

RESEARCH ARTICLE

A comparative study of flip classroom teaching method versus traditional classroom teaching method in undergraduate medical students in physiology

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ABSTRACT

Background: Due to the current passive type of traditional teaching methods leads to a lack of interest in the subject by students affects teaching-learning outcome. In the flipped classroom method, we provide prior handout/teaching material to students as well there is active participation of students by various interactive methods leads subject more interesting and chances of improving teaching learning outcome. **Aims and Objectives:** The aim of the study was to compare flip classroom teaching method versus traditional classroom teaching method in undergraduate medical students as well evaluate feasibility to implement a flip method in our department. **Materials and Methods:** After approval from the Institutional Ethical Committee, the study conducted in 130 undergraduate medical students in the Department of Physiology at GMERS Medical College, Gandhinagar between November 2017 and January 2018. Two Groups A and B having 65 students have taken pre-test (10 marks) followed by they have undergone Group A for flip method of topic composition and functions of sympathetic nervous system and Group B for traditional method of the same topic, Group B has undergone flip method for compositions and functions of parasympathetic nervous system and Group A for traditional method for the same topic. Post-test (10 Marks) has taken immediately after the intervention. Pre-validated structured feedback was taken both from students and from faculties in 5-point Likert's scale questionnaires. **Results:** After applying paired *t*-test it shows the flip classroom method is statistically significant ($P < 0.05$) than the traditional method in both Groups. Students feedback finding shows that flip method is more enjoyable, creates interest in the subject, while faculties feedback shows it requires more time, workforce, and resources. **Conclusion:** Active intervention in the form of a flip classroom method improves teaching-learning outcome as well improves overall academic performance in students compared to traditional passive teaching-learning method.

KEY WORDS: Flip Classroom; Interventional Method; Physiology, Teaching-learning

INTRODUCTION

The general formation of the medical curriculum remains more or less same having heavy preclinical didactic

lectures followed by a series of experimental practical. Didactic lectures occupy more time in various teaching-learning methods of the medical curriculum. This form of teaching technique is such as the lecture is delivered by a subject expert to a group of students. The size of the student group is different in various institutions according to intake capacity and that decides the aids used in teaching. The students' role is usually a passive type in the form of hearing, understanding the concepts or making notes, with little opportunities to raise question and interaction during the lecture hour.

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The flipped classroom is one form of “blended learning” in which students learn “core” content of topic either by online available resources or with already given handout materials before lecture hours. The flipped classroom has an advantage like it can be customized according to the difficulty level of topic and students also learn at their own pace. It leaves better and effective use of time. New teaching technique flipped classroom method is invented in an attempt to use available teaching-learning time for better use and at the same time increasing active participation of the student to meet their need which is learning.^[1]

In this model, of flipped classroom activities are carried out many ways, for example, initially student undergone self-study of a given material in the form of lecture notes, animated videos, portion of textbook, or internet material having valid resources. The class time is utilized for learning the core content, interactive discussion among students or having a problem-solving approach. Thus, the role of the teacher is shifted from being the “Sage on the Stage” to the “guide by the side.”^[2] There is evidence suggests that such students taught through this approach having a better understanding of the topic. This understanding allowed more focus in a study to perform optimally in the course.^[3] This mode of teaching has used in non-science courses long before, but the recent availabilities of handy internet facilities have changed the interest in this flipped model in medical science and technology related courses. Biology teachers are specially using this flipped approach

using web-based applications, videos, figures, charts, and handout materials to share ideas and easy understanding of this topic; however, there are few published studies demonstrating its effectiveness.

Many world’s leading teaching institutions have implemented this model, and the outcome and perception of the flipped classroom model have been studied in several student-centric models.^[4-6] Undergraduate medical students in the first trimester of a medical course have little fundamental knowledge of the topics they are taught; this could be considered as being one barrier to using the flip classroom method for this group of students. We conducted a study to assess the effectiveness this method in 1st-year medical students for two mentioned topics and implemented flipped method by providing prior materials and interaction during lecture and at same, we assessed teaching-learning outcome in the flip and traditional method. We also tried to assess the perception of students as well as faculties about the implementation of this method with available resources.

Aim and Objectives

The objectives are as follows:

- To introduce a new way of teaching-learning method which involves active learning aspect and will compare with current traditional passive learning
- To compare the flip classroom method versus the traditional classroom method

Table 1: Comparison between traditional and flip classroom methods by paired *t*-test

Topic	Classroom method		Flip classroom method	
Composition and functions of sympathetic N. system	Group B – Pretest (10)	Group B – Posttest (10)	Group A – Pretest (10)	Group A – Posttest (10)
	3.56±1.54	4.18±1.27	3.76±1.45	5.84±1.49
<i>P</i>	0.406		<0.05	
Composition and functions of para-sympathetic N. system	Group A – Pretest (10)	Group A – Posttest (10)	Group B – Pretest (10)	Group B – Posttest (10)
<i>P</i>	0.734		<0.05	

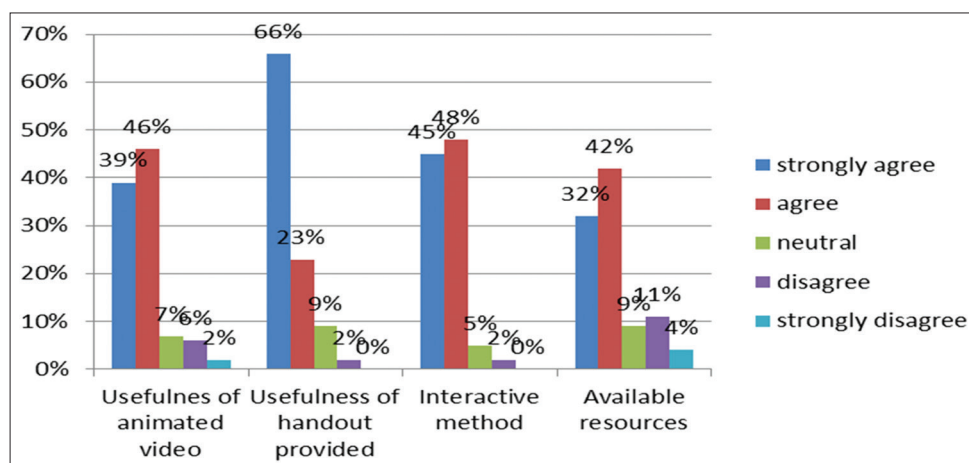


Figure 1: Students feedback on flip classroom method regarding content, intervention, and available resources

- To evaluate the feasibility and acceptance of the flip classroom method within available resources.

MATERIALS AND METHODS

Study Design

The study design was a open-labeled interventional study (Education Intervention).

Sample Size

The sample size was 150 (considering the strength of students coming to 1st MBBS course).

An approval from the institutional committee was obtained, informed consent was taken from all the participants and study was conducted among 1st-year undergraduate medical students at GMERS Medical College Gandhinagar from November 2017 to January 2018. Total 150 students involved in the study are divided into two groups according to their roll number, in which Group A having roll number 1–75 and Group B having roll number 76–150. All the students and departmental faculties have sensitized and explained about the study course.

Inclusion Criteria

All students with access to the internet can view the videos and teaching material before class.

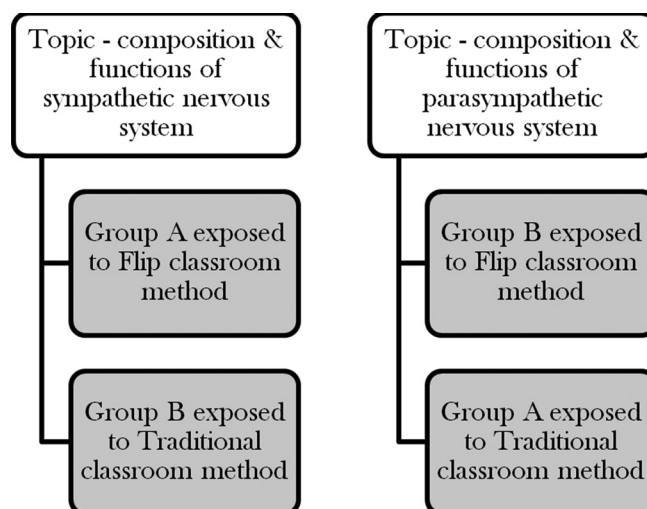
Exclusion Criteria

Any student who remain absent in either of class during flipped activity was excluded from the study.

After systematic grouping in flipped classroom method, we have provided study materials 1 day before intervention in the form of animated videos, handout materials, and sharing

softcopies for specific topic to particular group through forming defined social media, Group A for “components and functions of sympathetic nervous system,” Group B for “components and functions of Parasympathetic nervous system” then during lecture hour students are encouraged for active participation.

Following Mentioned Topics were Intervened on the day of Assessment



Evaluation

We have conducted pre-test (10 marks) and post-test (10 marks) questionnaire (pre-validated) given before and immediately after the lecture to compare the effectiveness of study after the intervention.

We have also given pre-validated feedback form to both groups and faculties for feedback evaluation with five-point Likert scale.

Data were analyzed using appropriate software by applying appropriate statistical methods.

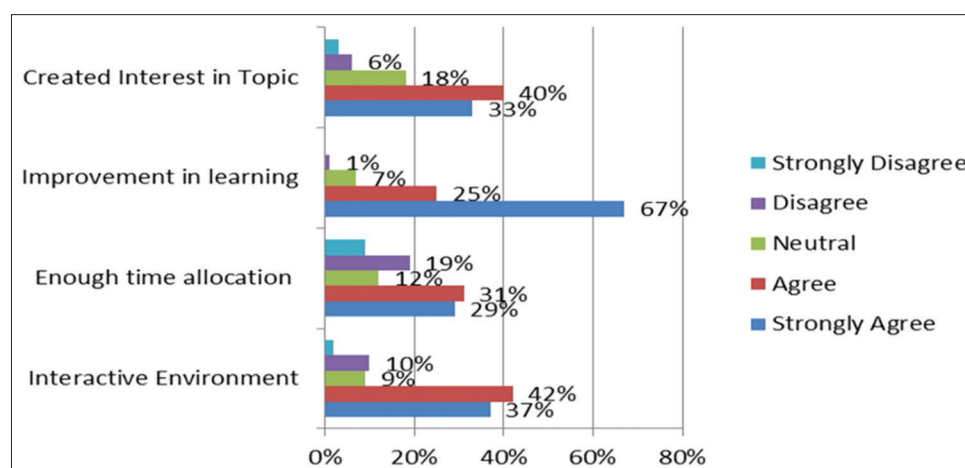


Figure 2: Students feedback on flip classroom method regarding interactive environment, time allocation, learning and interest compared to the traditional method

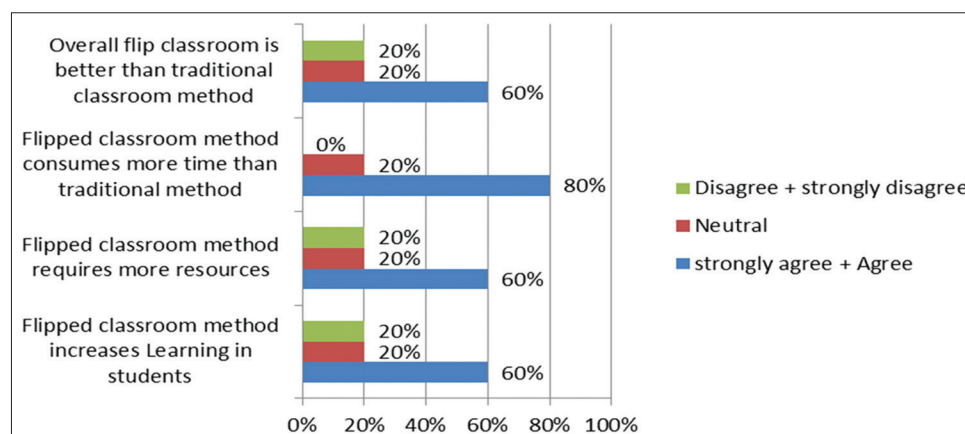


Figure 3: Faculties feedback on flip versus traditional classroom method

RESULTS

Findings observed in the present study are summarized in Table 1 and Figures 1-3. The result of the coefficient of variation also suggests that the flip method is superior to the traditional method.

DISCUSSION

Result of study which is shown in Table 1 After applying appropriate statistical test, shows there is statistically significant Post-test outcome in Flip classroom method compared to Traditional classroom method, concluding Flip classroom method improves Teaching-Learning outcome compared to traditional method. According to Figure 1 in flipped classroom method students enjoyment during class hours, interaction and learning process is more compared to the traditional method, Figures 2 and 3, as per faculties as well students feedback in flipped classroom method requires more time, more resources, and active participation to enhance teaching-learning outcome.

Various studies^[7-9] to compare the flipped classroom method versus traditional classroom method mostly shows that flip method is better to improve learning outcome in students. Study in Viveka *et al.*^[7] shows that number of students passing after flipped classroom intervention is more than students undergone traditional method also perceptive rating among students in the flipped classroom is more. Tune *et al.*^[8] study shows flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. Christopher and Pound^[9] studies said medical students have generally expressed strong satisfaction with early applications of the FC to undergraduate medical education, and generally prefer this method to lecture-based instruction. Whillier and Lystad^[10] study shows there is no difference in grades as well satisfaction level in a Flipped classroom of Neuroanatomy.

Strength of the study is Dedicated team of Faculties and Highly Interested students for this new intervention method.

Limitation of the study is outcome is determined only on base of Two topics as we have to include more topics and allocate more time for a better result, also bdue to chances of contamination of resource materials before intervention may affect the outcome of the study.

CONCLUSION

As we found a statistically significant result in flipped classroom method and teaching-learning outcome was also improved, this intervention method should implement in large scale in the majority of preclinical subjects; furthermore, we should go for more detailed study including other subjects and faculties to compare outcome in a larger scale.

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