RESEARCH ARTICLE

Comparison of blunder lecture with tutorial for small-group discussion among Phase I M.B.B.S. students in a medical college in North India

Archana Chauhan1, Neeraj Mahajan2, Donald S Christian3, Suchet Trigotra1

1Department of Physiology, Dr. Yashwant Singh Parmar Government Medical College, Nahan, Himachal Pradesh, India, 2Department of Physiology, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India, 3Department of Community Medicine, GCS Medical College, Hospital and Research Centre, Ahmedabad, Gujarat, India.

Correspondence to: Archana Chauhan, E-mail: archanadogra06@gmail.com

Received: January 22, 2022; Accepted: February 14, 2022

ABSTRACT

Background: Small-group discussion (SGD) plays an essential role in physiology to foster active learning by the students. Blunder lecture has been used to stimulate inquiry, reflection, and promote collaborative learning by cognitive conflict strategy. Aims and Objectives: The objectives of the study were as follows: (i) To compare the effectiveness of blunder lecture with tutorial for SGD and (ii) to assess the perception of students toward blunder lecture and tutorial. Material and Methods: An educational interventional study was conducted in the department of physiology among 116 Phase I MBBS students using tutorial and blunder lecture for SGD on two core topics of physiology which were already covered in didactic lectures. Blunder lecture included deliberate mistakes spread over the different levels of Bloom’s taxonomy. Blunders were identified and discussed during the group activity. The evaluation was done by validated pre-post tests and questionnaires. Results: There was a statistically significant gain in the mean score of the students who attended blunder lecture session in comparison to tutorial. Out of 116 students who participated in the study, 89% perceived blunder lecture as a challenging way to recollect prior knowledge. Conclusion: Blunder lecture is an effective reinforcement tool that can be used in SGD to facilitate the learning of the undergraduates.

KEY WORDS: Blunder Lecture; Cognitive Conflict; Tutorial; Small-Group Discussion

INTRODUCTION

Competence-based medical education (CBME) has been rolled out in India in the year 2019 to produce a competent Indian Medical Graduate (IMG).[1] CBME involves the attainment of observable abilities by students in a time-independent and learner-centered manner.[2] The student-centric approach demands the inculcation of active learning principles in the students. Wherein, the students bear the responsibility of their learning and are encouraged and expected to think both creatively and critically.[3,4]

The past few years have witnessed the pragmatic shift from “teacher-centric” to “student-centric” approach with redefining of various teaching-learning methodologies. Small-group teaching (SGT) has gained popularity as it promotes active learning in a dynamic and collaborative setting and allows the students to develop interpersonal, team building, and communication skills.[5] Some of the popular small-group methods explored in medical schools are tutorials, seminars, problem-based learning, bedside, and ward-based clinical teaching.[6]

A tutorial is a frequently used tool for SGT to facilitate a deeper understanding of the subject. Studies have shown that...
during tutorials, students clarify concepts taught in lectures, seek solutions, develop problem-solving skills, and indulge in self-directed learning.[4,7-10]

However, the conventional tutorials have failed to foster the learning needs of the students. Studies suggest that in a conventional tutorial, students get limited scopes for peer group-assisted learning with fewer opportunities to enhance teamwork and communication skills.[7,11]

Millennials crave active learning methods that challenge them and offer the ability to control the pace of their learning.[12] Hence, it is essential to offer the students the avenues that interest them to develop a deeper understanding of the subject rather than just develop rote memorization.

Blunder lecture is one such method that challenges the student’s prior knowledge with the deliberate blunders (mistakes) made by lecturer.[13] The anomalous data (misconcept) result in cognitive-conflict that stimulates the student inquiry, reflection, and collaborative learning.[13,14]

Blunder lecture braces a student-centric teaching-learning approach that effectively incorporates and fosters peer-assisted learning in a collaborative environment.[13-15]

An attempt has been made in this study to compare the conventional tutorial method with the blunder lecture method to assess the impact on the learning of the students in SGT sessions. The study also aims to assess the perception and preferences of students toward the two methodologies used in SGT.

MATERIALS AND METHODS

Study Design
An educational interventional study was conducted on Phase I medical students in the department of physiology in the medical college of North India.

Study Approval was sought from the Institutional Ethical Committee and Study Commenced After the Approval

Inclusion criteria
All Phase I MBBS students who gave their consent (informed) and responded to all questions of feedback questionnaire. And also, who had no previous exposure to small group discussion as a tutorial or a blunder lecture were included in the study.

Exclusion criteria
Those Phase I MBBS students who were not willing to participate in study, who had incomplete responses, and who did not submit the questionnaire response were excluded from the study.

Informed written consent was taken from each study participant
The study tools were prepared and validated by the subject experts and trained members of the Medical Education Unit. A 1/2-day sensitization session for the students and faculty was organized to provide orientation to the study.

Out of 120 volunteering Phase I students, 116 students who were present on the day of the study were included in the study and were randomly allotted (lottery method) to Group A and Group B.

The SGT was done on two separate days using two core topics of the physiology—sensory system and special senses. To avoid the ethical issue, for the same topic group, Group A was allotted to blunder lecture session and Group B to tutorial. For the second topic, Group A was allotted to tutorial and Group B to the blunder lecture method.

The group assigned for SGT by both methodologies was further subgrouped to form smaller groups of 12–13 students with one faculty member (facilitator).

Blunder Lecture Method
Blunder lecture incorporated 12 mistakes spread over different domains of cognitive learning based on learning objectives taught in didactic lectures on that topic [Table 1]. It included blunders in all levels of the hierarchy in the cognitive domain of Bloom’s taxonomy ranging from knowledge, comprehension, and application at the lower levels to analysis, synthesis, and evaluation at the higher levels.[16]

After the “blunder lecture” was delivered, the students in subgroups prepared a “blunders detection” list. The facilitator asked the students to present the blunders from the list followed by active discussion on mis-concept introduced in a blunder lectures and its correct clarification (concept). At the closure of the blunder lecture session, all the blunders (mistakes) were revealed and clarified.

Tutorial Method
The tutor asked the students in the subgroup to elaborate on different core concepts of the topic. The queries of students were cleared and mini-teaching was done wherever required to provide a better understanding of the topic. The tutor ensured that every student participated in SGT.

An evaluation was done with 20-item pre-test and post-test with multiple-choice questions, short essay questions, and extended matching questions. The questions were designed to assess the knowledge gained by students included an array of questions ranging from recall-based questions,
The feedback from the students was taken by an internally validated and pre-tested questionnaire. Students were asked to attempt a questionnaire without revealing their identity to facilitate the free expression of ideas.

The feedback questionnaire had two types of questions: (1) Questions with a 5-point Likert scale and (2) open-ended questions.

In the 15-item questionnaire, the participants were asked to select from a Likert scale 5-point rating: “Strongly disagree,” “disagree,” “neutral,” “agree,” and “strongly agree.” Two open-ended questions included were

What went well in the session?

What can be improved in the session?

Statistical Analysis

Data were collected using a Microsoft Excel sheet and were analyzed with SPSS software (24th version). Descriptive statistics were used for the analysis of data. The mean score of pre-tests was compared amongst two groups by unpaired test, $P < 0.05$ was considered to be statistically significant. The mean gain of scores of pre-tests and post-test was compared by unpaired $t$-tests to assess the knowledge gained, statistical significance was kept at 5%. Respondents on the Likert scale were expressed as a percentage.

Quantitative data: Respondents’ open suggestions were transcribed to identify the main ideas in them. These recurring main ideas illustrated by the quotations or verbatim were sceptically analyzed to identify themes.

RESULTS

A total of 116 students enrolled and participated in the study to compare the effectiveness of the tutorial method and blunder lecture method for SGD.

On analysis of data by paired $t$-test to find the difference between the pre-test and post-test marks by each methodology, it was found that there was a statistically significant difference between the means of pre-test and post-test marks ($P < 0.05$) of both blunder lecture method and tutorials [Table 2]. It revealed a significant gain in knowledge by both the methodologies.

In unpaired $t$-test analysis, it was found that absolute mean score gain by the blunder lecture method was significantly higher than that by tutorials (two-tailed $P < 0.0001$) [Table 3].

Thus, the analysis revealed that learning improved by both methods, however, the performance improvement was better with blunder lecture method.

Perception and preference between the two methodologies were assessed by feedback from students using the Likert scale and the result was expressed as a percentage [Figure 1].

On analyzing the different parameters, it was seen that students found blunder lecture more challenging (74.13% vs. 34.48%) ($P < 0.0000001$) $\chi^2 = 36.76$ and promoted peer-assisted learning (76.72% vs. 31.89%) ($P < 0.0000001$) $\chi^2 = 46.97$.

Overall, as compared to the tutorial, the majority of the students rated blunder lecture as a better teaching-learning method for small-group teaching (72.41% vs. 55.17%) ($P < 0.004292$) $\chi^2 = 7.465$.

The core ideas that emerged from open-ended questions and some expressions are given in Table 4.

The responses to the open-ended question of “What went well?” revealed that students found blunder lecture session useful to revise the concepts, clarify doubts, and gain insight into the topic to develop a better understanding. They found it...
The themes that emerged to suggestions for the improvement of the blunder lecture session were mainly related to better time and group management. The students felt that time for the presentation of blunder lecture can be increased with incorporation of a greater number of blunders in each session. The students suggested that more intensive monitoring of group activity by the facilitator can bring active participation from all the students.

**DISCUSSION**

Tutorial sessions are established teaching-learning tools in the basic sciences to impart a better understanding of the topics.\[4,16\] Whereas, blunder lecture is a recently evolving innovative teaching-learning tool that has been used mainly as a reinforcement tool.\[5,6\]

In the present study, where we compared tutorial with blunder lecture in small-group discussion (SGD) sessions, it was found that blunder lecture was more effective. The results of the study depicted that learning by the students had improved after the blunder lecture session compared to tutorial [Tables 2 and 3]. The student-centric design of blunder lectures involving active participation by intragroup activity, presentations, and active discussions stimulated active learning in study participants. In their responses to open-ended questions, students had stated that “blunder-busting” was like a game that “challenged” them. We observed that the students were more attentive in the blunder lecture session to detect the blunders made by teacher. Further, students found that blunder lecture session made them more vigilant and mindful to their learning. Students had enjoyed the blunder lecture session that helped them revise whole topic in short duration and they looked forward for such sessions in the future [Table 4].

Students felt that they were less actively involved in tutorial as the session and it was “rerun” of class and only few members dominated the session. Further, they felt that it was facilitator dominated the session with less opportunities of peer-assisted learning [Figure 1].

---

**Table 2: Comparison between blunder lecture method and tutorial method by paired t-test**

<table>
<thead>
<tr>
<th>Name of topic</th>
<th>Blunder lecture method</th>
<th>Blunder lecture method</th>
<th>Tutorial method</th>
<th>Tutorial method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory system</td>
<td>Group A (n=58)</td>
<td>Group A (n=58)</td>
<td>Group B (n=58)</td>
<td>Group B (n=58)</td>
</tr>
<tr>
<td>(Pre-test) Mean±SD</td>
<td>(Post-test 20) Mean±SD</td>
<td>(Pre-test 20) Mean±SD</td>
<td>(Post-test 20) Mean±SD</td>
<td></td>
</tr>
<tr>
<td>11.08±1.38</td>
<td>14.98±1.51</td>
<td>10.56±1.36</td>
<td>13.68±1.26</td>
<td></td>
</tr>
<tr>
<td>p&lt;0.0001, t=14.5197, df=114</td>
<td>p&lt;0.0001, t=12.8164, df=114</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special senses</th>
<th>Group B (n=58)</th>
<th>Group B (n=58)</th>
<th>Group A (n=58)</th>
<th>Group A (n=58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td></td>
</tr>
<tr>
<td>12.17±1.28</td>
<td>15.01±1.34</td>
<td>12.72±1.68</td>
<td>15.02±1.38</td>
<td></td>
</tr>
<tr>
<td>p&lt;0.0001, t=11.6716, df=114</td>
<td>p&lt;0.0001, t=8.0567, df=114</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P value is significant<0.05: n=116

**Table 3: Comparison between absolute gain in score by blunder lecture method and tutorial method on unpaired t-test**

<table>
<thead>
<tr>
<th>Name of topic</th>
<th>Group (n=116)</th>
<th>Absolute gain in test score Mean±SD</th>
<th>P value (unpaired test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory system (Day 1)</td>
<td>Group A (n=58)</td>
<td>Blunder lecture method 3.26±0.96</td>
<td>=&lt;0.0001, t=7.6258, df=114</td>
</tr>
<tr>
<td></td>
<td>Group B (n=58)</td>
<td>tutorial 1.76±1.15</td>
<td></td>
</tr>
<tr>
<td>Special senses (Day 2)</td>
<td>Group A (n=58)</td>
<td>Tutorial 1.64±1.28</td>
<td>=&lt;0.0001, t=8.3672, df=114</td>
</tr>
<tr>
<td></td>
<td>Group B (n=58)</td>
<td>Blunder lecture method 3.48±1.08</td>
<td></td>
</tr>
</tbody>
</table>

P value is significant<0.05, n=116

---

Figure 1: Students’ perception on Blunder lecture and tutorial session for SGD

be valuable tool for collaborative learning to learn from their peers. They were excited to have future sessions on blunder lecture on various topics and suggested that it should be done at least once a month.
Further, it was also observed that the students perceived “detection of blunders” as an “interesting” way to identify lacunae in their knowledge. They were able to gain insight into different topics that were either “overlooked” or “thought” to be irrelevant by them. The students felt motivated to “revisit topic” to develop a better understanding. They acknowledged the fact that deeper understanding of topic was required to solve the blunders. This insight in learner will be a valuable attribute to develop into a self-directed learner. For, it is well acknowledged that intrinsic motivation is a key trait in lifelong learner.

“Blunder lecture” is in line with Piaget’s cognitive theory where “cognitive-conflict” is central to cognitive development. The “anomalous data” are introduced in the form of blunders (mis-concepts) that create a state of cognitive-conflict. The presentation of contradictory data to the learners’ results in cognitive conflict (disequilibrium) that motivates them and they attempt to resolve conflict (equilibration) to achieve a balance or “cognitive harmony.” The process of cognitive development involves three steps of learning and memorization – acquiring, storing, and retrieving information for internal cognitive restructuring.

The study revealed that the mis-concepts incorporated in the blunder lecture acted as a “trigger” to activate students’ prior knowledge acquired in the didactic lectures.

Limon had found a direct correlation of “prior knowledge” in the learners with the successful applications of the cognitive conflict strategy. He stated that awareness of conflict was the first step of the process of integrating the new information. Students have to realize (be aware) that there are differences, and probably also similarities, between their knowledge and the new information.

Hence, prior knowledge can be considered an essential pre-requisite for creating a “meaningful conflict” that can

<table>
<thead>
<tr>
<th>Open-ended questions</th>
<th>Codes</th>
<th>Themes</th>
<th>Representative comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What went well in the session?</td>
<td>Revise concepts</td>
<td>Recollection of prior knowledge</td>
<td>“Learned topics which were overlooked by me”</td>
</tr>
<tr>
<td></td>
<td>Challenging interesting activity</td>
<td></td>
<td>“Helped in filling loopholes in my knowledge”</td>
</tr>
<tr>
<td></td>
<td>Peer-assisted learning</td>
<td></td>
<td>“It made understand more deeply and interestingly”</td>
</tr>
<tr>
<td></td>
<td>Active group interaction</td>
<td></td>
<td>“Covered a lot topics in very short time”</td>
</tr>
<tr>
<td></td>
<td>Future sessions on blunder lecture of SGD.</td>
<td>A challenging and interesting way</td>
<td>“Was attentive throughout session”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“It was like game of Blunder Busting. Loved it”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promoted active learning</td>
<td>“I was geared up to find blunders in lecture”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promoted collaborative learning.</td>
<td>“Motivated to study topic again”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I know now what I know and what I need to study again”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I had not gone through the topic deeply”</td>
</tr>
<tr>
<td></td>
<td>Recommend for SGT sessions and other topics as well</td>
<td>“We learned from all our friends”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Topic covered was well revised by this method”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Small-group discussion helped us in clearing doubts”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“The way we discuss the topics in group and rectify blunders was quite interesting”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Our group scored highest mark”</td>
<td></td>
</tr>
<tr>
<td>2. What can be improved?</td>
<td>Inform earlier about session</td>
<td>Regular activity of blunder lecture in department</td>
<td>“Didn’t come fully prepared but yes learned a lot by this method, so didn’t participate”</td>
</tr>
<tr>
<td></td>
<td>Time for lecture</td>
<td></td>
<td>“Now we know how this is done.so it will be better next time.”</td>
</tr>
<tr>
<td></td>
<td>Group activity.</td>
<td></td>
<td>“Hold it regularly else no use”</td>
</tr>
<tr>
<td></td>
<td>Involve all students</td>
<td>Increasing the duration of blunder lecture session.</td>
<td>“Time management”</td>
</tr>
<tr>
<td></td>
<td>More discussion time.</td>
<td></td>
<td>“The presentation may be given more time”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“More blunders can be discussed in lecture”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better group coordination.</td>
<td>“Make small groups”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Confusion in group in some blunders”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Some members didn’t participate while some dominated”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“All wanted to present blunders”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Time for discussions</td>
<td>“Time must be more for group discussion”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Less time was given for discussion of blunders in presentation”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“At the end give another lecture to clarify blunders once again”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“A bit of coordination while discussion”</td>
</tr>
</tbody>
</table>
be challenged with “anomalous” information. In the study, 70% of students were able to correctly detect the blunders with their existing knowledge on the topic. Hence, blunder lecture sessions can be viewed as an opportunity to obtain insights into students’ understanding of the concepts that were covered in lectures.\(^{[13]}\)

Di Carlo\(^{[9]}\) had advocated that the teachers should try to arouse readiness in the learners. This can be done by adopting a fun way of learning rather than just focusing only on the content to be covered in the lecture. He believed that once the learners are motivated and interested, the content delivery can be done seamlessly.

To trigger the readiness in learners, it is necessary to evoke curiosity in learner for the content to be covered in the session. This can be achieved by addressing learning needs of students by making the content engaging to capture the interest of the students besides being relevant to achieve the desired outcomes.

Blunder lecture has been effectively used in classroom setting to enhance the learning of students.\(^{[13,14]}\)

Lee and Kwon\(^{[20]}\) observed that when learners recognize a situation incongruous with their conceptions, they become interested in learning process.

Learning and participation are inseparable.\(^{[21]}\) Group activity during blunder lecture session allowed the learners to learn collaboratively and competitively from their peers.

The very design of the blunder lecture is participatory where the students are eager to spot the mistakes and, in the process, they learn and remember the concepts.\(^{[22]}\)

Prakash et al. found that students preferred the blunder lecture method for the revision of topics over seminars and tutorials.\(^{[15]}\)

Various studies have revealed the paucity of conventional tutorials to promote active learning. The reported pitfalls in a tutorial session include a low level of student participation, discussion dominated by a few students, or an insufficient variety of activities in a session.\(^{[5,10]}\)

Deep thinking is essential because understanding is the residue of thinking.\(^{[19]}\) In the study, the designing of blunders (mis-concept) was done to create a meaningful conflict, as the presentation of only “anomalous” data has no relevance without a “meaningful conflict.” Only a “meaningful cognitive conflict” causes cognitive restructuring hence every effort should be made to challenge the reasoning abilities of students.

Satinder et al. in the study found that blunder lecture technique facilitates deep thinking in a fun way of learning.\(^{[13]}\)

However, in the present format of tutorial fails to promote higher order skill in the students, as it has more of the teacher-controlled activity with little or no active involvement of learners.\(^{[10]}\) The conventional tutorial is converted to “mini-lectures” where the “tutor” tries to reinforce the concept, clarify doubts, and the learners are passively involved. This passivity or disinterest is perceived as the biggest hurdle in the progress of the learner.

A need has been felt since long to bring modifications in the tutorial to suit to present curriculum. Several studies have suggested modifications in tutorial sessions for developing competent professionals who have better communication and self-directed learning skills.\(^{[4,8,23]}\)

Various studies have established blunder lecture as an efficacious tool to supplement the didactic lectures. Students perceive blunder lecture as a useful tool to revise innovatively and also gain insight into their learning.\(^{[4,13,14]}\)

**Strengths of this Study**

The study tools were validated by MEU and subject experts from department and fellows of Advance course in Medical Education which offered greater reliability, validity and authenticity in the study. The study had meticulously designed ‘blunder lecture module’ so that all the levels of Bloom’s Taxonomy could be explored. This provided the learner with an opportunity to uncover his understanding in all cognitive domain. The study was done during scheduled small-group discussion sessions, no extra time and preparation were required. The study was feasible with requirement of minimal resources to implement the study. This ease in study design facilitated the enthusiastic participation by the department faculty to the new methodology adopted for SGD. In the study we had an Eighty nine percent response rate by study participants on feedback questionnaire which provided us a greater insight to the perception of students about the two methodologies.

**Limitation of Study**

The study was conducted only in the department of physiology, hence, the study results cannot be generalized. Many similar studies will have to be carried out in various departments and institutes to generalize the findings. Long-term knowledge retention could not be assessed due to the COVID-19 pandemic. Written assessment for long-term retention can be planned for future studies.

**CONCLUSION**

Blunder Lecture facilitates a deeper learning of the subject in the undergraduates. Hence can be used as an effective reinforcement tool during SGD in physiology and in
other subjects to reveal the on understanding of subject by the students in an challenging way. Since the results are favorable by blunder lecture sessions, it might be worthwhile to conduct further studies to investigate its role in different settings. It also suggested that studies for planning modification in conventional tutorial can be worked out to ingrain the principles of active learning in students.

ACKNOWLEDGMENT

We thankful to all the resource faculties of Advance Course in Medical Education of NMC Nodal center for their constant guidance and mentoring. We would like to thank our students for actively participating in this study and giving their true feedback. We would also like to thank our departmental faculty and Medical Education Unit who helped us carry out this project.

REFERENCES

8. Parmar P. Comparative study between interactive structured tutorials and traditional tutorials in Forensic medicine subject. IAIM 2015;2:61-3.