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Original Research Article

Perspectives of Phase-I Medical Students on Jigsaw Cooperative Learning

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ABSTRACT

Background: The Jigsaw method is a learning methodology which is gaining importance in the present era of medical education but its definitive benefits in undergraduate teaching requires careful study. The perspectives of students has been mixed owing to varying factors like their first time exposure to Jigsaw to indivdual student experiences. Hence this study aimed to compare and understand the outlook and experience of students in undergoing Jigsaw method of teaching learning compared to those undergoing a didactic lecture method as part of phase 1 MBBS curriculum.

Material and Methods: Following approval from the institutional ethical committee, 152 Phase 1 MBBS students were selected for the study. The students were divided into two groups: Batch 1 was engaged in the jigsaw method, while Batch 2 participated in the didactic method for the same specified topic. Open ended feedback and Focus group discussions were conducted by selecting groups of 8 students from batch 1 and batch 2.

Results: After excluding the absentees on the day of the session, out of 146 students who attended the session, 114 students submitted the feedback (58 students who attended didactic and 56 students who attended the Jigsaw method) and focus group discussions were conducted in groups of 8 students who voluntered from each of the two batches.

Conclusion: Students who participated in the jigsaw method felt their session was very interactive and productive and few students suggested conducting more such interactive sessions with more time allotment for the sessions. 1 student during the focus group discussion expressed preference for small group teaching by faculty instead of peer assisted learning as in Jigsaw. Most students of the didactic lecture group felt their learning was good and expressed need for more interaction in the lecture session.

KEY WORDS: Jigsaw methodology, Qualitative study, Student perspectives.

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BACKGROUND

Cooperative learning is characterized as an active learning strategy wherein diverse student groups collaborate in small teams with specific learning goals to achieve a shared objective [1]. The Jigsaw technique, developed by Aronson et al in 1978, was designed to promote interracial interactions [2] and emphasizes collaboration over competition and encourages students to discuss, explore and teach one another [3-5].

Based on the CBME curriculum for medical undergraduate teaching, an important skill expected of a medical graduate is the ability to be a lifelong learner who can search for and critically assess medical literature and apply this knowledge in patient care [6]. Knowledge acquisition occurs when students actively engage in processing and critically analyzing the subject content. But a significant obstacle to active and interactive teaching is the lack of resources, including faculty members who are willing and able to facilitate the learning [7]. In large classroom settings where these challenges exist, traditional lectures seem to be the most suitable option. However, these didactic lectures have been criticized for being teacher-centered, resulting in slower learning. Additionally, student's interest in the subject could get diminished due to the passive nature of traditional classroom teaching [8,9].

This prompted us to study the students' perspectives in undergoing a cooperative learning method such as Jigsaw technique against the traditional didactic lecture. A few quantitative analysis studies on Jigsaw method has shown to enhance the understanding, knowledge, critical thinking, communication and listening skills [5,10]. Apart from academic achievements, other important outcomes such as social relations, level of participation, cooperation and motivation also needs to be assessed to more accurately understand the effects of Jigsaw [11]. The previous studies on Jigsaw has provided mixed views on its efficacy in these areas.

Therefore, this study aimed

1. To understand the perspectives of 2 student groups who underwent the Jigsaw and the didactic teaching method respectively for the same specified topic.
2. To identify the advantages and disdvantages of both the methods from a student perspective and to explore the modifications required to overcome the disadvantages of the Jigsaw method.

MATERIALS AND METHODS

As part of routine implementation of innovative teaching methods in the CBME curriculum, a qualitative study on Jigsaw method versus didactic method of teaching was conducted after obtaining clearance from the institutional ethical committee. Phase 1 MBBS students of 2024-25 batch, of ESIC Medical College and Hospital, Chennai, who had not been exposed to the Jigsaw method of cooperative learning previously, were selected for the study. The anatomy of knee joint which is a fundamental core competency encompassing both knowledge and skill domains, was chosen as the lesson topic and the study period was between January to May 2025. A total of 152 students were divided into two batches: Batch 1 (Roll No. 1 to 76) and Batch 2 (Roll No. 77 to 152) based on their roll numbers. The batch 1was engaged in a jigsaw teaching method, while the batch 2 was engaged in traditional didactic lecture. Faculty members received a briefing on the lesson plan for the jigsaw session one week in advance and their queries were addressed. Pre-reading materials on the topic were distributed to the students one week prior to the session.

Exclusion criteria: Upon excluding the students who were absent on the day of the session a total of 146 students participated in the study.

In a scheduled 3 hour tutorial period, batch 1students were given a pre test. Following which they were divided into 5 parent groups (A, B, C, D & E), with each parent group consisting of 15 students with 1 faculty to facilitate them. The parent group, subgroup and expert group formation is tabulated in **Table 3.**

Each of the parent (15 members) group was divided into 5 subgroups (with 3 members in each subgroup) - Parent group A divided into A1, A2, A3, A4 & A5. Similarly all the parent groups were divided (Group B : B1-B5, Group C: C1-C5, Group D: D1-D5 & Group E: E1 -E5).

The lesson topic was divided into 5 subtopics (a) Type of joint & Articulating surfaces; b) Capsule, Ligaments & Relations; c) Actions and Muscles producing the movements; d) Blood supply, Nerve supply and e) Applied anatomy) and was alloted to the subgroups of each parent group, such that Parent group A with subgroups A1 to A5 was alloted the 5 subtopics in an order. Similarly all the 5 subtopics were alloted to all the parent group subgroups in the same order. Each student was given 20 minutes time to individually study their subtopic with the help of their study material.

Following this each 3 member subgroup having the same subtopic of study were convened to form expert groups, as below:

Expert group 1 - A1,B1,C1, D1&E1 with subtopic a) Type of joint and articulating surfaces.

Expert group 2 - A2,B2,C2,D2&E2 with subtopic b) Capsule, Ligaments & Relations

Expert group 3 - A3,B3,C3,D3&E3 with subtopic c) Actions and Muscles producing the movements

Expert group 4 - A4,B4,C4,D4&E4 with subtopic d) Blood supply, Nerve supply

Expert group 5 - A5,B5,C5,D5&E5 with subtopic e) Applied anatomy

With facilitation from their respective faculty member, these expert groups engaged in discussion of their subtopics for 30 minutes. After this period, the expert groups returned to their parent groups, where they were guided by the facilitator to discuss all the subtopics in sequence. This part of the session lasted for 30 minutes.

By the end of this 30-minute period, each member of the parent group had become well-versed and knowledgeable about the knee joint topic. One member from each parent group was invited to volunteer and present the subtopics in an order without any overlap. Following the presentation, the class and facilitators shared additional points one at a time. At the end of the session, feedback was collected from the students using open-ended questions and focus group discussions **(Table 4)** which were conducted within a week with 2 groups of eight volunteers from each of the two batches. To maintain anonymity, their responses were labeled with numbers (1 to 8 and 9 to 16) for Batch 1 and (1 to 8 and 9 to 16) for Batch 2.

Batch 2: A traditional 50-minute didactic lecture was delivered using a PowerPoint presentation. Upon conclusion of the lecture, student feedback was collected utilizing the same structured open-ended feedback form employed for Batch 1. To ensure parity between the two batches, a Jigsaw session was conducted for Batch 2 following the didactic lecture, during the dissection hour, concurrently by the same set of trained faculties.

Quantitative data consisting of pre test, post test and likert scoring feedback responses were collected and studied parallely. This present article focuses only on the qualitative data comprising of open-ended feedback responses of students along with data from focus group discussions pertaining to both the didactic lecture and the Jigsaw session.

RESULTS

Of the 146 students who attended,114 students submitted the feedback (58 students who attended didactic and 56 students who attended the Jigsaw method). From batch 1, two groups of 8 students each were randomly selected. Similarly from batch 2, two groups of 8 students each were randomly selected and focus group discussions were conducted (**Table 4**).

Student Reflections on Jigsaw method:

"Group discussion makes us to interact with everyone"

"Content can be shared to peer group so that both sides are benefitted"

"We should learn something from our group and it is interesting and fearless communication along with our friends"

"Making everyone participate is the advantage of Jigsaw learning"

"We understood very well because of the early reading of pre read material.The interactiveness of session - motivation to all of us and correction of our wrong understanding of concepts.

"Group activities enables us to connect on the same level and similar mindset helps in better learning and memory retention"

"We were able to know a topic in detail and understand it our own way".

"It definitely improved memory retention of that topic"

"I am extremely thorough and probably will never forget my expert topic"

"Group activities is more fun and gives the oppurtunity to see many different perspectives"

"Topic can be discussed between peers so that some students wont feel shy"

"Yes, I can able to master a topic and can reproduce it very well"

"Everyone participate in the session and it is interesting".

"Learning by this method is more knowledgeable and fun"

"We want such exciting and interesting sessions so that we can achieve success together with all our batchmates"

"Yes, think this method can be used more frequently"

"Yes, I feel this method to be very interesting to learn about the topic. Giving sufficient time"

"Yes. this method can be continued to make learning more interesting and fun"

"All of us actively participated and discussed. The facilitators supported us in it"

"It was a good experience as I understood that learning can be easier and more interesting by discussions amongst our group members."

"No disadvantages"

"More time required for the session"

"More time can be allotted to discuss more efficiently"

"Topic can be difficult for me to understand as each individual has different methodolgy of teaching but when I study it as a textbook I can able to correlate"

"In our group, some people were really active while some did'nt participate. We were'nt able to talk to everyone but eventually everyone understood the topic"

"Disadvantage is difficulty in time management"

"I was not able to understand few topics that were taught by others but could understand the topic i presented"

"I was focussed on my presentation while others presented, so i was'nt able to focus on that"

Table 1: Qualitative data analysis of Focus Group Discussion following the Jigsaw method.

S.No	Theme	Sub theme	Codes
1.	**Exposure to innovative teaching learning methods**	The innovative teaching learning methods the students have been exposed prior to this session	- Small group teaching, Large group teaching
			- Group discussion
			- Self study, self understanding, self analysis
			- Promodoro technique, Rewarding technique
			- Panel discussion
			- Fishbowl method
			- Student seminar
2	**Acquisition of skills**	Communication skills	- Good interaction among members
			- Fearless communication among peers
			- Better expression helps in better learning and retention
		Collaboration skills	- Working as a team with a facilitator, leader and reporter helps to stay focussed and discuss productively
			-Attaining clear concepts by sharing the content in a sequence with peers
		Critical thinking skills	- Understand details and logical explanations of peers
			-Discussing concepts and clarifying doubts by referring to the relevant topics of the reading material
		Active participation/ Motivation	- More fun,
			- Interesting, team work
			-Working as a team gives an accountability
			- Accountability helps in better contribution to the group
3	**Factors favouring or hindering the learning**	Favoring factors for learning	- Assigning team leader and reporter, acts as a monitor to ensure active participation of all team members
			.- Methodical learning helps understand the concepts
			- Students feel a substantial positive impact in the level of learning
			- Providing pre reading material and the lesson plan well before the session helps students to come prepared
			-The interactiveness in the session provides motivation to all the members in completing the session successfully
			- Ensuring active participation helps develop skills such as cooperation, collaboration, communication and critical thinking
			- Peer group discussion helps overcome shyness
			- Learning by this method is more knowledgeable and fun
		Hindering factors in learning	- More time required to cover a single topic compared to the traditional method
			- Students focussing more on their expert topic and their own presentation and neglecting to listen actively to the points contributed by the rest of the team members
			- Level of understanding can be difficult because teaching methodology of each student is different.
4	**Difficulties encountered during the session**	What were the difficulties encountered	- Insufficient time for a detailed discussion
			- Few students felt they could not communicate initially to all the team members but got better eventually.
			- Topics were difficult to understand as each students way of teaching is different
		How were the difficulties overcome	- The interactive session helped to understand and correct their mistakes.
			-The support by team members and faculty helped to clarify doubts and get concepts clear
		Support provided by facilitators and team members	- Guidance by facilitators to conduct the session methodically
			-Clearing doubts and explaining the concepts that were difficult
5.	**Recommendations for improvisation**	Preferred teaching methods	- Students prefer to continue the Jigsaw method as it is felt to make learning more interesting and fun.
			- More such Jigsaw method of teaching is wanted as it is an exciting and interesting session and helps achieve success
			- Interactive lectures as it helps to understand the concepts much better
			- Some prefer both group activity and interactive lectures because both play an important role in correcting mistakes and learning
		Suggestions for improvements	More time allotment to discuss more efficiently
			More time required for the session

Table 2: Qualitative data analysis of Focus Group Discussion following the Didactic method.

S.No	Theme	Sub theme	Codes
1	Exposure to innovative teaching learning methods	The other teaching learning methods the students have been exposed prior to this session	One way learning, writing and revising
			Didactic lectures
			small group learning and large group teaching
			jigsaw method
			Group discussion
			Panel discussion
			Visual learning, rote method, practical observation
2	Acquisition of skills	Critical thinking	- In-depth concept attainment
		Motivation	- Faculty delivered lectures helps students stay focussed
			- No distractions
			- A complete overview of the topic in a lecture facilitates better after class self reading and understanding
3	Factors favouring or hindering the learning	Advantages	- Learning objectives are clearly stated
			- All subtopics covered at an equal pace
			- Crystal Clear explanation by faculty helps attaining good understanding of the topic
			- Recollection and Retention of more than 50% of the lecture content
		Diadvantages	- Students could not keep up with the speed at times
			- The speed of teaching is fast
			- More interaction to make session interesting
			- One way teaching with Q&A with no scope for active peer discussion
4	Difficulties encountered during the session	What were the difficulties encountered	- Learning difficulties with the pre read material
			- Difficulty in understanding the new terminologies
			- Speed of the session
		How were the difficulties overcome	Learning difficulties with the pre read material was overcome after attending the didactic lecture
		Support provided by facilitators and team members	- Support mainly by the faculty by way of questioning inbetween the lecture to keep students focussed
5	Recommendations for improvisation	Preferred teaching methods	- Both lectures and Jigsaw
			- Didactic lectures followed by Jigsaw method
			- More lectures compared to Jigsaw method
		Suggestions for improvements	- More Interactive teaching with more explanations
			- Extension of time limit for certain lectures by upto 30 minutes

S.No	Subtopics	Group A	Group B	Group C	Group D	Group E	Expert groups
1	Type of joint, Articulating surfaces	1 to 3	16 to 18	31 to 33	46 to 48	61 to 63	1 (A1 to E1)
2.	Capsule and ligaments, Relations	4 to 6	19 to 21	34 to 36	49 to 51	64 to 66	2 (A2 to E2)
3	Actions and Muscles producing the movements	7 to 9	22 to 24	37 to 39	52 to 54	67 to 69	3 (A3 to E3)
4	Blood supply, Nerve supply	10 to 12	25 to 27	40 to 42	55 to 57	70 to 72	4 (A4 to E4)
5	Applied anatomy	13 to 15	28 to 30	43 to 45	58 to 60	73 to 76	5 (A5 to E5)

Table 3: Parent and Expert group division.

Table 4: Questionnaire for Focus group discussion.

S.No	*Questions	Probes
1	**What are the teaching learning methods you are aware of?**	– At school
		– Name the methods you have practised
2	**Do you prefer group activities or interactive lectures**	- Reason
3	**What was your opinion on the teaching learning method employed for session on knee joint**	– Advantages and disadvantages
		– Level of understanding
		– Did it have a substantial impact in your level of learning
4	**What were the difficulties you encountered during the session**	– Were you able to overcome the difficulties and continue
		– Were your facilitators/team members supportive in overcoming your difficulties
5	**Would you prefer this method of teaching learning to be employed more frequently**	- Give your reasons
		- Suggest changes/improvisations

DISCUSSION

Several factors influence the outcomes of didactic lectures and Jigsaw methodology sessions such as student strength and diversity, student age group, student's prior exposure to the method of teaching, the topic of study, implementation time, faculty and infrastructure availability. The outcomes of these methods can be analysed based on student's academic performance, motivation and social relations.

According to a qualitative study by Aliya Nusrath et al in 2019 on phase 1 MBBS students, the students showed a preference for jigsaw method. They expressed a positive attitude towards Jigsaw Cooperative Learning (JCL) with most of the students acknowledging the benefits of JCL especially in enhancing their communication skills. However this study lacked a control group undergoing didactic lecture to compare the effects of the methods [14].

A study conducted by Vives et al in 2021, showed that the Jigsaw method had benefits in terms of academic performance only for students with low performance goals, self-esteem and low working memory capacity. He concluded that the Jigsaw method can be adapted to vulnerable students, without reducing the performance of high-performing students[15].

Cochon Drouet et al in 2023 showed that Jigsaw training for teachers helps facilitate professional development and encourages changes in practice that are beneficial to all students, especially those facing difficulties. The time spent training teachers could alter the effects of the Jigsaw method [11]. The results of this review highlighted factors and conditions that enable the Jigsaw method to "work" to achieve positive effects in terms of student achievement, motivation, social relations and self-esteem.

The present study was conducted among two equal groups of phase 1 MBBS students, representing diverse backgrounds and between 18 to 19 years of age, who had no prior exposure to Jigsaw method of learning. The groups underwent the didactic lecture and Jigsaw method parallely on the same chosen topic.

The study showed that the students in the Jigsaw group were elaborate in their response, exhibited increased interest and were more expressive of their experiences compared to the group which underwent didactic lecture. The skills section in T**able 1** and **2** shows that their perception of skill acquisition such as commuication, collaboration, critical thinking, active participation and motivation was more effective in the Jigsaw session. A common challenge faced by the Jigsaw group was the need for more time for a detailed discussion. They felt thorough and confident on their respective expert group subtopic but focussed less on the other subtopics covered by their colleagues.

CONCLUSION

This study offers a detailed comparison on the students perspective of Jigsaw and didactic teaching methods within the Phase-I MBBS curriculum, highlighting their respective strengths, challenges and potential synergies. The Jigsaw method is particularly effective in promoting engagement, collaboration and mastery of subtopics, although it faces logistical challenges such as time constraints and the need for extensive preparation. This could be overcome by adequate training of faculty and prior sensitisation of the session plan to the students. Additionally, further studies are essential to identify topics that can be effectively addressed using the Jigsaw method throughout all phases of the MBBS curriculum.

Conflicts of Interests: **None**

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