to pursue actual improvements in such educational studies involving peer assisted learning.

Keywords: Peer Guidance, Evaluation, Improve, Viva, Academic, Haematology, Clinical

Even if subtle clues are given often students fail to hit the bulls eye when coming to answering to the point. Possibly they fail to realize what is missing in their answering for viva. Often presuming this is known so need not be emphasized. To bridge this gap, this pilot study was undertaken. Students were guided to step into shoes of examiner and evaluate the answers of their own peers. This was under the guidance of investigator / teacher while discussing the key with split up of marks. During evaluation, students anyway learn the correct answers. This is expected to bring an improvement in the evaluating student's own academic performance.

This study aims to analyse the effectiveness of students becoming an evaluator of their own peer, for short Physiology practical questions, learning the correct answers in this process and thus being benefited for their own practical examination related viva.

MATERIALS AND METHODS

This study involves first M.B.B.S students of year 2016 at Government T.D. Medical College, Alappuzha, Kerala who gave written consent. Clearance was obtained from Institutional Research Committee - Protocol no: S30/2016 dated 29/11/2016 and Institutional Ethics Committee - EC 51/2016 dated 29/11/2016 (Part B).

120 Students gave consent to participate. This educational study had 6 practical based Pretest sessions - 3 each for Hematology and Clinical experiments. Portions of each session, having 3 or more experiments were informed one week prior.

Each session began with a Pretest of 10 questions, to be answered briefly in the same paper itself. The answers were discussed with key by investigator and students themselves evaluated the shuffled answer paper of their own peers. Later this Pretest was evaluated by teacher (T) also.

Post tests were planned for both Haematology and clinical sections, as Initial (at end of section) and Later (at end of

INTRODUCTION

Of 3 subjects dealt in first professional MBBS, majority of students find Physiology more difficult in terms of learning and of course scoring marks.¹ This is equally reflected in viva voce associated with each subsection of Physiology practical exam. Haematology and Clinical experiments are major part of Physiology Practical examination. Amphibian graphs have a minor role. Students have to do the corresponding practical which is followed by a discussion involving viva questions ranging from few or most aspects covering procedure, methods, normal range of results, clinical applied aspects and some relevant theory also. Evaluation is based not only on knowledge but also on skill and ability to answer, so relevant theory and its application clinically is involved.

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study) sessions, each of 20 questions, from prior discussed portions. This would assess student’s grasp of a revised topic, when repeated from prior session.

STATISTICAL ANALYSIS

Data were analyzed using SPSS software version 16. To look for any significant difference in scores of Pre test and Post test, comparison was done using Paired t test.

RESULTS

In the 6 different sessions of pretest (for Haematology and Clinical sections) each of 10 marks, significant difference between Student and Teacher (S and T) scores, is seen for 3 sessions only (Table:I), where scores of student evaluation remain higher than that of teacher.

Tabulating all the actual scores, from all 6 sessions, significant difference was seen between Pretest Student S and Pretest Teacher T scores, $p = 0.032$, by paired t test, $n=110$.

Post tests were conducted at end of Haematology (H) and Clinical (C) sections (Initial) and at end of study (Later). Post test scores out of 20 were converted to 10 for uniformity. There is no significant difference between Initial and Later Post test scores (for Haematology (H) and Clinical (C) experiments), paired t test, $p = 0.587, 0.729$ respectively, $n= 14$.

Depending on sessions attended by student, Average Pretest score was calculated for each student (Table: II). There is significant difference between Average Pretest score of Student (Avg PreS) and Pre test Teacher (Avg PreT), when compared by Paired t test, $p < 0.001, n=74$.

Student scores are somehow higher in spite of discussion based on key for guided evaluation where split up of 1 mark for each answer was also specified.

Same students did not attend all the successive sessions; which would have been ideal. Moreover the PostTest sessions; Haematology H and clinical C sections, were attended by fewer students.

Depending on session attended by student, Initial (at end of section) or Later (at end of study) post test or average score was taken as **Post test** score. This would allow actual comparisons to see any improvement in student from pre test to post test.

This Initial/ Later /average Post test session score, was compiled with the corresponding pre test scores of student, to get the Corresponding average CAvg scores. Finding out any improvement in Post test, was thus limited to few students; $n=37$ (Table:III). Comparison using Paired t test shows the difference between Corresponding Average CAvg - Pre test scores of student (CAvgPreS) and teacher (CAvgPreT), and between both CAvgPreT and CAvgPreS scores when compared with Post Test (CAvgPost), are not statistically significant, $p = 0.065, 0.901$ and 0.681 respectively.

This was unexpected and due to multiple reasons for the low participation such as ; unable to read up portions, other tests / seminar in between, seniors /colleagues helping in studying consuming time, other extra curricular activities, medical exhibition etc.

Session	n	Mean PreS	Mean PreT	p value
I	7	4.2500	3.2143	0.033
II	11	3.5227	2.8864	0.000
III	10	2.5000	2.5000	1.000
IV	42	5.6726	5.1310	0.003
V	27	5.4537	5.6204	0.292
VI	13	3.0846	2.7692	0.214

The 6 Pre test sessions (I-VI), with the number of participants for each as n, Mean Pre test scores of Student (Mean PreS), Mean Pre test scores of Teacher (Mean PreT) and the p values when comparing Mean Pre S and T scores of each session by Paired t test. Significant difference only for sessions I, II and IV.

Table-1: Pre test session scores:

	Mean	Low scorers (%)	High scorers (%)
AvgPreS	4.6167	46 (62.2)	28 (37.8)
AvgPreT	4.2148	51 (68.9)	23 (31.1)

Score of each student, from all 6 sessions, $n=74$, shows the Average scores for- Pretest Student (Avg PreS) and Pre test Teacher (Avg PreT). Mean scores are higher for Student valuation. Next columns show number of Low scorers (those scored below 50%) and within brackets their % and High scorers (above 50%) and within brackets their %. Majority in Pretest are low scorers.

Table-2: Average Pre test scores

	Mean	Low scorers (%)	High scorers (%)
CAvgPreS	4.444	22 (59.4)	15 (40.5)
CAvgPreT	4.222	23 (62.1)	14 (37.8)
CAvgPost	4.271	25 (67.5)	12 (32.4)

Corresponding Average CAvg scores of Pretest Student (CAvg PreS), Pre test Teacher (CAvg PreT) and Post Test scores(CAvgPost), $n=37$ students, show that the mean scores are higher for student S. Next columns show number of Low scorers (scored below 50%) and within brackets their % and High scorers (scored above 50%) and within brackets their %. Majority are low scorers.

Table-3: Corresponding Average CAvg scores:

DISCUSSION

Physiology, due to nature of discipline, requires learning and integrating concepts, so is difficult to learn for most students.¹ Role of peer participation in contributing to positive academic outcomes is already known from prior studies.^{2,3,4,5,6} Novel approaches are need of hour to supplement learning process of medical undergraduates, reducing their stress and furthering the cause of nurturing a competent medical graduate in the initial phases itself.⁴ Bringing clinicians to teach Physiology showing improvement in pass percentage of students was one such approach in an earlier study⁵. Making models of play dough to study neural tracts is a way of tackling tough areas in nervous system where active learning is encouraged.⁶ So the requirement for making Physiology easy, interesting and enjoyable to learn needs newer methods to be tried and tested. Peer assessment is shown to have adequate reliability and validity in bringing positive outcomes for students;

even more than teacher assessment.² Learning from peers nurtures active learning, creative thinking and makes them more responsible for own learning.³ Supplementing routine learning, with materials prepared by senior students for areas they identified as difficult, is another approach where supplemental instruction is put in use.⁷

Helping the students to identify core areas or topics to which they should focus more attention may reduce their burden in learning a difficult subject like Physiology.⁸

Peer tutoring where senior students help juniors and in the process learn teaching, provides first year students with a different learning experience.⁹

With various forms of peer assisted learning, appearing promising it needs more proof as to which is ideal method. For example benefits to the student tutors in Peer assisted learning is not satisfactorily proven.¹⁰ Regular, genuine peer feedback helps in long term personal and professional development of students, still more proof is required.^{11,12}

Even peer led discussion seems as effective as usual teacher led approach.¹³ Somehow being taught by near peers, instead of faculty, is valued differently by students.¹⁴ Carefully designed peer assessment and feedback has formative benefits in classroom.¹⁵

Generally assessing is of more benefit, than being assessed, as students don't prefer being assessed. In this study students are doing both. As per a meta analysis also peer assessment is comparable with self assessment and has more positive benefits compared to no assessment or teacher assessment.¹⁵ Evaluating peer answers, after discussion with a provided key, helps the evaluator students to realise the shortcomings in answers of peers, as seen in prior study involving short Physiology reasoning questions.⁴

In this study, participant feedback itself shows peer paper evaluation was beneficial for 25 (got additional points-3, the way of answering questions-6, more knowledge-2, perfecting of answers-1, came to know common mistakes-7, got marks distribution-1; responses respectively).

Being not able to read up and come, was mentioned as main reason for low motivation to participate in study, apart from being tiring as it was scheduled after routine theory hours.

Students as evaluators were more liberal. Each session had a mix of new and regular participants. There was no significant improvement in Post test scores as expected. The participation of students was low and not consistent due to various reasons. Fear /discomfort of scoring low marks was a major deterrent for many participants, apart from other seminar, tests, extra curricular activities like arts and sports. Major drawback was that as the same set of participants did not attend the post test sessions both Initial (at end of section) and Later (at end of study), so comparison was incomplete, failing to reach a definite conclusion in terms of expected benefit in post test performance.

So this pilot study shows the requirement for such educational interventional sessions to be evaluated before and after, the key discussion with evaluation under guidance.

Feedback taken during post test sessions mentioned that the study was Useful- for 3 and Very Useful –for 23. Further,

such sessions were recommended to be conducted in small groups by 27 students.

Suggested modifications were diverse like -more time for interactive session and discussion, preparing a booklet giving all questions and answers, more clinical examination sessions, conduct this in upcoming years also, extend this method to long and short essays, quiz type is more beneficial, discussion amongst us then give test, use board, make it compulsory so will benefit others and my friends also, closer interval between sessions, more tests, pre reading is must, take class then conduct test, give coffee then more students will come, give answers beforehand, everybody must be included etc.

Constraints of study

Post tests were attended by fewer and different students. Participants did not read up portions to be covered, so the purpose of supplementing learning was incomplete. Timing of study was late; after routine theory hours. Practical experiments 3 or more had to be combined to reduce the number of sessions required.

CONCLUSION

Students as evaluators are more liberal inspite of guided evaluation with a provided key having split up of marks. Unfortunately as the same set of participants did not consistently attend corresponding post test sessions, the expected significant improvement, ideally could not be assessed. The comparison was incomplete or inconclusive in terms of actual improvement academically. Though the study was rated as useful and recommended by participants, statistically significant improvement was not seen in Post test. Peer assisted learning is of known benefit. Hence further studies are required and ideally each such guided evaluation session, requires before and after discussion comparisons to specify regarding actual academic improvement in the evaluator student.

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