Original Research Article

Impromptu yet effective conduct of Jigsaw to teach a topic in biochemistry for first MBBS students

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ABSTRACT

Background: Jigsaw technique as a teaching modalities is an important and fascinating mode of teaching students a particular topic in an effective and interesting manner. Though the effectiveness of Jigsaw implementation is documented by many researchers, not only for medical science subjects but also for various topics in chemistry, engineering and nursing courses, it's application and feasibility is often being questioned. Many researchers find the implementation of Jigsaw a daunting task, which requires a lot of time, planning and number of resource person.

This article emphasises upon feasibility of Jigsaw implementation and its effectiveness in spite of all odds like limitation of resource faculty, time, space etc.

Methodology: In this study Jigsaw planning was done impromptu for revision of the topic "Enzyme" for students of biochemistry in first MBBS.

49 out of total 62 students of batch A reported for tutorial session. They were divided into 6 experts groups[EG1-EG6]. Each EG was given one sub topic out of above. They were instructed to discuss it among their peers in EG. Later one student from each EG was mobilised to create home group[HG].

Total 8 HG were thus created and the students were asked to discuss their subtopic in HG in sequential manner; which means first of all student from EG-1 discusses the sub topic to rest of the members of his/her own HG, next the student from EG 2 explains the sub topic to rest of the members of his/her own HG. This fashion all the sub topics were sequentially discussed in all the HG parallelly and the whole topic of enzyme was discussed in each HG in peer assisted learning fashion. Students were later asked to write reflection on this activity.

Same activity was repeated for batch B students.

Result: During analysis of reflection it was found that this exercise was appreciated by majority of students, and they perceived this activity as an interesting and effective modality of teaching learning. They even wanted repetition of Jigsaw activity in future for various other topics.

Conclusion: It is concluded that in-spite of limitation of time and limited faculty backup, Jigsaw can be effectively implemented for benefit of students in a short notice.

1. Jigsaw and it's Advantages

Jigsaw classroom was first designed by Social Psychologist Elliot Aronson in 1971. This is the method of organizing classroom activity in such a fashion that students are dependent upon each other to succeed. It breaks classes into groups and breaks topic into subtopics. The Home group (HG) and Expert Group (EG) is designed where students assembles to discuss the subtopic to complete the task.[1]

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Jigsaw is an important strategy of cooperative learning where the students are actively involved in teaching learning process, and they take the responsibility for their own learning as well as for the learning of others. [2,3]

There are number of advantages of jigsaw mode of teaching, it is an important strategy where students are motivated, and they are more enthusiastic to learn. It increases student participation and helps in developing interpersonal skills like argumentation skill, creative & logical thinking skill, communication skill etc. [4–8] Jigsaw strategy is very effective when large content is to be taught in small duration in student centric, peer group assisted learning fashion. Effectiveness of jigsaw in learning a topic in various subjects of MBBS curriculum is well documented. [9–14]

New Competency Based Medical Education (CBME) implemented by MCI in year 2019 for medical undergraduates, emphasizes upon the SPICES model of teaching where S stands for student centred approach, P stands for Problem based learning, I stand for Integrated or inter-professional teaching, C stands for Community based education, E stands for Elective studies and S stands for Systematic or planned approach.

In Jigsaw model many of the components of SPICES model is covered as it is a strategy which is student centric and a well planned systematic study.

2. So where is the problem

Most of the time it is stated that conducting jigsaw is a challenging process and it requires lot of strategic planning, time, resources in the form of specific class room setting and number of resource persons.

There are many reservations in it's implementation and many researchers have raised the concern regarding feasibility of organizing jigsaw strategy in a resource limited setting with limited availability of time and resource person.

3. Our Experience

Authors wish to share their personal experience of conducting Jigsaw in department of biochemistry to revise a topic of enzyme which was previously taught in didactic lecture.

This activity was conducted in department of biochemistry in month of April 2022 for MBBS batch 2021-2022 for the topic 'Enzyme'. Total number of students in the class were 125 which were divided in batch A of 62 students and batch B of 63 students, and this activity was conducted for batch A and batch B separately.

This topic was already taught in didactic lecture and when batch A student came for tutorial session, they were sensitized regarding the Jigsaw conduct and it's methodology and the topic of enzyme which was divided into 6 subtopics was given to them for discussion in jigsaw mode

The six subtopics decided for topic enzyme were as follows

1. Definition and classification
2. Cofactors & coenzymes
3. Factors affecting the enzyme activity [pH, Temperature]
4. Factors affecting the enzyme activity [enzyme concentration, substrate concentration]
5. Competitive inhibitors
6. Non-competitive, uncompetitive and suicidal inhibitors.

There are certain ground rule for subtopic planning and jigsaw conduct. They are a) One subtopic is not dependent upon other and is not a prerequisite of learning b) Time taken to discuss each subtopic in expert group must coincide.

In batch A, only 49 out of total 62 students were present. As the number of sub topics where six, 49 students were divided into six experts group (EG-1 to EG-6). EG-1 to EG-5 had 8 students each & EG-6 had 9 students. EG setting took 5 minutes.

They were explained that once they learn the sub topic assigned to them in EG they will be rearranged as to make the Home Group (HG), where at least one representative from each EG will join to make the team having members from each EG. They were asked to refer the didactic lecture class notes, e-books which they carry in their mobile, textbook etc and discuss the sub topic in their EG. Fifteen minutes time was allotted to them to discuss their respective sub topic in their respective EG. Once the discussion in EG was complete, these students were reorganised in the HG in next 5 minutes.

Figure 1: First picture is showing EG discussion and second picture is showing HG discussion

Total 8 home groups (HG-A TO HG-H) were formed. Each home group had 6 students except Home group H which had total 7 students.

In each home group students were instructed to teach each other in sequential order of the sub topic which means, first of all students from EG-1 teaches rest of the member then students from EG-2 teaches rest of the members. This goes on till all the student from each EG teach their

colleagues in HG. Time allotted for HG discussion was 50 minutes. All these steps took 75 minutes. Twenty minutes doubt solving session was conducted where students ask their doubt if any and this was followed by reflection writing by students for which fifteen minutes time was given.

This total activity took 110 minutes (1 hr 50 minutes). Attendance was taken and student dispersed.

The same activity was repeated next day for batch B students where 57 out of 63 students were present and accordingly the Expert group and Home group setting was done.

On analysis of reflection, we found that though the activity was conducted without any prior preparation and no prior communication was done with the students in this regard, they found this activity very useful and it helped in understanding the topic better, they enjoyed the activity and requested for repeated such activities in teaching other topics. As they were given the responsibility of teaching others in the HG, they took extra interest and paid attention to learn the subtopic clearly in their EG.
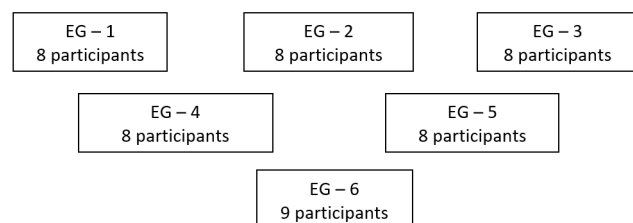
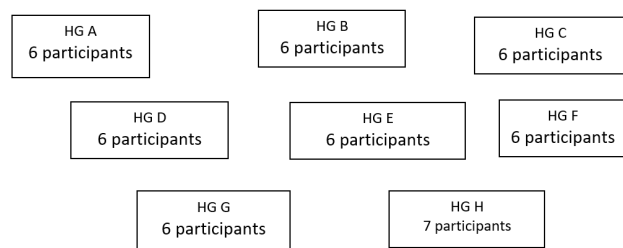**Figure 2:** Expert group setting (6 expect group) for batch A

Figure 3: Home group setting (8 Expect Group) for batch A

4. Conclusion

In nutshell, we wish to state that jigsaw can be planned in a resource limited setting and it can be successfully implemented in given time slot as per departmental timetable. It doesn't need a lot of preparation for it to become effective; even with the help of student class notes, e-books and other resource material which students commonly carry with them, Jigsaw activity can be planned in tutorial hours in a very short notice and it will benefit student understanding of topic in peer assisted learning set up.

What is important here to note that instructor or the faculty should be well versed with jigsaw methodology, so as to clearly instruct the students regarding the conduct of Jigsaw and swift transition between EG and HG.

If time permits the modules for sub topic can be prepared by expert faculties and if it is practically not possible due to time limitation then students can be instructed to bring their own resource material along with them for jigsaw mode of discussion and learning.

5. Source of Funding

None.

6. Conflict of Interest

None.

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