Large group interactive learning among first year medical students: A comparative study

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Abstract

Introduction

Learning is an active process. Lectures are the most commonly used method for large group teaching in medical education. Traditional didactic lectures cater to scientific delivery of information in a systematic and organized way by a competent individual in the selected field[1]. Didactic lecture for an hour becomes monotonous after 15-20 mins as there is no involvement of students thereby promoting passive learning [2].

However, lectures are less effective when instructional goals involve imparting application of content and facilitation of critical thinking, analysis and decision making[3].

There is a need to restructure our lectures to promote them as effective learning tool to foster critical thinking [4]. The best approach is to engage an interactive lecture which involves interchange of ideas between teachers, students and lecture content[5,6]. Recently with implementation of competency based medical education, active learning by medical students is being recommended by National Medical Council. Inspite of these recommendations, quite a few faculty are reluctant to engage interactive teaching. These facts initiated us to undertake this educational scholarship with an aim of facilitating active learning among first year medical students by means of interactive lectures.

Objectives:

1. To facilitate active learning among first year medical students by engaging of interactive lectures.
2. To evaluate effectiveness of interactive lectures by comparing with traditional didactic lectures

Methodology

Study setting: Department of Biochemistry.

Study participants included 1st year medical students.

Study duration: 1 February 2021 to 1 December 2021

Study design: Educational intervention study with cross-over design

Implementation process: Total of 245 students were divided into 2 batches. Batch A of 123 students were taught in a traditional didactic way and batch B of 122 students were engaged interactive lectures for a period of 8 weeks. First formative assessment using MCQ test comprising of 75 questions was conducted to assess the effectiveness of intervention. Cross-over of batches was done, batch A was engaged with interactive lectures and batch B with didactic lectures for the next 8 weeks and at the end, second formative assessment was conducted using MCQ test comprising of 75 questions.

Intervention: Interactive strategies/techniques used:

1. Rhetorical questions were used before commencing the class just to stimulate interest among students without expecting answers from them.
2. Brainstorming session at the beginning of the class to assess students baseline knowledge.
3. Think pair share activity to facilitate student-student interaction.
4. Short video related to lecture content followed by reflection by students to facilitate higher order thinking skills was used whenever relevant content was delivered.
5. Case vignettes to facilitate application of content to provide clinical relevance were used wherever needed.

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6. Linking content with other topics/subject to trigger concept of integration
7. Recall by students to promote ability to summarize the content.
8. Multiple choice questions were used at the end of the class to assess the effectiveness of learning by students and to foster self-assessment by them.

Not all strategies/techniques were used in a single lecture. A lot of planning was involved to choose appropriate interactive strategy relevant to the content to be engaged. Interactive lectures started with rhetorical questioning or brain storming for 5mins followed by content delivery for 20 mins. Either think pair share activity or short video display followed by reflections or solving of case vignette or asking them to link the lecture content with other topic/subject as per need of the content was carried out for 10mins. Lecture was continued for the next 15mins. Multiple choice question test was conducted at the end of the class for 5mins. For the last 5mins, students were called on random basis to summarize the content and any misconceptions were clarified by faculty. (Figure 1)

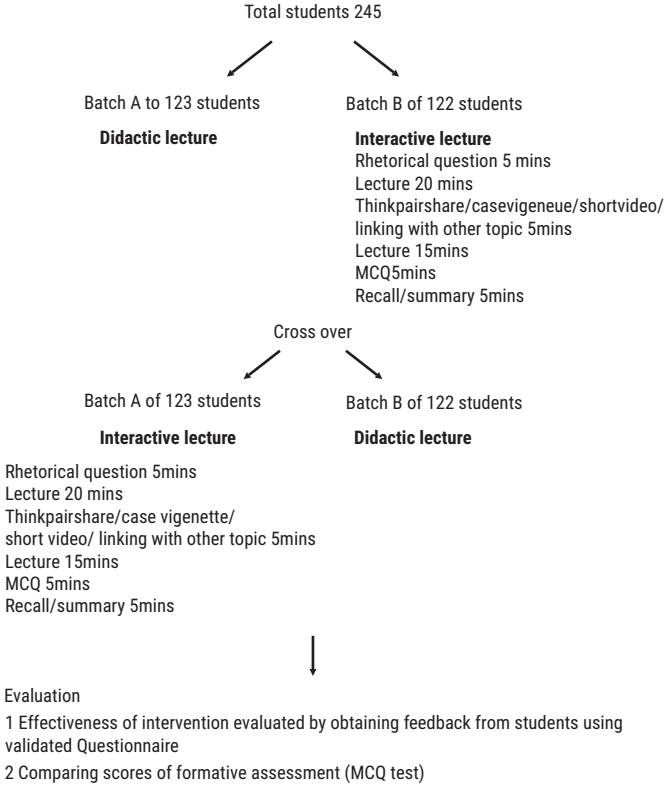


Figure 1: Overview of methodology

Evaluation of intervention

1. Feedback questionnaire. Questionnaire was designed incorporating components related to interactive strategies/techniques on a 5-point Likert scale ranging from strongly agree to strongly disagree. It was validated by subject experts and MEU members. Internal consistency calculated by Cronbach's alpha was 0.9 (table1). Descriptive statistics (frequency) was used to analyze responses.
2. Comparing score of formative assessment conducted at the end of all interactive and traditional didactic lectures.

Table 1: Feedback questionnaire to evaluate effectiveness of interactive lectures

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Interactive teaching improved your attention span					
Interactive teaching provided safe environment for learning					
Interactive teaching facilitated better understanding of topic					
Interactive teaching stimulated critical thinking					
Interactive teaching facilitated application of content					
Interactive teaching fostered higher order thinking skills including analysis, decision making					
Interactive teaching facilitated self-assessment					
Interactive teaching improved communication skills					
Interactive teaching provided feedback regarding learning content					
Which interactive activity is liked by you the most?					

Results

Effectiveness of intervention was assessed using Kirkpatrick's first two levels of evaluation.

1. Level 1/ reaction was assessed by obtaining students feedback on interactive lectures using a validated questionnaire.

95% of our students perceived that interactive lecture improved their attention span, provided safe environment for learning and stimulated critical thinking. 97% opined that they understood topics better with ability to apply the content. 90% stated that interactive teaching improved their communication skills, stimulated higher order thinking skills thereby facilitating effective learning. 83% perceived that engaging in interaction provided immediate feedback allowing them to identify their areas of weakness and strengths. (Table 2)

Table 2: Student feedback on effectiveness of interactive lectures

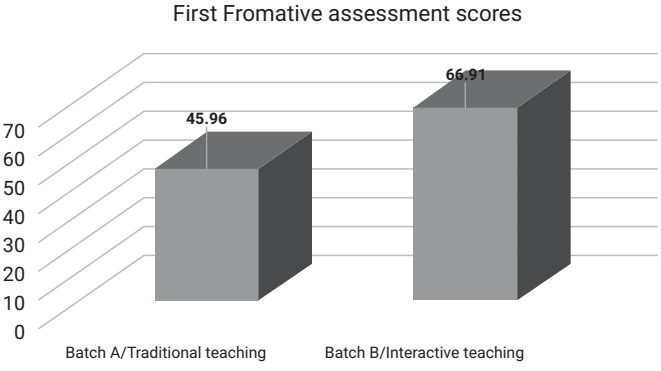
	Strongly agree N (%)	Agree N(%)	Neutral N(%)	Disagree N(%)	Strongly disagree N (%)
Interactive teaching improved your attention span	50 (40%)	45 (36%)	28 (22%)	-----	------
Interactive teaching provided safe environment for learning	40 (32%)	55 (45%)	28 (22%)	------	------
Interactive teaching facilitated better understanding of topic	45 (36%)	52 (42%)	26 (21%)	------	------
Interactive teaching stimulated critical thinking	50 (40%)	45 (36%)	28 (22%)	------	------
Interactive teaching facilitated application of content	45 (36%)	52 (42%)	10 (8%)	6 (5%)	-----
Interactive teaching fostered higher order thinking skills including analysis, decision making	30 (24%)	60 (48%)	20 (16%)	15 (12%)	-----
Interactive teaching facilitated self-assessment	40 (32%)	55 (45%)	28 (22%)	------	----
Interactive teaching improved communication skills	30 (24%)	60 (48%)	20 (16%)	15 (12%)	-----
Interactive teaching provided feedback regarding learning content	28 (22%)	55 (45%)	14 (12%)	6 (5%)	-----

Among different interactive strategies used, solving case scenario was the activity liked most by all students followed by solving multiple choice questions, think pair share, reflecting after watching short video. Rhetorical question, brain storming, recall, linking with other topic and subject were appreciated to lesser extent (figure 2) may be because the baseline knowledge of first year students is limited. With acquisition of more and more knowledge they will be able to participate effectively in these interactive strategies too.

1. Rhetorical question
2. Brain storming
3. Think-pair-share
4. Solving Case vinegette
5. Recall
6. Solving Multiple choice question
7. Short video
8. Linking with other topics

Figure 2: Interactive Activities Liked By Students

Level 2/ learning. This was assessed during formative assessment by administering multiple choice question test. Average score of first formative assessment of Batch B students engaged in interactive lectures was 66.91±2.97 and batch A students who were engaged traditional didactic lecture scored 45.96±3.19 (figure 3).

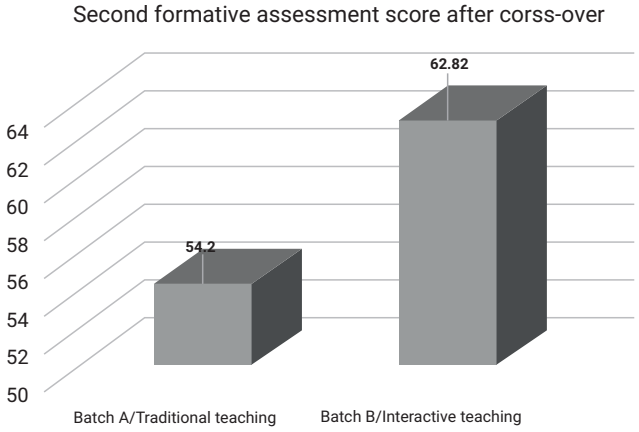


Difference between scores of both the batches analysed by Unpaired t test was found to be statistically highly significant with p<0.001

Figure 3: First formative assessment score

After cross-over, Batch A students who were engaged interactive lectures scored 62.82±4.64 when compared to batch B students who were taught with didactic lectures scored 54.2±5.39 (figure 4)

Scores revealed that students who were part of interactive lectures scored better over students who were exposed only to traditional didactic lecture.



Difference between scores of both the batches analysed by Unpaired t test was found to be statistically highly significant with p<0.001

Figure 4: Second formative assessment score

Discussion

It is well documented that student's attention can be captured by engaging them actively using interactive lectures[7]. Active learning promotes better retention of topic, clarifies the doubts better, facilitates development of communication skills and better reproducibility[8]. Feedback is an essential part of learning. Interactive teaching and learning allow teachers to receive feedback about students' perception so that this could be used to modify their teaching accordingly[9].

The Medical Council of India in 2018 outlined five competencies for Indian Medical Graduate. The graduate should posses' requisite knowledge, skill, attitude, value and responsiveness so that he/she function appropriately and effectively as physician of first contact of community while being globally relevant[10]. To cater to these attributes of IMG, various changes has been suggested in teaching learning methods. More emphasis is given to interactive lectures, small group discussions, formative assessments, multiple assessments and many more. However, flexibility is given to individual institution and faculty to design and develop their unique interactive teaching learning strategies to make their students active leaners.

We were able to use variety of interactive teaching strategies to develop our own module of interactive teaching. We had used rhetorical question, brainstorming, think-pair-share, case vignette, short video, multiple choice questions, recall/summarizing to engage our student as active learners. These interactive lectures were very well appreciated by our students. They perceived that interactive teaching improved their attention span, motivated them to participate actively, fostered critical thinking thereby facilitating effective learning(table2). A lot of planning is needed by the faculty to structure their lecture content and incorporate interactive strategies at relevant interval without compromising on the allotted topic and time. However, continuous involvement in engaging interactive lecture will definitely make us proficient. Further positive feedback by our students is a motivating factor to try out different innovative interactive techniques to facilitate them to become active learner.

Conclusion

There was good acceptance for interactive teaching among students when compared to traditional didactic lectures. Interactive lectures definitely facilitated good interaction among teacher and students, provided safe environment for learning, improved their attention span, enhanced their critical thinking skills, ability to apply the content, facilitated collaborative learning by peer interaction thereby promoting them as active learners.

Challenges faced

A lot of preparation is needed by faculty with high degree of motivation. Lecture needs to be highly structured. Appropriate interactive activities have to

be chosen at relevant interval during lecture delivery. Sometimes interactive activities did consume more time than allotted because not all students responded quickly. Had to engage extra class to cover that content. Some students were passive, had to motivate them to participate.

We could systematically conduct two interactive sessions of 8 weeks each for each batch followed by formative assessment at the end of every 8 weeks. We could not continue this for the entire academic year due to implementation of lockdown to curb transmission of SARS-CoV2 where entire batch was engaged with online teaching.

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