



## Student perception and Acceptance of Flipped class room and traditional teaching methods: A comparative study

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### ABSTRACT

**Background:** Traditional lecture-based teaching in medical education is often associated with passive learning and limited student engagement. The flipped classroom, an active learning strategy, has been proposed as an alternative to enhance learning outcomes and student satisfaction. Evidence regarding its effectiveness in undergraduate medical education, particularly in resource-constrained settings, remains limited.

**Objectives:** To compare the effectiveness of the flipped classroom approach with traditional teaching methods in undergraduate medical education and to evaluate student perceptions, acceptability, and feasibility of the flipped classroom model.

**Methods:** This quasi-experimental comparative study was conducted among 100 undergraduate medical students in the Department of Physiology at a government medical college. Participants were allocated into a flipped classroom group (n = 50) and a traditional teaching group (n = 50). Both groups were taught the same topic by the same faculty member. Learning outcomes were assessed using a validated post-test consisting of 20 multiple-choice questions. Student perceptions were evaluated using a validated five-point Likert scale questionnaire assessing engagement, conceptual clarity, self-directed learning, faculty interaction, and overall satisfaction. Data were analyzed using the independent Student's t-test, with  $p < 0.05$  considered statistically significant.

**Results:** Baseline characteristics were comparable between the two groups ( $p > 0.05$ ). The flipped classroom group demonstrated significantly higher post-test scores compared to the traditional teaching group ( $p < 0.001$ ). Student perception scores were also significantly higher in the flipped classroom group across all domains, including class engagement, conceptual clarity, encouragement of self-directed learning, interaction with faculty, and overall satisfaction ( $p < 0.001$ ).

**Conclusion:** The flipped classroom approach was more effective than traditional lecture-based teaching in improving academic performance and was better received by undergraduate medical students. Incorporation of flipped classroom strategies may enhance active learning, promote self-directed learning, and improve overall educational outcomes in undergraduate medical curricula.

**Keywords:** Flipped classroom; Traditional teaching; Medical education; Active learning; Student perception.

### INTRODUCTION

The traditional classroom typically adheres to a conventional instructional model in which instructors or faculty members deliver lectures during scheduled class sessions, while students complete assignments and related learning activities outside the classroom. Student group sizes vary across institutions based on intake capacity, which in turn determines the

teaching aids used. Students typically play a passive role—listening, grasping concepts, or taking notes—with limited chances to ask questions or interact during lectures.(1)The flipped classroom, a type of blended learning, has students study core topic content beforehand using online resources or provided handouts before class time. Its advantages include customization to the topic's difficulty level and allowing students to learn at their own pace. Recently, a growing number of higher education institutions have adopted blended learning approaches, in which students initially engage in face-to-face instruction on campus and subsequently continue learning through Internet-based platforms, allowing flexibility in terms of location and pace according to individual preferences.(2) In the flipped classroom model, learning activities are implemented through multiple modalities. Students initially engage in self-directed study using prescribed materials such as lecture notes, animated videos, selected textbook sections, or validated online resources. Classroom time is subsequently devoted to in-depth learning of core concepts, interactive peer discussions, and problem-solving activities. Consequently, the instructor’s role transitions from that of a “sage on the stage” to a “guide on the side,” facilitating active learning rather than delivering didactic instruction. (3)This method let students access pre-class lectures at their own comfort and learning pace, a key factor in their high satisfaction. They highly valued small-group discussion activities in flipped classroom face-to-face sessions, as these boosted engagement, motivation, and interest in the subject matter. The objectives of the present study were to introduce an innovative teaching–learning approach incorporating active learning principles and to compare it with the existing traditional passive learning method; to compare the flipped classroom approach with the conventional classroom model; and to evaluate the feasibility and acceptability of the flipped classroom method within the constraints of available institutional resources.

## MATERIALS AND METHODS

### Study Design and Setting

This comparative, quasi-experimental study was conducted in the Department of Physiology at Government medical college , Ongole during the regular academic schedule. The study protocol was reviewed and approved by the Institutional Ethics Committee prior to commencement. Written informed consent was obtained from all participants, and confidentiality of student data was strictly maintained throughout the study.

### Study Participants

A total of 100 students were included in the study and allocated into two groups based on their roll numbers, with Group A comprising students numbered 1–50 and Group B comprising students numbered 51–100; all participants and departmental faculty were sensitized and briefed regarding the study protocol prior to its conduct.All students with internet access who were able to view the pre-class videos and teaching materials were included.

**Exclusion criteria:** Students who were absent from any session of the flipped classroom activity were excluded from the study.

Both groups were taught the same physiology topic by the same faculty member. The flipped classroom group received pre-class learning materials, including recorded lectures and reading resources, one week prior to the session, and classroom time was devoted to interactive discussions and problem-based learning. The traditional teaching group received conventional didactic lectures using PowerPoint presentations. Learning outcomes were assessed using a validated post-test comprising 20 multiple-choice questions, administered immediately after the teaching session. Student perceptions were evaluated using a validated five-point Likert scale questionnaire assessing engagement, conceptual clarity, self-directed learning, faculty interaction, and overall satisfaction. Data were analyzed using standard statistical software. Continuous variables were expressed as mean  $\pm$  standard deviation. Intergroup comparisons were performed using the independent Student’s *t*-test, with  $p < 0.05$  considered statistically significant.

## RESULTS

A total of 100 undergraduate medical students participated in the study, with 50 students in the Flipped Classroom Group (FCG) and 50 students in the Traditional Teaching Group (TTG). Baseline characteristics of the participants are presented in Table 1. There were no statistically significant differences between the two groups with respect to age, gender distribution, attendance, or previous academic performance ( $p > 0.05$ ). This baseline comparability ensured that observed differences in learning outcomes could be attributed primarily to the teaching methodology rather than confounding factors.

**Table 1. Baseline Characteristics of Study Participants**

Variable	Flipped Classroom Group (n = 50)	Traditional Teaching Group (n = 50)	<i>p</i> value
Age (years), mean $\pm$ SD	19.8 $\pm$ 1.2	20.0 $\pm$ 1.3	0.42
Gender (Male/Female), n (%)	26 (52%) / 24 (48%)	25 (50%) / 25 (50%)	0.84
Previous academic performance (%)	64.5 $\pm$ 6.8	63.9 $\pm$ 7.1	0.68

Variable	Flipped Classroom Group (n = 50)	Traditional Teaching Group (n = 50)	p value
Attendance (%)	91.2 ± 4.5	90.6 ± 4.9	0.55

**Table 2. Student Perception of Teaching Methods**

Perception Parameter	Flipped Classroom Group Mean ± SD	Traditional Teaching Group Mean ± SD	p value
Class engagement	4.4 ± 0.6	3.2 ± 0.7	<0.001
Conceptual clarity	4.3 ± 0.5	3.4 ± 0.6	<0.001
Encouragement of self-directed learning	4.5 ± 0.5	3.1 ± 0.7	<0.001
Interaction with faculty	4.2 ± 0.6	3.3 ± 0.6	<0.001
Overall satisfaction	4.4 ± 0.5	3.2 ± 0.7	<0.001

Table 2 Shows that Student perceptions regarding the teaching methodologies were analyzed using a five-point Likert scale. Across all evaluated domains—class engagement, conceptual clarity, encouragement of self-directed learning, interaction with faculty, and overall satisfaction—the flipped classroom group reported significantly higher mean scores compared to the traditional teaching group ( $p < 0.001$  for all parameters). Notably, the highest perception scores in the flipped classroom group were observed for encouragement of self-directed learning ( $4.5 \pm 0.5$ ) and overall satisfaction ( $4.4 \pm 0.5$ ), highlighting the learner-centered nature of this instructional approach. In contrast, students in the traditional teaching group reported comparatively lower engagement and motivation, reflecting the passive nature of conventional didactic lectures.

## DISCUSSION

The present study evaluated the effectiveness of the flipped classroom approach in comparison with traditional lecture-based teaching in undergraduate medical education. The findings indicate that the flipped classroom method resulted in significantly improved academic performance and more favorable student perceptions, highlighting its pedagogical advantage over conventional teaching methods. (4) Students exposed to the flipped classroom achieved higher post-test scores than those taught using traditional lectures, suggesting enhanced understanding and application of concepts. This improvement can be attributed to the instructional design of the flipped classroom, wherein students acquire foundational knowledge before class and engage in interactive, application-based learning during classroom sessions. (4,5) Such an approach facilitates higher-order cognitive processing, including analysis and problem-solving, which are essential components of effective medical education. (6)

In contrast, traditional lecture-based teaching predominantly emphasizes passive knowledge transmission, which may limit student engagement and opportunities for immediate feedback. Active learning strategies, as employed in the flipped classroom model, have been shown to improve academic performance across science and medical education disciplines. (6) The higher minimum scores observed in the flipped classroom group further suggest that this method supports more consistent learning outcomes among students with varying academic abilities. (5) Student perception analysis demonstrated significantly higher levels of engagement, conceptual clarity, interaction with faculty, and overall satisfaction among students taught using the flipped classroom approach. Positive learner perceptions have been consistently reported in previous studies and are considered important indicators of instructional effectiveness in medical education. (7,8)

Notably, students reported greater encouragement of self-directed learning in the flipped classroom group. This finding aligns with the principles of competency-based medical education, which emphasize learner autonomy, accountability, and lifelong learning skills. (9) Enhanced faculty–student interaction observed in the flipped classroom setting may have further contributed to improved conceptual understanding and learner motivation. (8) The results of this study are consistent with existing literature demonstrating that flipped classroom methodologies are either superior or equivalent to traditional teaching approaches with respect to learning outcomes, while offering additional benefits related to student engagement and satisfaction. (5,6) Although increased preparatory workload has been identified as a potential challenge of flipped classrooms, structured pre-class materials and guided in-class facilitation may mitigate these concerns. (7) Despite these strengths, the study has limitations. The single-institution, quasi-experimental design may limit generalizability, and only short-term learning outcomes were assessed. Long-term retention of knowledge and impact on clinical competence were not evaluated and should be explored in future multicenter and longitudinal studies.

## CONCLUSION

The present study demonstrates that the flipped classroom approach is more effective than traditional lecture-based teaching in improving academic performance among undergraduate medical students. The flipped classroom method was also better received by students, with higher levels of engagement, satisfaction, and encouragement of self-directed learning. These findings support the integration of flipped classroom strategies as a complementary instructional approach within undergraduate medical curricula. Adoption of learner-centered teaching methodologies such as the flipped classroom may enhance educational outcomes and better prepare students for clinical practice and lifelong learning. Further large-scale and longitudinal research is recommended to establish long-term educational and clinical benefits.

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