



## INTERACTIVE TEACHING IN MICROBIOLOGY : UNDERSTANDING PERSPECTIVES OF II MBBS STUDENTS

Dr G. Pavani\*

Professor , Dept of Microbiology, Apollo Institute of medical sciences and research, Hyderabad \*Corresponding Author

### ABSTRACT

**Background :** Lectures constitute an important mode of teaching. But a long lecture can fail to hold attention till the end of the class. Hence there is a need for innovative techniques to plan lectures to sustain student attention.

**Materials and Methods:** The present study was conducted on 100 IInd MBBS students .About 6 interactive teaching methods - brainstorming with picture prompt, empty outlines, arrange in sequence ,Socratic questioning ,muddiest point and one sentence summary were introduced in the course of the lectures . Later the perceptions of the students were elicited regarding these sessions based on Likert scale using a questionnaire, which was validated in a pilot study.

**Results:** Validation of the scale indicated good internal consistency with Cronbach's alpha coefficient of 0.9. 86% of the students liked the sessions. Most popular interactive technique was brainstorming with picture prompt followed by muddiest point and empty outlines . Most students opined that interactivity improved the attention span during the lecture ,improved their alertness , aided in the retention of the knowledge after the class and also helped them in clearing doubts. .

**Conclusion:** Interactive sessions during lectures should become an integral part of all lectures to make lectures interesting and effective.

**KEYWORDS :** Interactive teaching methods ,Lecture, MBBS students

### INTRODUCTION

With the Innovations in instructional methodologies and technologies , our concerns as medical teachers are to promote effective learning to develop active, interactive, engaged, student-centred teaching to facilitate higher order thinking . Given that student's attention span is around 15 to 20 minutes only and classes in a medical college last for an hour, we need to do something to control students attention. <sup>1</sup> To break the monotony of instruction in medical colleges, interactive teaching methods can be introduced in the lectures to inculcate interest in the subject. . Interactive teaching is engaging ,enjoying adaptable , flexible,student centric teaching -learning style which also makes the students more independent <sup>2</sup> Literature reveals that there are a number of new interactive teaching methods for conducting interactive lectures which include Picture Prompt, Think Break , Cliffhanger Lecturing ,Choral Response ,Grab a Volunteer ,Socratic Questioning , Quote Minus One ,Empty Outlines , Discussion Row, Recall-Summarize- Question- Connect and Comment ,Brain storming ,Mind Dump ,muddiest point ,One sentence summary etc. <sup>3,4</sup> Though there are a number of Interactive teaching methods ,we need to choose the interactive techniques which suit our medical speciality for teaching . Hence the present study was conducted to introduce six interactive teaching methods in lectures for 2<sup>nd</sup> MBBS students in microbiology and to study the effectiveness of these methods based on the student perception.

### MATERIALS AND METHODS

The present study was conducted in the Department of Microbiology of AIMSR, involving 100 IInd MBBS students. Initially, a pilot study was conducted with two interactive teaching sessions for 30 students to introduce the students to the concept of interactive teaching. Feedback was taken from the students about their perception of these interactive teaching sessions by using a prevalidated questionnaire which was validated by administering to a group of students. Internal consistency was assessed by Cronbach's alpha coefficient using Statistical software SPSS Version 17 to calculate Cronbach's alpha coefficient. A Cronbach's alpha of more than 0.7 was taken as a satisfactory internal consistency. After this ,a series of interactive teaching sessions were planned and interactive techniques were introduced in the lesson plans for 2 months which included 10 lectures by the same teacher.During the course of the lectures, 6 interactive teaching learning methods such as brainstorming with picture prompt , empty outlines,arrange in a sequence ,socratic questioning ,muddiest point and one sentence summary were introduced in the lectures . Usually a Microbiology theory class would be dealt with under the following headings – morphology of the organism causing disease , cultural characteristics ,biochemical reactions ,pathogenesis/life cycle and lab diagnosis of the organism. We introduced the interactive teaching method 'Brainstorming with picture prompt ' at the beginning of the lecture by displaying pictures related to the topic without any labels and asking the students what information they infer from the pictures . The interactive teaching method- 'Empty outlines' another interactive teaching method was used in the middle of lectures after discussing the morphology ,cultural characters and biochemical reactions . Empty outlines of the topic are given and the teacher asks the student to fill in

the gaps . The interactive teaching method ' Arrange in a sequence ' was used after discussing the pathogenesis or the lifecycle . Before discussing the lab diagnosis, we used the interactive method 'Socratic reasoning' as the student needs to relate the diseases discussed in the pathogenesis to the patient samples to be collected . We used muddiest point as the penultimate interactive method to clear the students doubts . The student is asked to write in a piece of paper which part of the lecture the students have not understood. The teacher randomly collects the chits from the students and discusses the doubts .To conclude the class we used the interactive method 'one sentence summary' . The teacher asks students to write down a one sentence summary of the class giving a minute time after which the students are asked randomly to read out what they have written . This method enables the teacher to know what the students have understood from the class . After this the validated questionnaire was administered to the students to elicit their perceptions on the interactive sessions they participated in.

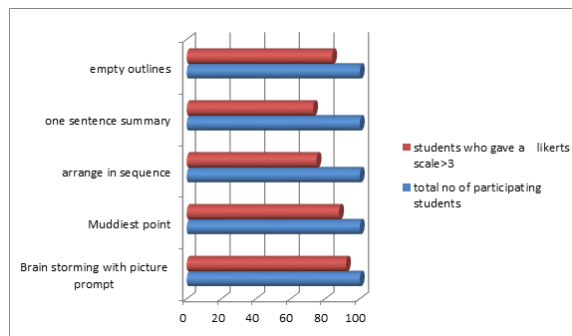
### RESULTS

The pilot study on 30 students to validate the instrument for internal consistency yielded a Cronbach's alpha coefficient of 0.9 indicating good internal consistency. Face, content and consensual validity was also rated satisfactory by experts.The student's responses in the feedback form were given using Likert's scale 1-5. Student's interest in interactive lecture was evident from the feedback they gave after the special session.

This was followed by 10 interactive sessions in large group. The feedbacks from the students using the validated questionnaire were summarized using descriptive statistics. Summative data analysis was carried out of the related questionnaire.

The interactive lectures were liked and enjoyed by 78%of the students Among the 6 interactive teaching techniques incorporated in the lectures , Brainstorming with picture prompt was most liked by most of the students[92%],followed by muddiest point [88%] and empty outlines technique.[84%] .

**Figure 1 showing the students choice for the 6 interactive methods :**



**Table 1 showing the response of Students on Design and Utility of interactive sessions**

Item	Total no of students participated	No[%] of students giving Likerts score >3 for the item	No of students giving Likerts score <3 for the item
Increased understanding of the topic	100	82 [82%]	18 [18%]
Created an easy learning environment and enjoyed them	100	80 [80%]	20 [20%]
Gained more knowledge and stimulated thinking	100	84 [84%]	16 [16%]
Felt enthusiastic and motivated to participate	100	23 [23%]	11 [11%]
Felt encouraged to discuss	100	78 [78%]	22 [22%]
Useful and clarified my doubts	100	88 [88%]	12 [12%]
There was emphasis on key points	100	87 [87%]	13 [13%]
The interactive sessions were interesting	100	80 [80%]	20 [20%]
The use of interactive methods is relevant in medical schools	100	73 [73%]	27% [27%]
Felt more alert then in the regular class	100	86 [86%]	24 [24%]
Able to concentrate for more time than before .	100	75 [75%]	25 [25%]
Able to retain more after the class	100	76 [76%]	24 [24%]
Sessions are different but not sure whether they helped me to learn more	100	23 [23%]	77 [77%]
Liked the sessions and wanted all classes to be converted into interactive classes.	100	78 [78%]	22 [22%]

The students felt that interactive lectures were interesting , the interactivity improved their attention span , aided in better understanding of the topic, created an easy learning environment , helped them gain more knowledge by stimulation of their thought process and were useful and clarified their doubts . They also felt enthusiastic and motivated to participate and discuss during these sessions ,were able to concentrate for more time and retain more information after the class than before.They felt that there was emphasis on key points and want all classes to be converted into interactive classes..Only few students did not appreciate the use of interactive methods.

## DISCUSSION

Medical education has changed significantly over the past few decades.<sup>5</sup> One of the current themes of medical education is the shift from a teacher centred approach to a learner centred approach, where the emphasis is on what the students learn.<sup>6</sup> To achieve this shift, the traditional didactic teacher should be replaced by a learning facilitator , and traditional didactic teaching methods should be replaced by interactive teaching . Over the past decade, reform efforts in medical and health care education curricula have emphasized the importance of active learning to improve student engagement and critical thinking skills.<sup>7-11</sup> Key medical education conferences, such as the International Association for Medical Science Educators, have included workshops and instructional guides to improve active learning techniques.<sup>12</sup> Interactive teaching is a method which incorporates both the student centric approach as well as active learning in students<sup>13</sup>

We incorporated five different interactive methods such as picture prompt with brainstorming , arrange in a sequence ,Socratic questioning ,muddiest point and one sentence summary in our lectures. Majority of the students liked Brain storming with picture prompt followed by muddiest point and empty outlines . Brain storming with picture prompt can activate the students to think, can serve as excellent set induction method , can make the lecture interesting and also allows the student to have a general idea of the topic upon which the rest of the lecture can be reinforced . The incorporation of muddiest point at the end of the class enables the students to clear their doubts and is specially advantageous for students who are scared of asking doubts in the class.

Borkaret al's study on interactivity in community medicine classes also found that all students were in favor of interactive lectures and found that smallgroup discussion was the most liked teaching learning method.<sup>3</sup> A study in UK revealed MCQs as the best interactive method .<sup>15</sup> Anshu Gupta et al incorporated of interactive teaching strategies like case based scenario, think pair and share, quiz and role play in her study.Quiz was the most preferred method of interaction in her study<sup>16</sup> Dr. Mrunal R. Shenwai et al's study revealed that interactive methods like Crossword puzzle , Arrange in sequence , Fastest finger first and 'confusion' technique were effective methods.<sup>17</sup>

Different Interactive teaching methods were tried by many teacher researchers and it is found that it helps in better understanding and should be incorporated into the curricula for teachers of various fields.

## CONCLUSION

The present study emphasises that interactive teaching is definitely preferred by the students of 2nd MBBS in learning Microbiology. The novel role assumed by a teacher as a facilitator in interactive lectures is better appreciated by the students as against a teacher delivering didactic lectures. Hence wherever possible interactive lectures should be incorporated in microbiology classes . Brainstorming with picture prompt - empty outlines, arrange in sequence – socratic questioning - muddiest point – one sentence summary is an effective interactive model which could be incorporated in lesson plans of teachers for teaching microbiology classes in medical schools.

## REFERENCES

- Lise M, Robin K P, Charlyn K, Christine M.Tracking Active Learning in the Medical SchoolCurriculum: A Learning-Centered Approach.. Journal of Medical Education and Curricular Development 2018;5: 1–9
- Pavani G, Reddy NVN, Jyothi Lakshmi GM.Evaluation of microteaching as a new teaching modality in microbiology in a medical college setup .Journal of Microbiol. Biotech. Res., 2015, 5 (2):5-7
- Archana C. B, Shirish S. C, Sunita A. B. Interactive teaching: Understanding perspectives of II MBBS students in Pathology.Medical Journal of Dr. D.Y. Patil University. 2014; 7 (60): 693-695
- Senthamarai S. Interactive teaching strategies.Journal of Applied and Advanced Research. 2018; 3( 1):36-38
- Doherty M, Dawes P. Student teaching, guidelines in the undergraduate curriculum in the UK. Br J Rheumatol. 1992; 31:409–412
- Spencer JA, Jordan RK. Learner centred approaches in medical education. BMJ 1999; 318:1280–1283
- Stuart G, Triola M. Enhancing health professions education through technology: building a continuously learning health system. In: Proceedings of a conference recommendations. The Josiah Macy Jr Foundation. 2015; 1: 1-15.
- Krisberg K. Flipped classrooms: scrapping lectures in favor of active learning. AACM News. 2017;1:1.
- Freeman S, Eddy S, McDonough M. Active learning increases student performance in science, engineering, and mathematics. Proc Natl Acad Sci U S A. 2014;111:8410–8415.
- Stewart D, Brown SD, Clavier CW, Wyatt J. Active-learning processes used in US pharmacy education. Am J Pharm Educ. 2011;75:68.
- Fornari A, Poznanski A. How-to Guide for Active Learning. IAMSE.2017;1:1-3
- Peter A, Maya P,Erika J, Martha W. Active Learning and Student-centered Pedagogy Improve Student Attitudes and Performance in Introductory Biology . Life Sciences Education 2009; 8: 203–213.
- Archana C B, Shirish S C, Sunita A B. Interactive teaching: Understanding perspectives of II MBBS students in Pathology.Medical journal of Dr. D. Y. Patil Vidyapeeth. 2014 ; 7 ( 6 ) : 693-695.
- Armstrong P, Elliott T, Ronald J, Paterson B. Comparison of traditional and interactive teaching methods in a UK emergency department. Eur J Emerg Med 2009;16:327-9.
- Anshu G, Karun B, Rani W, Pallak A, Sandeep K Implementation of Interactive Teaching Learning Methods in large Group in Endocrine Pharmacology.Indian Journal of Pharmacy and Pharmacology, October-December 2015;2(4):197-202
- Dr. Mrunal R. S. Interactive interventions for enhanced active learning in first M.B.B.S.students.International J. of Healthcare & Biomedical Research.,2013;2( 1): 8-11.