

A COMPARATIVE STUDY TO EVALUATE THE EFFICACY OF FLIPPED CLASSROOM VERSUS FLIPPED CLASSROOM-JIGSAW METHOD IN II MBBS STUDENTS

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ABSTRACT

Background: Declining student attention in conventional medical lectures necessitates innovative teaching strategies. Flipped classroom (FC) and jigsaw methods promote active learning and competency-based education. The objective is to compare the efficacy of flipped classroom and flipped classroom-jigsaw (FCJ) methods among II MBBS students. **Materials and Methods:** A comparative interventional study was conducted among 149 II MBBS students divided into two groups. One group underwent FC, while the other underwent FCJ. Groups were crossed over for the second half of the module. Outcomes included academic performance (test scores, MCQs) and student perceptions. **Result:** No statistically significant difference was observed between FC and FCJ in between-group comparisons. However, within-group comparisons showed significant improvement depending on the method applied. Student preference favored FCJ (71.7%). **Conclusion:** Both methods enhance learning outcomes, but FCJ is preferred by students due to better engagement, understanding, and motivation.

INTRODUCTION

Attention levels among medical students, particularly during afternoon sessions, have been declining. Contributing factors include prolonged clinical postings and increased late-night engagement with digital media. This highlights the need for innovative, student-centered teaching strategies.

Medical education is also transitioning from traditional objective-based approaches to competency-based training, emphasizing entrustable professional activities. The flipped classroom (FC) model has emerged as an effective pedagogical strategy to address these needs.

Originally popularized by Bergmann and Sams,^[1] the FC model involves pre-class exposure to learning material, followed by active in-class engagement. It consists of three phases:

Pre-class preparation

In-class active learning

Application and assessment.^[2]

The low technical tools are encouraging reading, sending power points etc., some high technical tools are online quiz, google forms, moodles containing interactive modules.

Evidence suggests that FC improves learning outcomes compared to traditional lectures. As per the study done by Khe Foon HEW, FC yields significant improvement in student learning compared to traditional lectures.^[3]

The jigsaw method, developed by Elliot Aronson, is another cooperative learning strategy promoting peer interaction and shared responsibility. It involves dividing students into groups, redistributing them into mixed-topic groups, and facilitating peer teaching.

Aim: To compare the efficacy of flipped classroom and flipped classroom-jigsaw methods in II MBBS students.

Review of Literature

A study by Ting-Ting Wu et al. (2023) demonstrated that the jigsaw-integrated flipped classroom significantly improved learning achievement, motivation, and attitude among students. The method was effective across both high and low achievers.^[4] It was done in the Indonesian university in the academic year 2021-22. They selected 2 groups of 25 students each. It was done for 6 weeks. Data collected were test scores of the students in two methods and questionnaire to measure the learning attitude and motivation. It was concluded that jigsaw had a

positive outcome in learning achievement in both low and high achievers. It is better in learning attitude motivation also.

MATERIALS AND METHODS

Study Design: Interventional comparative study

Study Setting: Department of Pharmacology, Government Medical College, Dindigul.

Study Population: II MBBS students (n = 149)

Study Procedure: Ethical clearance was obtained and informed consent secured from the II MBBS students.

Students were divided into two groups (75 and 74) by simple random method by computer generated numbers.

For the first half of the chapter, the Group A had Flipped Classroom (FC) and Group B had Flipped Classroom–Jigsaw (FCJ). Groups were crossed over for the second half of the Hormones module

Intervention Details

Flipped Classroom:

Pre-class PowerPoint materials shared

Students divided into small groups

Topic presentation by students

Faculty facilitated discussion

Flipped Classroom–Jigsaw:

Pre-class materials shared

Initial grouping followed by re-grouping into mixed-topic teams

Peer teaching and discussion

Faculty reinforcement and assessment

Assessment Tools: Internal assessment tests (essay, short answer, MCQs)

Structured questionnaire assessing learning attitude and motivation

Statistical Analysis

Descriptive statistics

Student's t-test for normally distributed data.

RESULTS

Between-Group Comparison: No statistically significant difference was observed between FC & FCJ.

Table 1: Between Group Comparison

Portion	Flipped	Flipped jigsaw	p value
I Half	65.1±14.5	61.6±12	0.1739
II Half	49.75±19.25	53.3±19.9	0.2650

Significant differences observed between 2 methods. The A batch students performed better in FC and B batch in FCJ.

Table 2: Within Group Comparison

	Flipped	Flipped jig saw	p value
A Batch	65.1±14.5	53.3± 19.9	0.0001
B Batch	49.75±19.25	61.6±12	0.0001

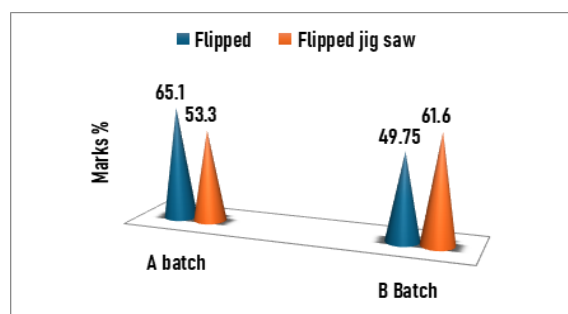


Figure 1: Within Group Comparison

Comparison with Previous Performance

Previous IA average: 47.45

Hormones test average: 54.6

Significant improvement (p = 0.0001)

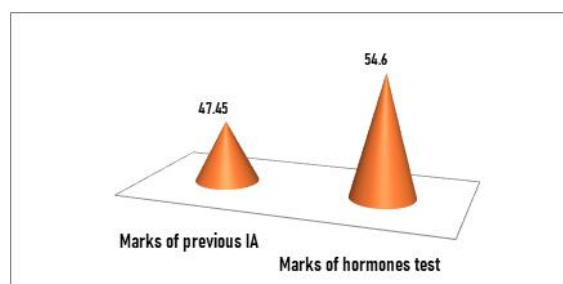


Figure 2: Comparison with Previous Performance

Student Perception: When analyzing the responses for questionnaire about the attitude and learning motivation about both the methods students preferred jigsaw method (71.7%) over flipped classroom. (28.3%).

The questionnaire had 10 questions to be answered in Liker's scale. The grading were: 0- Strongly disagree 1-Mildly disagree 2-Agree -Strongly agree 4-Very strongly agree

Students reported: They felt better engagement; improved understanding and enhanced motivation with FCJ.

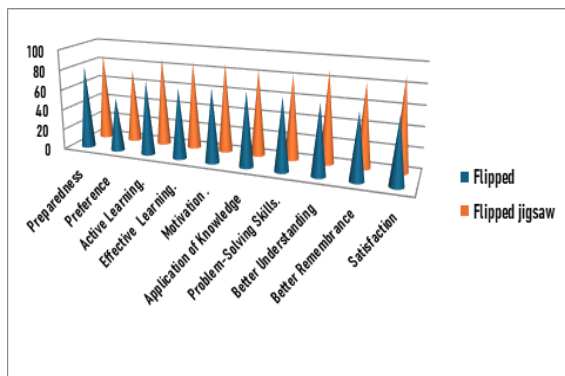


Figure 3: Comparison Between Perception of Two Methods

DISCUSSION

Both FC and FCJ improved academic performance compared to traditional methods. However, no significant difference was observed between the two in objective assessment scores.

Despite similar performance outcomes, students strongly preferred the FCJ method due to:

Increased peer interaction

Better topic coverage

Reduced stage fear

Enhanced motivation

These findings align with previous studies indicating that collaborative learning models improve engagement and cognitive outcomes. Integrating structured mentorship into the flipped Jigsaw model significantly enhanced student outcomes in metacognition, satisfaction, and academic interaction while reducing mental effort and improving educational efficiency. This combined approach may offer a more effective instructional model for complex content such as sectional anatomy.^[5]

In a study done by Cabi E on flipped classroom in 28 students, eight students stated they experienced motivation problems; nine students encountered problems related to the lesson content, and four students encountered problems related to learning. Six students said they did not experience any problems.^[6] By blending the strengths of computer-mediated instruction (eg, digital interfaces, self-paced learning, online engagement) and face-to-face class time (eg, collaborative opportunities, applied problem-solving, instructor and peer engagement), the flipped classroom can effectively improve student outcomes, increase student engagement, and enhance critical thinking development.^[7]

From a faculty perspective, the flipped classroom can take a significant amount of time and energy to develop initially. McLaughlin and colleagues reported an additional 127% of time to redesign and implement a basic pharmaceuticals course into a flipped classroom.^[8]

In a study done by revealed Ali usman et.al., that the Flipped Jigsaw model fosters higher levels of learning motivation compared to the conventional

Flipped Classroom. This advantage is explained by the way FJ combines independent learning with structured peer collaboration, thus more effectively meeting students' needs for autonomy, competence, and relatedness as outlined in Self-Determination Theory.^[9]

Several studies revealed that jigsaw II promotes cooperation, student interdependence, and joint learning, which leads to a sense of responsibility for group performance and increases engagement and empathy (Şahin, 2010; Slavin, 1989).^[10]

Challenges identified include:

Unequal participation in groups

Initial faculty workload for content preparation

Dependence on student preparedness.

CONCLUSION

Interactive teaching methods such as flipped classroom and jigsaw significantly enhance learning outcomes in medical education. While both methods are effective, the flipped classroom–jigsaw approach is more favorably perceived by students and promotes deeper engagement.

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