

Evaluation of student-symposium as a teaching-learning tool

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Abstract:

Didactic lectures are traditionally most commonly used for teaching undergraduate medical students. Some drawbacks of didactic lectures can be overcome by supplementing with novel teaching techniques. The current study was conducted to evaluate student-conducted symposium as a teaching learning tool in the subject of Pharmacology. Three symposia were conducted by randomly selected 20 students for each symposium, from a batch of 180 students of second year undergraduate medical students. The perception of students who conducted symposia and those who attended as audience was evaluated by using separate questionnaires. The performance was also assessed by giving a multiple choice question (MCQ) test. Students who got the opportunity to conduct symposium gave far more positive opinions about the teaching tool than those who passively attended the session. For example, 94% of the students conducting symposium opined that 'the knowledge acquired via this teaching technique will help them in clinical practice' as opposed to only 56% from students attending it. Similarly, 77% of the student speakers wanted this teaching pattern to be continued in future compared to 38% of the listeners. The performance of audience however was uniformly improved in all 3 sessions. Thus, student-conducted symposium as a teaching learning tool was well accepted and appreciated by especially those students, who were involved in conducting sessions. Efforts are needed to increase the participation of students in such sessions.

Key Words: Students-Symposium, teaching learning tool

Introduction:

The didactic model of teaching has been used all throughout the world as a tool to impart medical education. Didactic lectures typically comprise of an authoritative teacher and passive audience. This strategy has advantages such as: (a) new information can be provided to a large heterogeneous group in a short period of time; (b) may be recorded for future use; (c) a subject expert imparts his knowledge to a raw audience (1).

However, the didactic system also has some basic drawbacks, such as: (a) it places the burden of teaching entirely on the teacher (b) establishes a 'tell me' mindset in the learners; (c) the knowledge presented may be at the teacher's level of understanding rather than at the learners' level of comprehension; (d) being a one-way discourse, offers limited opportunities for assessment and feedback; (e) can lead to learner overload as it is common for teachers to include too much

little opportunity for independent thinking by the learners; and, (f) can lead to boredom since the learner is passive (1).

These disadvantages have prompted many educators in medical colleges to experiment novel and innovative teaching techniques that involve more active participation by the learners. These involve problem solving, bedside clinics, case-based teaching, and student symposia.

The major concern regarding these novel techniques is that they might interfere with the regular imparting of knowledge in the field of medicine since the syllabus itself is so vast. Further, even though the novel teaching techniques are being increasingly used these days worldwide, adequate research is lacking in the aspect of the acceptability by students, vis-à-vis the traditional didactic method.

Hence, we planned this study to examine the effect of student symposia as a teaching tool. For this purpose, we chose the subject of pharmacology, and students of 2nd year MBBS, in

medical college in Mumbai, India. Pharmacology is often considered a 'volatile subject', and for the same reason, there is a need for the teaching to be interesting to the learner, at the same time hold the attention of the learner. Since one of the major drawbacks of didactic lectures is that it can lead to boredom, teaching Pharmacology offers excellent scope to introduce novel teaching techniques.

The objectives of this study were to evaluate: (a) the performance of students attending symposium conducted by students themselves, and (b) the perception of students towards student symposium as a teaching learning tool.

Materials and Methods:

The study was done at Seth GS Medical College, Mumbai, India, after obtaining the institutional ethics committee approval, and involved 150 students studying in 2nd MBBS who gave their consent to participate in the study.

Sixty students were randomly selected from the consenting population and were randomly assorted into three groups containing 20 students each. Each group was assigned one topic in pharmacology, with the intention of preparing and presenting a symposium on the topic, which would be presented in front of their peers. Ten students in each group were asked to present the topic, and the remaining students were instructed to assist the speakers in preparing the symposium, collecting of references, study materials and other details. One faculty member from the department of pharmacology was allotted as a guide to each group; however, no direct input was provided by this facilitator. Thus there were three different symposia conducted on three different topics in Pharmacology conducted on three different days, one every month.

Each symposium began with the facilitators administering a pre-test comprising of multiple choice questions (MCQs). This was followed by the symposium. At the end, the facilitators provided their inputs on the topic, and concluded the session.

Later, the students were handed a post-test (MCQs). At the end of each symposium, the perception and attitude of the students who attended the symposium was collected using a questionnaire (Questionnaire-1) and the perception of the speakers towards symposium as a teaching tool was assessed using another questionnaire (questionnaire-2). Both these questionnaires used 3-point Likert items for the assessment (Agree, Neutral and Disagree). All the MCQs and questionnaires were pre-validated.

The study methodology is illustrated in figure 1, and the questionnaires used are illustrated in figures 2 and 3.

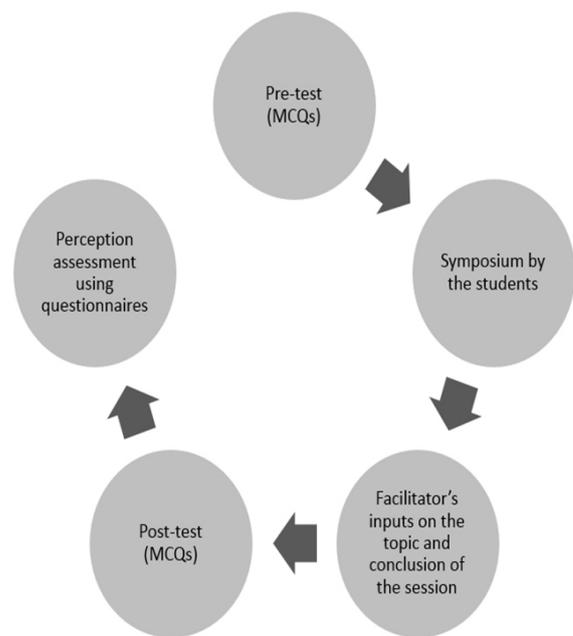


Figure 1: Study methodology

The difference in the average marks obtained in the MCQ test before and after the session, compared by paired t test, was considered as a measure of the effectiveness of the teaching learning tool. The questionnaires were assessed by descriptive statistics

Figure 2: Questionnaire-1: Perception Student listeners

Questionnaire -1 (Listeners)

Questions	Agree	Neutral	Disagree
1. Teaching technique is good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Good understanding is achieved by this teaching technique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. As a student i was satisfied with this teaching technique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. This topic must be thought by this teaching technique only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Time allocated for all the subtopics was adequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Discussions were held during and after the sessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Time allocated for discussion was adequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Discussions held in class helped in understanding the subject better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The session was interactive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. The flow of contents during the session was lucid and clear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Students were given an opportunity to clear their doubts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I expect to score better in this topic as a result of this teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The knowledge acquired about the topic via this teaching technique will help me in clinical practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. This teaching technique will encouraged my intellectual curiosity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Students speakers explanations were very clear to understand the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. For this teaching techniques , the facilitators & students speakers had taken collaborative efforts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Speakers used LCD projector effectively in the class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. The speakers provided guidance for self learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. The clinical applications of topic were explained by the student speakers' teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. There was repetition of some points during the session to reinforce the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Student speakers paid enough personal attention to the audience students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. This pattern of teaching should be continued in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Newer teaching methods are unnecessary : routine lectures are sufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 3: Questionnaire-2: Perception student speakers

Questionnaire - 2 (speakers)

Questions	Agree	Neutral	Disagree
1. Good understanding of the topic is achieved by me after conducting this symposium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I was satisfied with this approach of covering few selected topics as symposium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Time allocated for all the speakers for covering different subtopics was adequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Discussion were held during / and after the session	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Time allocated for discussion was adequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I expect to score better in this topic as a result of this teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The knowledge acquired about this topic via this teaching technique will help me in clinical practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The symposium has encouraged my intellectual curiosity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. For this teaching technique the facilitators and student speakers had taken collaborative efforts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. The pattern of teaching should be continued in the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Newer teaching methods are unnecessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. There was repetition of some points during the session	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The symposium has enhanced my confidence as a speaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The symposium has increased the sense of cooperation among all student speakers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results:

A total of 150 students consented to participate in the study. Since the symposia were conducted on three different days, and were integrated with the regular teaching schedule, the actual number of students that participated in each symposium was different. Three topics that were randomly selected for the purpose of this study were pharmacotherapy of urinary tract infection (UTI), pharmacotherapy of diarrhoea and constipation, and pharmacotherapy of anaemia, and the numbers of students attending each symposium were 140, 130, and 136 respectively.

(a) Performance of students attending symposia

The score of the students in the pre-test and post-test conducted before and after each symposium is presented in Table 1.

Table 1: Comparison of pre-test and post-test scores in three different symposia

Symposium topic	N	Pre-test score (Mean ± SD)	Post-test score (Mean ± SD)
Pharmacotherapy of UTI	140	4.82 ± 1.74	6.29 ± 1.69 *
Pharmacotherapy of diarrhoea and constipation	130	3.07 ± 1.76	6.38 ± 2.05*
Pharmacotherapy of anaemia	136	3.59 ± 2.15	6.41 ± 1.57*

* P<0.01 when compared with pre-test scores; paired t test.

(a) Perception of students towards student symposium as a teaching learning tool.

Questionnaire-1, containing 23 questions, evaluated the perception of the students who attended the symposia as listeners. Responses to 5 questions showed clear-cut answers from the students with responses being 50% or more towards one of the three options: most students agreed that the teaching technique was good (51%), the knowledge acquired by this technique would help them in clinical practice (56%), collaborative efforts were there between student-speakers and facilitators (61%), and that the visual aids usage was adequate (52%); however, most of them felt that the session was not

which 40 to 49% of response went to one of the three options: students agreed that good understanding of the subject was achieved (45%), adequate time were allocated for all the subtopics (43%), discussions were useful (41%), clinical applications were explained well (48%), and some points were repeated to achieve reinforcement of the topic (45%). While students felt that the speakers did not pay enough personal attention to the audience (49%), most students were not sure whether they will score better in the topic as a result of this teaching technique (41%). The answers to the remaining questions were not pointing towards any clear-cut perception by the students.

Questionnaire-2, containing 14 questions, evaluated the perception of the students who presented the symposia as speakers to their peers. Most of the student-speakers agreed that they understood the topic well after conducting the symposium (89%), they were satisfied with the approach of covering few selected topics as symposium (89%), adequate time was allocated for all subtopics (50%), adequate discussions were held during and after symposia (55%), they expect to score better in the topics that they spoke about (94%), the knowledge acquired by this technique would help them in clinical practice (94%), the technique has encouraged their intellectual curiosity (89%), and enhanced their confidence as a speaker (94%), the facilitators and student-speakers had taken collaborative efforts (89%), and that this pattern should be continued in the future (77%). Students also agreed that adequate time was allocated for discussion (44%), but were not sure as to whether there was repetition of some points during the session (44%). Thirty-nine percent student-speakers disagreed to the point that the newer teaching techniques are unnecessary.

There were few common questions in questionnaire-1 and questionnaire-2 for which the responses obtained were significantly different; these are summarized in Table 2.

Table 2: Common questions in questionnaires 1 and 2 for which responses obtained were significantly different

No.	Question	Listeners (n = 150) (Questionnaire-1)	Student-speakers (n = 60) (Questionnaire-2)
		Response % Agree	Response % Agree
1	Good understanding is achieved by this teaching technique	45%	89%
2	Discussions were held during / and after the session.	39%	55%
3	I expect to score better in this topic as a result of this teaching	41%	94%
4	The knowledge acquired about this topic via this teaching technique will help me in clinical practice.	56%	94%
5	This teaching technique encouraged my intellectual curiosity.	37%	89%
6	For this teaching technique, the facilitators & student speakers had taken collaborative efforts.	61%	89%
7	This pattern of teaching should be continued in the future.	38%	77%

Discussion:

It is often felt that teaching is not an exclusive domain of trained graduates who impart knowledge and training to untrained students. The concept of students teaching to their peers was originally established by Jean-Pol Martin, a German professor for foreign language teaching. Popularly known as the LdL (Lernendurch Lehren, German for 'Learning by teaching') model, this method allows pupils & students to prepare & to teach lessons, or parts of lessons (2).

The effectiveness of engaging students as teachers is well-known. It has been reported that teaching a concept to someone else results in better learning than by being taught by someone. Further, preparing to teach and teaching involves more active thought about material, analysis, and selection of main ideas, and processing the concepts into one's own thoughts and words (3).

In the present study, we assigned three topics to randomly selected students from a group of 150 consenting students, and we asked them to prepare a short talk on subtopics on the topic that were assigned to each group. After the students presented their talks in front of their peers in the format of symposia, we objectively assessed the performance of the students by the means of a pre-test and post-test. We also assessed the subjective perception of the participants and the speakers towards the symposium approach in imparting

medical education.

The performance of the students in the post-test conducted after all the three symposia was significantly better than their performance in the pre-test that was conducted before the symposium. This reflects that the students were able to grasp the topics that were taught to them by their peers, since the students who attended the symposia were not exposed to any of the topics before the sessions were conducted.

When we assessed the perception of the students regarding this teaching technique, we found that the response of a majority of the students was favourable. The fact that the responses were collected in an anonymised fashion further added to the authenticity. It is apparent that the technique was well-received by most of the students, more so by the student-speakers. This upholds the concept that a topic is better retained when it is taught to others than by just listening to somebody else speaking on the topic. The same has been described by the so-called learning pyramid developed by NTL Institute for Applied Behavioural Science which approximates the retention rates depending upon the learning mode (4). The average learning rates given in this pyramid are 5 % in lectures, 10% by reading, 20% by audio-visual aids, 30% by demonstration, 50% by group discussion, 75% by practising the learned subject and a maximum of 90% by teaching others.

Previous studies have also described the beneficial effects of learning by teaching. In a study reported by Fiorella L et al, students were asked to study a lesson, and some of them were informed that they would be later teaching the topic. Of this latter group, only some students were actually asked to teach. It was found out that even though the comprehension was similar in all students initially, the students who studied with an intention of teaching had better comprehension of the topic after one week of the exercise, and the comprehension was the best with those students who actually taught. The authors suggested that when students actually teach the content of a lesson, they develop a deeper and more persistent understanding of the material than from solely preparing to teach (5).

In another study reported by Mafa, it was concluded that despite needing more time, resources and tutor guidance, these learning-by-teaching strategies were found quite successful in raising the motivation, depth, and level of achievement in both short-term and long-term (6). The same study also listed out the advantages and disadvantages of the student-symposium model.

In addition to these advantages, studying a topic with an intention to teach also creates an interest in the subject and better learning. Other advantages include improvement in communication skills, gaining of confidence and overcoming of stage fright. Finally, it provides an opportunity for the recognizing ignorance and renders oneself open to the possibility of learning (7).

However, the incorporation of this technique in the regular teaching curriculum of medical schools in India is a challenging task, due to the vastness of medical curriculum, and also due to the differing interests and expressiveness of the medical students. This challenge needs a serious thought and appropriate action in order to utilize this novel teaching technique for better teaching of medical subjects. Only those topics which can be easily taught by students, do not require concept building and are relatively simple to understand should be selected.

The limitations of our study are that there is no comparison done with the traditional method of teaching with respect to the scoring in the tests. Also, only the subject of pharmacology was considered; inclusion of other subjects may also bring out the acceptability and the objective benefits of the teaching technique.

Conclusion:

Teaching by learning is a technique that has been known to be better than learning by listening. We have showed that this method, imparted by means of student symposia, resulted in better objective performance of the students in tests after the session when compared to pre-tests. At the same time, the students find the technique acceptable, more so the student-speakers. Though the technique is an effective one, it is a challenge in incorporating it into the regular teaching curriculum of medical schools in India.

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