

Introduction of active learning method in learning physiology by MBBS students

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ABSTRACT

Context: Active learning has received considerable attention over the past several years, often presented or perceived as a radical change from traditional instruction methods. Current research on learning indicates that using a variety of teaching strategies in the classroom increases student participation and learning. **Aim and Objectives:** To introduce active learning methodology, i.e., “jigsaw technique” in undergraduate medical education and assess the student and faculty response to it. **Subjects and Methods:** This study was carried out in the Department of Physiology in a Medical College of North India. A topic was chosen and taught using one of the active learning methods (ALMs), i.e., jigsaw technique. An instrument (questionnaire) was developed in English through an extensive review of literature and was properly validated. The students were asked to give their response on a five-point Likert scale. The feedback was kept anonymous. Faculty also provided their feedback in a separately provided feedback proforma. The data were collected, compiled, and analyzed. **Results:** Of 150 students of MBBS-first year batch 2014, 142 participated in this study along with 14 faculty members of the Physiology Department. The majority of the students (>90%) did welcome the introduction of ALM and strongly recommended the use of such methods in teaching many more topics in future. 100% faculty members were of the opinion that many more topics shall be taken up using ALMs. **Conclusion:** This study establishes the fact that both the medical students and faculty want a change from the traditional way of passive, teacher-centric learning, to the more active teaching-learning techniques.

Key words: Active learning, jigsaw technique, learning skills, students, teaching methodology

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INTRODUCTION

While lecturing is an important aspect of university instruction, it is not necessarily the only or best way of engaging students in the ideas and information we are presenting. Lecturing induces passivity of thought, even in the best of students.^[1] This method of teaching is being seen as teacher-centric wherein the role of the student is reduced to mere listeners.

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^[2,3]Active learning is often contrasted to the traditional lecture where students passively receive information from the instructor.^[4,5]

Whereas active learning has attracted strong advocates among faculty, for many there remain questions about what active learning is and how it differs from traditional education.^[6] Current research on learning indicates that using a wide variety of teaching strategies in the classroom increases student participation and learning.^[7,8] More importantly there is a shift in medical education toward educating physicians who can work as team members as part

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of a health team.^[9,10] Various active learning methods (ALMs) have been proposed that ensure the active participation of students.^[11-13] One of the ALMs is jigsaw method.^[14,15] In jigsaw technique a particular topic is divided into subtopics and allotted to students for self-learning. The students are allotted serial numbers and divided into primary groups and subtopics are allotted accordingly. After this, there is further grouping and re-grouping in a particular way where these subtopics are discussed by students among themselves and hence learning occurs actively without much aid from a teacher.

The purpose of this study was to introduce ALM (jigsaw technique) in teaching physiology to first year MBBS students and to assess the student and faculty response to this methodology through a properly designed feedback questionnaire.

SUBJECTS AND METHODS

This study was carried out in the Department of Physiology in a Medical College of North India. A prior approval from the institutional ethical committee was taken. The students and the teaching faculty were informed that the active learning strategy will be introduced in learning a particular topic. To make them familiar with the methodology a power point presentation was given both to students and faculty wherein purpose and technique of various ALMs were explained and discussed in detail with particular emphasis being laid on jigsaw technique,^[14,15] that was going to be used in this study.

A total of 150 first MBBS students formed our study group. Eight students did not turn up hence leaving a study group of 142. A topic “circulatory shock” was chosen from the chapter of cardiovascular physiology. The topic was subdivided into five subtopics. On day 1 - the students were randomly allotted serial numbers 1–10. Now the students were divided into 14 primary groups designated as group 1 to group 14 and each group had students from serial number 1–10, hence, a total of 140 students. The remaining 2 students were allotted one each to group 13 and 14. Students with serial no. 1 and 2 were assigned subtopic 1, with serial number 3 and 4, subtopic 2, etc. Hence, 5 subtopics were divided among 10 serial numbers. The students were asked to read about the assigned subtopic on their own from their course books, referral books, and also use internet if required.

On day 2–10 expert teams were formed each having same serial number, i.e., expert team “1” will have only students with serial number 1, team 2 will have students with serial number 2 and so on. Each expert team had their assigned subtopic and they discussed the same in the team. A team leader was chosen who moderated the discussion and in addition every

team was supervised by a faculty member and they ensured that every student is participating and the discussion is going in a proper direction.

On day 3 - students were again regrouped into their primary 14 groups and now each group had an expert for each subtopic covering all the 5 subtopics. The students in each group discussed all the 5 subtopics and thus completing the topic of “circulatory shock” as a whole. Most of the students had prepared notes and the groups, after discussion, compiled the notes for each subtopic into one final note covering the whole topic.

The total time taken for these sessions (day 1, 2 and 3) was approximately 3 h. All through the activity the student discussion was monitored by teaching faculty and students asked questions and clarified doubts wherever they existed. A feedback instrument (questionnaire) was developed both for students and for faculty in English language through an extensive review of literature. The students and faculty were asked to give their response on a five-point Likert scale. Both the feedbacks were collected a day after completion of the exercise. The data was collected, compiled, and analyzed.

RESULTS

Of 150 students of MBBS first year, batch 2014, 142 participated in this study along with 14 faculty members of the Physiology Department. Regarding Student’s Feedback Questionnaire, the response to all the 11 questions was encouraging and in favour of active learning process. Particularly in response to question no. 11 wherein students were asked if more topics shall be taught using ALMs, 70 strongly agreed, 62 agreed, 8 were neutral, 1 student disagreed, and 1 strongly disagreed. Hence, majority of the study population (93%) were in favor of ALM. Furthermore, question no. 5 stated, “Active learning methodology encouraged active student participation and discussion,” to which 96% of the students strongly agreed or agreed. Similarly in response to question no. 7 that stated: “Learning by this method gave you much clearer and in-depth understanding of the topic,” again 86% students strongly agreed or agreed while as 11% were neutral and rest 3% disagreed [Table 1 and Figure 1]. 100% faculty members, i.e., 14 out of 14 were of the opinion that many more topics shall be taken up by using ALMs. They also strongly agreed that students were very enthusiastic and this methodology definitely encouraged student participation and active discussion [Table 2 and Figure 2].

DISCUSSION

The present generation students want to have a very active role in whatever they do. They want to have clear

Table 1: Student response to feedback questionnaire

Question number	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
1.Aims and objectives of the teaching methodology were explained beforehand	135	7	0	0	0	142
2.The academic contents of the method were stimulating	50	79	11	1	1	142
3.The active learning by jigsaw method was refreshing	98	36	6	1	1	142
4. Response and interest shown by teachers was enthusiastic	50	69	22	1	0	142
5.Active learning methodology encouraged active student participation and discussions	76	60	5	0	1	142
6.Active learning methodology motivated students to visit library and search internet	45	72	20	3	2	142
7. Learning by using ALM gave you clearer and an in-depth understanding of the topic	48	74	15	2	3	142
8.The presence of teacher as moderator helped in discussions	34	53	40	10	5	142
9.Using active learning methodology was helpful in improving your learning skills	77	50	12	2	1	142
10.Active learning methodology was helpful for you in rating your own learning standards	41	72	24	3	2	142
11. Many more topics shall be taught by using ALMs	70	62	8	1	1	142

ALM:Active learning method

Table 2: Faculty response to feedback questionnaire

Question number	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
1.Aims and objectives of the teaching methodology were explained beforehand	14	0	0	0	0	14
2.The academic contents of the method were stimulating	6	8	0	0	0	14
3.The active learning by jigsaw method appeared to be refreshing both for students and faculty	9	5	0	0	0	14
4. Response and interest shown by students was enthusiastic	12	2	0	0	0	14
5.Active learning methodology encouraged active student participation and discussions	13	1	0	0	0	14
6.Active learning methodology motivated students to visit library and search internet	8	4	2	0	0	14
7.Active learning methodology motivated students to ask questions and clarify doubts from teachers	3	6	4	1	0	14
8.Using active learning methodology was helpful in improving student learning skills	6	8	0	0	0	14
9.Active learning methodology was overall an interesting exercise	8	6	0	0	0	14
10. Many more topics shall be taught by using active learning methods	9	5	0	0	0	14

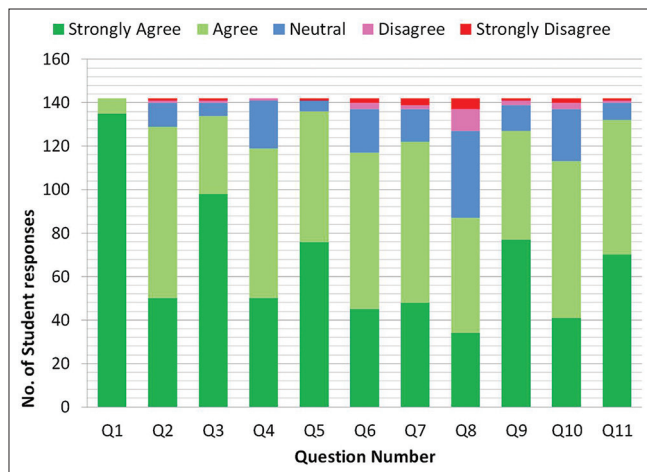


Figure 1: Students response to feedback questionnaire

expectations and explanations, personal rapport with their instructors, honesty, and uninhibited use of technology. This raises the question of whether it has already become immoral to teach without extensive use of active learning techniques that so enhance performance. Learning and participation are inseparable. In response to findings such as these, the faculty is being encouraged to adapt and alter

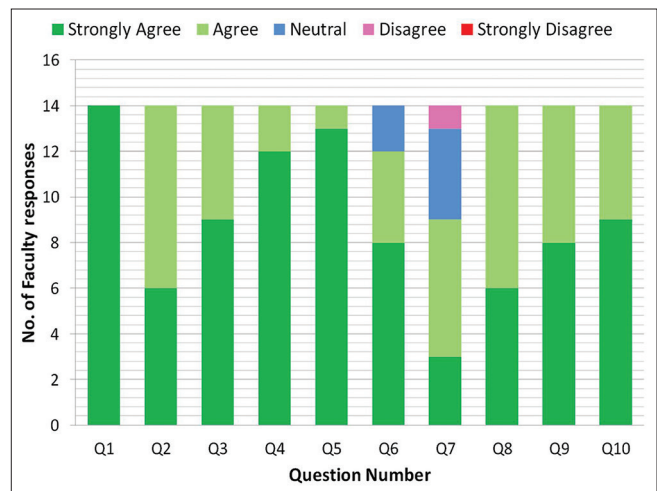


Figure 2: Faculty response to feedback questionnaire

their teaching methods to address the new generation of students.^[16]

From the wide variety of strategies that can be used to actively engage students in their own learning, the ones that are chosen depend on the objectives of the course and the needs of the students. Simulations, demonstrations, experiments,

debates, role play, small group discussions, creating visual representations and models, problem-solving, case studies, research and presentations, and games are all examples of active learning strategies. These strategies are widely employed in primary and secondary classes and in adult education and workplace training.^[5]

The literature is clear on the benefits of active, student-centered learning over a strictly lecture approach. Lecture is not ineffective but active involvement in the learning process is beneficial to students, it reduces the density in the lecture thereby increasing retention, and addresses a wider range of objectives over and above the transfer of content from instructor to student. Very simply put, “there is a great difference between imagining that we have done the problem and actually doing it, active learning provides an opportunity for students to do the problem.”^[2]

The overall feedback in this study indicates that the students are very receptive to this type of learning and definitely loved and enjoyed this new methodology. The faculty was also surprised to see the enthusiasm and interest of students in such activity as was confirmed from their feedback. From the feedback collected, the students strongly demand that many more topics shall be taught using ALMs. The students agreed that this method of learning gave them much clearer and an in-depth understanding of the topic. They appreciated the fact that this method encouraged the active participation of all the students and brought out the learning capabilities. Students were also able to rate their own learning standards. The faculty also enjoyed this activity and took it as a welcome change from the routine of delivering orthodox didactic lectures. As is evident from their feedback, faculty also agreed that many more topics must be taught by active methods.

There were also few suggestions to improve upon the present technique, for example, the group size shall be smaller that will further enhance the interaction and understanding and also time for discussions may be increased a little more.

Although the overwhelming majority enjoyed the interaction, very few (1–2%) of the students did not see a benefit to their learning and felt that it detracted from traditional lecture time. These students, although alerted and prepared for these “new” activities, still felt uncomfortable exploring and breaking new ground as opposed to the traditional lecture format. Very few students tolerated the activity rather than being actively engaged, the reasons may be poor hold on English language, inability to open up for discussion because of their shy nature, uncomfortable with opposite sex and of course unwillingness to put in their efforts. The perception of “wasted time” and lack of recognition of learning in group work by few students need

to be addressed as these students have to be comfortable in a “team” approach for their future professional careers. Some students may feel that the lecture method is easier for them because they can remain passive in a way they are comfortable with and to which they are accustomed.

As far as faculty is concerned a certain amount of internal resistance sometimes sets in. Trying new activities might seem like inviting disaster, especially when it means giving up the control that a lecturer commands. Moreover, there is always the pressure to cover more and more material, so that activities involving students—activities taking up classroom time—seem wasteful. There is also a kind of institutional pressure not to experiment with our teaching, since any experimentation takes thinking about—thereby taking time away from our research and writing. Incentives and even collegial support to improve or alter our teaching are often nonexistent. And also, of course, is the fear of trying something new and failing – a fear of taking risks in the classroom.^[6] Despite the fact that trying new teaching methods can feel uncomfortable, the faculty was positive and very much receptive in using ALMs in their large classes. They do believe that it makes a difference and is worth experimenting with. Getting your students involved in activities in the classroom also requires them regularly to assess their own degree of understanding and skill at handling concepts or problems in your discipline. Rather than allowing them to rest comfortably with a surface knowledge, it forces them to develop a deeper understanding. As a result, students are much more likely to study carefully, to regularly note their own questions or difficulties with assignments. Such students are also more likely to prepare in a consistent way for exams, not waiting until the last minute with difficulties or concerns. In short, active learning in the classroom offers significant benefits both to faculty and the students.

CONCLUSION

Active learning strategies can be incorporated in delivering important topics as a renovation of the traditional undergraduate medical curriculum. The adoption of such strategies does need the flexibility, time, and effort of both the instructor and the participating students.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Russell IJ, Hendricson WD, Herbert RJ. Effects of lecture information density on medical student achievement. *J Med Educ* 1984;59 (11 Pt 1):881-9.
2. Prober CG, Heath C. Lecture halls without lectures – A proposal for medical education. *N Engl J Med* 2012;366:1657-9.
3. White G. Interactive lecturing. *Clin Teach* 2011;8:230-5.
4. Active Learning: Getting Students to Work and Think in the Classroom. Vol. 5. Stanford University Newsletter on Teaching Fall; 1993.
5. Anderson GL, Passmore JC, Wead WB, Falcone JC, Stremel RW, Schuschke DA. Using active learning methods to teach physiology. *J Int Assoc Med Sci Educ* 2014;21:8-20.
6. Panitz T. Why more teachers do not use student centered learning techniques and policies needed to encourage positive changes. *J Stud Cent Learn* 2003;1:55-60.
7. Ismail S, Rahman NI, Mohamad N, Jusoh NM, Hood AI, Arif LA, *et al.* Preference of teaching and learning methods in a new medical school of Malaysia. *J Appl Pharm Sci* 2014;4:48-55.
8. Wlodkowski R. Fostering motivation in professional development programs. *New Directions for Adult and Continuing Educ* 2003;97:17-28.
9. Jamshidi HR, Cook DA. Some thoughts on medical education in the twenty-first century. *Med Teach* 2003;25:229-38.
10. Fowler G. Postmodernism: This changes everything! *J Stud Cent Learn* 2003;1:87-95.
11. Cantillon P. ABC of learning and teaching in medicine: Teaching large groups. *Br Med J* 2003;326:437-40.
12. Jacques D. ABC of learning and teaching in medicine: Teaching small groups. *Br Med J* 2003;326:492-4.
13. Brown G, Manogue M. AMEE Medical Education Guide No 22: Refreshing lecturing: A guide for lecturers. *Med Teach* 2001;23:231-44.
14. Aronson E, Blaney N, Stephen C, Sikes J, Snapp M. *The Jigsaw Classroom*. Beverly Hills, CA: Sage Publications; 1978.
15. Palmer J, Johnson JT. Jigsaw in a college classroom: Effects on student achievement and impact on student evaluations of teacher performance. *J Soc Stud Res* 1989;13:34-7.
16. Smith P. Curricular transformation: Why we need it, how to support it. *Change* 2004;36:28-35.