

Introduction of Flipped Class Room Teaching Method for Undergraduate Students of Surgery in Assam Medical College - A Prospective Study

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ABSTRACT

BACKGROUND

Higher education including medical education has been shifting towards more active and learner centric strategies. The flipped classroom (FCR) is basically student centered where as traditional teaching is teacher centered. Educationists and researchers have been debating about the pros of flipped classroom for over a decade and it is believed that flipping the classroom helps in inculcating the habit of self learning among the learners, leading to refinement of their analysis and synthesis skills. There are very limited data available regarding FCR teaching method especially surgery subject. Hence, this study was planned to introduce flipped class room among medical undergraduates in surgery.

METHODS

A prospective and observational study of 110 student selected out of 115 was carried out. Topics were selected from common surgical topics – cholelithiasis (2 classes) and appendicitis (1 class). Pre class activities were intimated digitally. In class and post class activities, student and teacher perceptions were measured and evaluated using standard statistical techniques.

RESULTS

58 : 52 (Male : Female) students were included. Among them, 70 agreed & 10 strongly agreed that proper and clear instructions were provided, pre-class reading materials and similarly 80 agreed & 16 strongly agreed that adequate reading material was provided. 60 agreed that it was useful method in understanding and 10 strongly agreed that they learnt better but 36 felt neutral. Regarding faculty perception on if they would prefer flipped classroom over other teaching method: 12 agreed, 4 strongly agreed and 4 were neutral. Students suggested less text, more videos, and the use of FCR for selected topics.

CONCLUSIONS

Flipped classroom is an innovative method for medical education and should be incorporated in the curriculum. More studies, newer performance indicators and methods of implementation are needed to fine tune its technique and mode of delivery.

KEYWORDS

Flipped Classroom, Medical Education

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DOI: 10.18410/jebmh/2021/558

How to Cite This Article:
Brahma RC, Emanee SYS. Introduction of
flipped class room teaching method for
undergraduate students of surgery in
Assam Medical College - a prospective
study. J Evid Based Med Healthc
2021;8(33):3060-3065. DOI:
10.18410/jebmh/2021/558

Submission 30-04-2021,
Peer Review 10-05-2021,
Acceptance 24-06-2021,
Published 16-08-2021.

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BACKGROUND

Higher education including medical education has been shifting towards more active and learner centric strategies. However, most of the teachers in our institute are following the traditional methods of teaching like giving lectures in the class and then giving assignments that have to be done at home. Though the contemporary teachers are comfortable with the traditional methods of teaching, however students find it very boring which leads to decrease interest and deep in the academic performance. The pioneers in the flipped classroom approach of teaching methodology was believed to be used by Bergman and Aron Sams.¹ They devised this methodology as a remedy to the problems of student absenteeism and started posting their lectures online so that they can assess the contents even from the remote areas. Basically, flipped classroom refers to pedagogical method in which students do the homework at school and school work at home. Sometimes, it is also known by the terminology 'inverting the class'.² The flipped classroom is basically student centered whereas traditional teaching is teacher centered. Moreover, the classroom time available can be better utilised for meaningful interactions, discuss advance topics and also take feedback.³

Educationists and researchers have been debating about the pros of flipped classroom for over a decade and it is believed that flipping the classroom helps in inculcating the habit of self-learning among the learners, leading to refinement of their analysis and synthesis skills.^{3,4} In the traditional teaching method where the teachers deliver a lecture in a class there have been group learning and with the flipped classroom, focus has been shifted to individual learning and thus there is enhancement of learning and the understanding of the subjects is better.⁵ In this method, the role of faculty changes from that of a lecturer to a mentor and facilitator who engages the students in a learning process.⁶ This form of teaching method is rarely practised in our institute. Flipped classrooms have many advantages which always overcomes its drawbacks. In the recent comparative study between flipped classrooms and lecture-based class, ophthalmology has concluded that the flipped classroom approach shows positive impact on the students. But it has showed some drawbacks. So, it requires further evaluation and modifications before it can be widely accepted and implemented.⁷ We should use this teaching modality especially for medical students. Medical students are future health professional.

Medical student's needs to be updated about important information related to subject's topic. It will be easy for them to utilize the pre-reading material anywhere. Introducing FCR as innovative teaching learning method will be helpful for all students. There is very limited data available regarding FCR teaching method especially in surgery subject. They would also get a chance to give feedback that they understood the topic better or otherwise, which is not present in traditional learning. Students would be able to ask questions during the class and clear their doubts on material they have already read beforehand. Students would also learn to share the reading materials and were encouraged to do self directed learning.

They would also be able to present the learning topics in front of the teachers and their friends giving them confidence to stand before the audience. Medical education is becoming challenging in view of the advancement in medical sciences and expansion of medical knowledge. As a result, we need to constantly innovate and upgrade teaching methodology in order to keep pace with the advancement of the knowledge. After starting flipped classroom teaching with surgery, gradually other clinical subjects, para-clinical subjects and pre-clinical subjects need to be flipped so that the teaching becomes learner centric and student's interest is generated. Flipped classroom will elevate the student's confidence and facilitate independence in learning dynamic and challenging educational and work environments. It will allow learning to progress beyond mere knowledge acquisition to being a memorable and motivating experience.

Objectives

1. To evaluate the utility of flipped classroom among undergraduates in surgery in common surgical topics.
2. To measure student perception and faculty perception about FCR after the class.

METHODS

This was a prospective and observational study. The study was conducted in Surgery Department at Assam Medical College and Hospital, Dibrugarh, from July 2020 to August 2020 after getting clearance from Institutional Research Committee. A total of 110 students were enrolled from M.B.B.S. batch of 2017. Total 115 students were present in last flipped class room. Out of 115, five incomplete forms were excluded for final analysis.

Before the start of activities, faculties and postgraduates of the department were sensitized about flipped classroom and a brief orientation program regarding flipped classroom for medical undergraduates was arranged. As the batch already have whatsapp group for academic interaction among themselves, group administrators and class representatives were asked to post their assignments, or any work related to project in the group whenever the study materials were sent to them for circulation among the students before the start of flipped classroom. In the course of the study, two activities were done. First, there were pre-class activities which was followed by in-class activities. Cholelithiasis and appendicitis were the topics chosen to be taught by using flipped class room.

Pre-Class Activities

For pre class activities, reading material from text books, power point presentations, pre-recorded videos & text handouts & important links etc. were provided to all students through whatsapp, depending upon the suitability for each topic. Specific instructions to students were given asking them to read these provided materials before coming for the scheduled class on the topic. These materials were given 1

week prior to in-class activities. Two days prior to in-class activities, trigger assignments like multiple choice questions (MCQ) or 2-3 reasoning questions were sent and posted in the whatsapp group for all the students to come prepared in the ensuing flipped classroom.

Surgery Topic/Time Period	Pre-Class Activities (1 Week Prior to Class Activities)	In - Class Activities	Time (Minutes)
1. Cholelithiasis 2. Appendicitis a. Aetiology, b. Clinical features, c. Investigations, d. Management e. Operation - open and laparoscopic	Reading text material from books, standard guidelines, videos & ppts depending upon the suitability for each topic.	Summarization of given topics followed by question & answers session.	4 - 5
	Assignments: 1. Write note 2. Summarize the topic. 3. Write down their queries 3. Assigned task 2 days before class activities (MCQ, (10-15) or Reasoning question (3-5)	Small group discussion (5 groups) - Assignment (30 min duration) will be given to all groups. This will comprise of three questions (within 20 minute) then small presentation from each group (10 minutes)	30 - 35
		Presentation from each group	6 - 12
		Feedback form given (at end of third flipped classroom)	10 - 12

Table 1. Flipped Classroom Activities

In-Class Activities

This was started with small summary of the given topic by any student followed by queries of students. Then students were dispersed into their respective groups. Assigned task was given to all students as per group activity. The assignment comprised of a few questions which they discussed among themselves. Then they prepared a small presentation on one topic of their choice out of above discussed questions. This assignment activity was of total 30-minute duration; out of which 20 minutes were used for group discussion and last 10 minutes for making small presentation. At the end of third topic, feedback questionnaire forms were provided to all students as well to faculty and postgraduates to know about their perception and attitude towards flipped classroom. A feedback questionnaire was given to the students and another one for faculty and postgraduates. The student feedback questionnaire was comprised of domains like demographic characteristics and student’s perception. The faculty feedback questionnaire was comprised of demographic characteristics and faculty’s perception.

Statistical Analysis

Results were expressed as percentage and frequency. Analysis was done by Microsoft Excel 2007.

RESULTS

The demographic data of the participants is mentioned in Table no. 1. Female students were more as compared to male in 58 : 52 (Male : Female) ratio. The student belongs

to 2017 batch. Most of the students (95) live in hostel and rest (15) in home. The faculties were all male participants. Figure 1 had demonstrated about pre-class assignment in flipped classroom. In this, 70 agreed & 10 strongly agreed that proper and clear instructions were provided, and similarly 80 agreed & 16 strongly agreed that adequate reading material was provided. During in-class activities which were depicted, students understood the topic better in flipped classroom (10 neutral, 72 agreed & 14 strongly agree). Learning has increased (30 agreed & 15 strongly agreed). Motivated to read the topic after FCR (90 agreed, 14 strongly agreed & 4 neutral).

Table 2 has mentioned that the student’s perception in flipped classroom, in which 60 agreed that it was useful method in understanding and 10 strongly agreed that they learnt better but 36 feel neutral. There were interactions with classmates and 63 agreed, 10 strongly agreed and 32 were neutral. In interactions with teachers, 58 agreed, 10 strongly agreed and 30 were neutral. Queries were solved (25 agreed and 21 neutral). Flipped classroom should be for selected topic (60 agreed but 10 strongly agreed and 24 were neutral). Students found that the best in FCR were more interaction with batch mates, understanding topics better etc.

Pre-Class Activities			
	Proper and clear instructions were given to you	Pre class reading material provided to you was adequate	Pre class activities were more time consuming as compared to lecture-based classroom
Strongly disagree	0	0	2
Disagree	5	4	60
Neutral	25	10	4
Agree	70	80	30
Strongly agree	10	16	14
In Class Activities			
	I have understood the topic better which was covered in FCR	My learning increased in group activities	I am motivated to read the topic after FCR
Strongly disagree	4	1	0
Disagree	10	2	0
Neutral	10	10	4
Agree	72	90	90
Strongly agree	14	7	16

Table 2. Pre-Class Activities and In-Class Activities

Students Perception					
	FCR is useful teaching method in understanding subject better	I was able to interact more with my classmates	Interacted more with my teacher	FCR should be used only for selected topics	
Strongly disagree	2	3	2	0	
Disagree	2	2	10	10	
Neutral	36	32	30	24	
Agree	60	63	58	60	
Strongly agree	10	10	10	16	
Faculty Perception					
	FCR is a feasible method	FCR will enhance student's learning skill	FCR is a more time-consuming method	I would prefer to use FCR over other teaching metho	I would choose FCR for more topics
Strongly disagree	0	0	0	0	0
Disagree	0	0	4	0	0
Neutral	2	1	1	4	2
Agree	14	10	10	12	10
Strongly agree	4	9	5	4	4

Table 3. Student's Perception and Faculty Perception

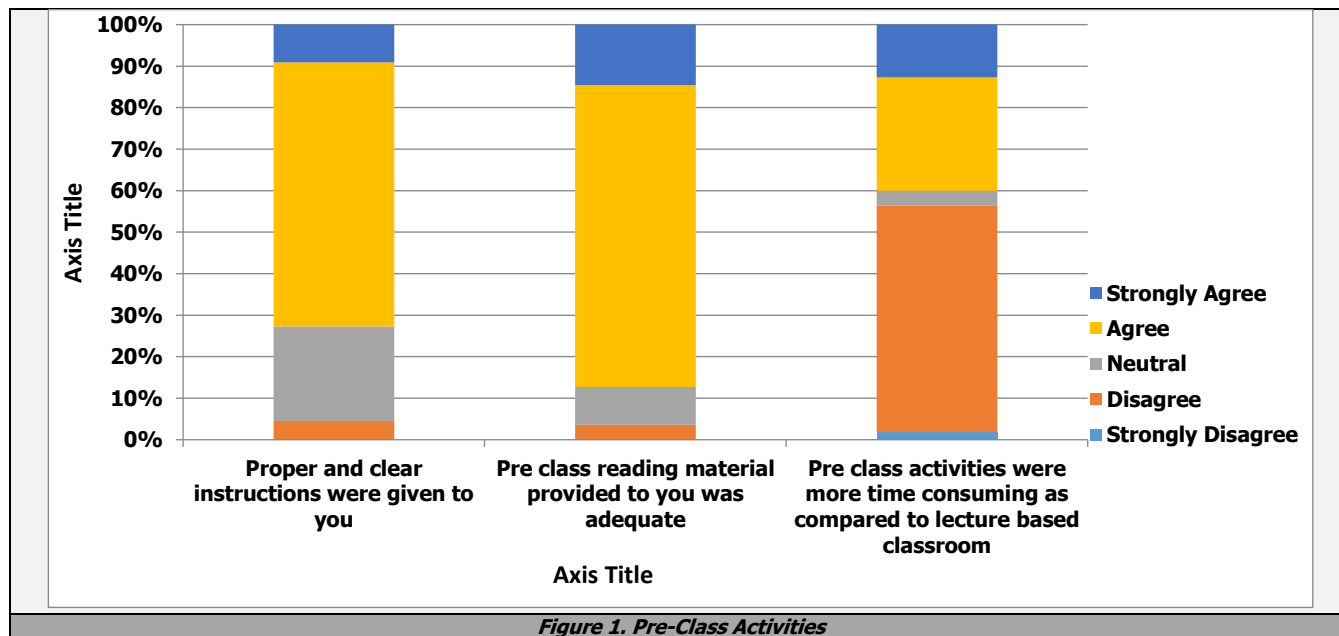


Figure 1. Pre-Class Activities

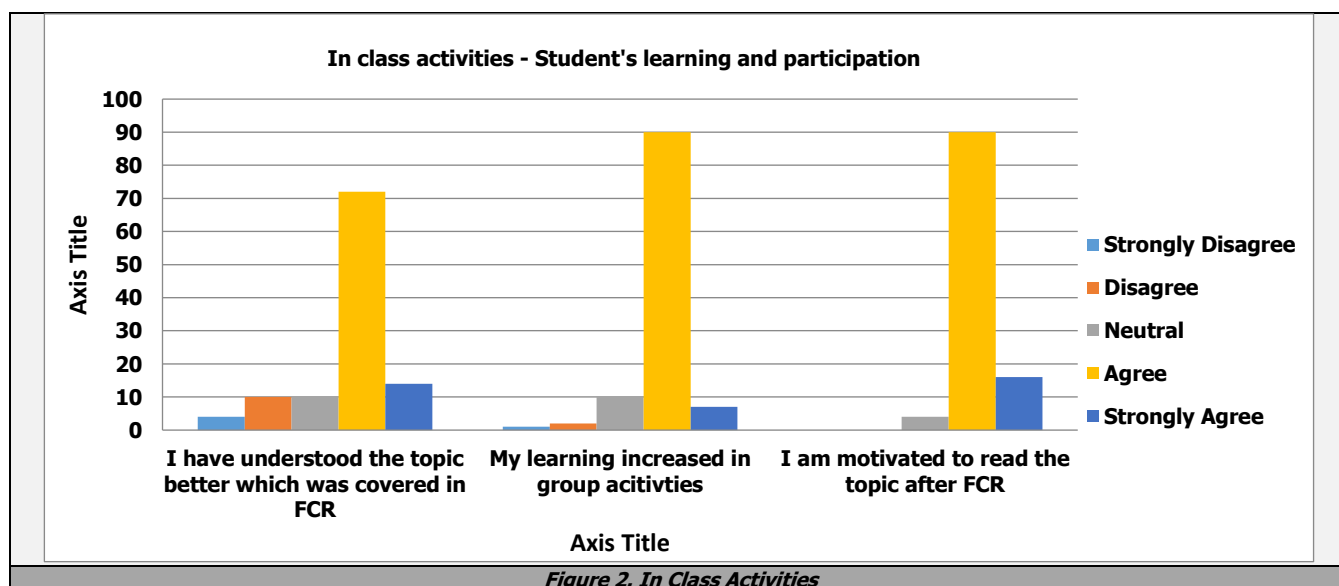


Figure 2. In Class Activities

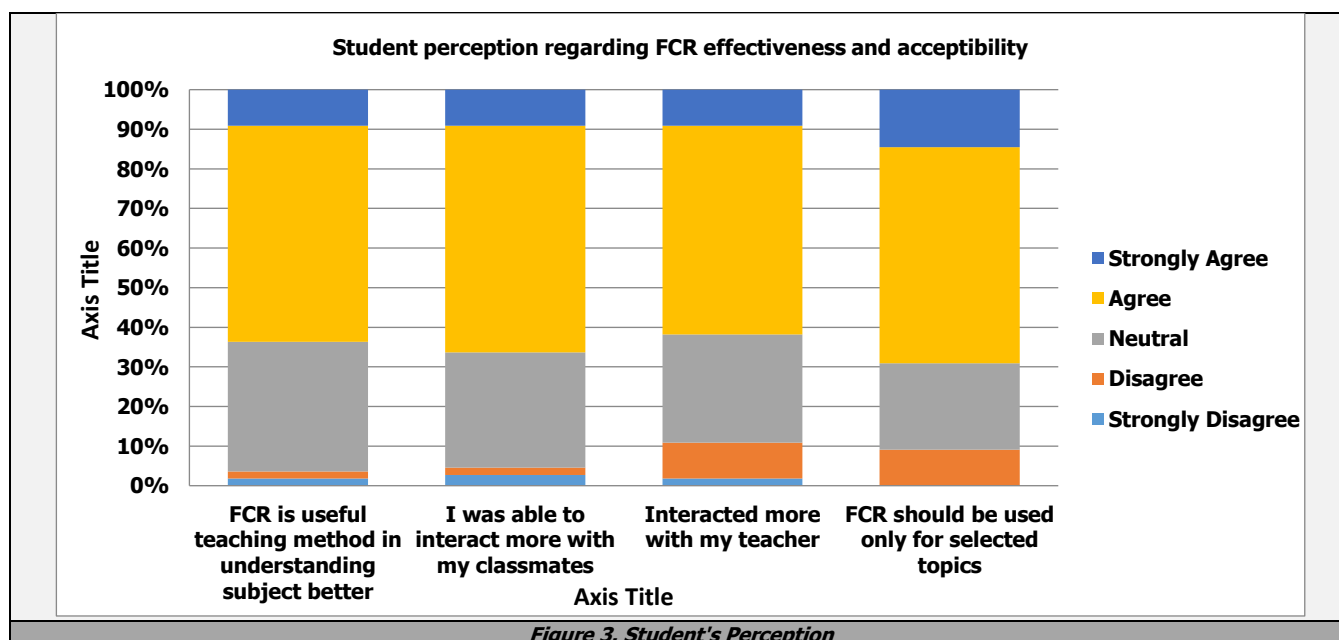
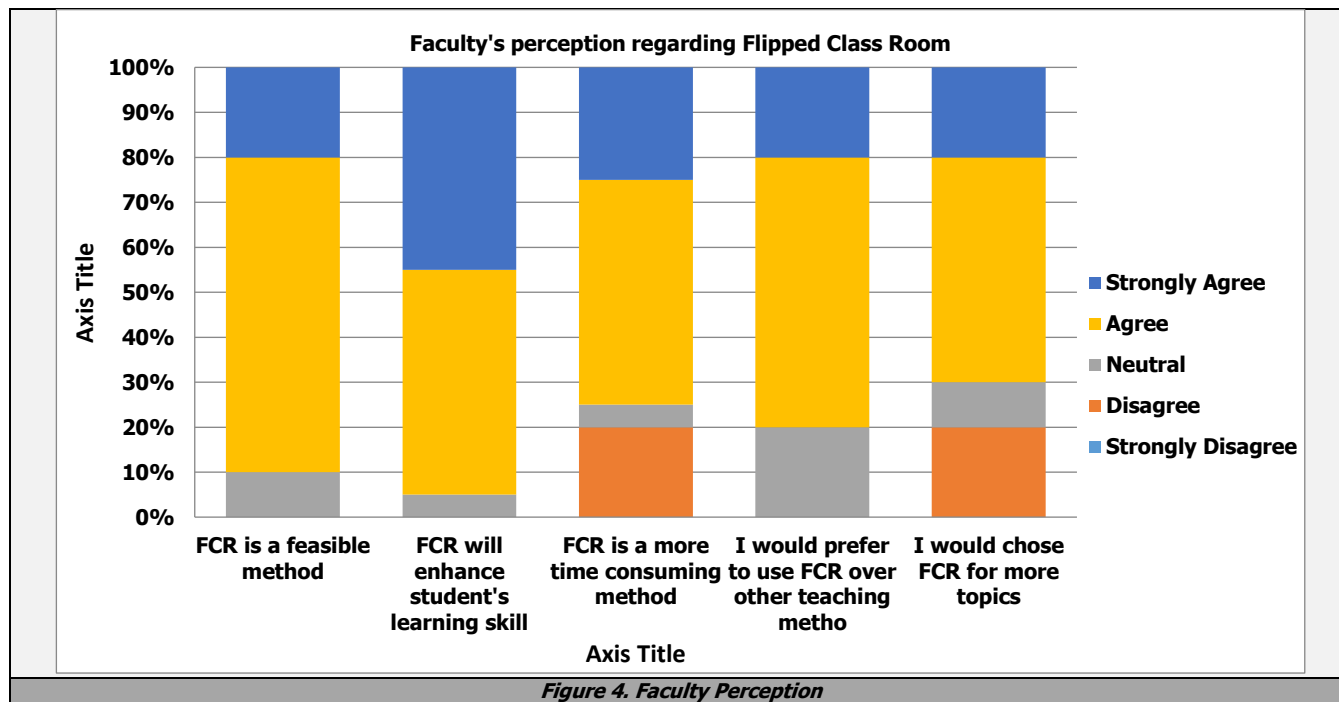


Figure 3. Student's Perception



Faculty's perception has been demonstrated in which 14 agreed, 4 strongly agreed on feasibility of flipped classroom. Flipped classroom enhanced learning (10 agreed and 9 strongly agree and 1 neutral), flipped classroom was more time consuming (10 agreed and 5 strongly agreed, 4 disagreed).

Would they prefer flipped classroom over other teaching method, (12 agreed, 4 strongly agreed and 4 were neutral). Would they choose flipped classroom over other methods, (10 agreed, 4 strongly agreed, 4 disagreed and 2 were neutral). Discussion, interaction between students etc., were best in flipped classroom according to faculties.

DISCUSSION

Many studies have been done on flipped class room in different fields. Less literature was found among medical undergraduate and especially in surgery subject. In current study, regarding pre-class activities, maximum students have mentioned that proper and clear instructions were provided to them. The pre-class reading materials are relevant and adequate in our study. This finding is same in a study where around 100 % students have described that pre-reading material was relevant.⁸

During in-class activities in present study, more than fifty percent students have found that they understood the topic better in flipped classroom. Similarly, in another study, around seventy percent students learned and understood the topic better in flipped classroom.⁹ Maximum students found that their learning had increased, and they are even motivated to read the topic after flipped classroom. This is noticed in other studies too.^{9,10}

This study described the student's perception on flipped classroom as a useful and innovative teaching learning method. In one of the study, it was mentioned that around one third students not only agreed that this teaching method

is useful because it addressed the needs of all types of students but also found that they had more interactions with their classmates as well as with teacher regarding their doubts or any query. In the same way, another study had mentioned that students communicated more with other students.

Undergraduates of our study stated that they would prefer flipped classroom over other teaching methods. This is quite similarly noticed by another study which has reported that nearly half of the students preferred or strongly preferred the flipped model over the traditional model.¹⁰ In one of the other researches, students have wished that more instructors should use flipped class method in their teaching. More than half of the respondent students have decided that flipped classroom should be for selected topic.

What this study adds to the current literature is that flipped classroom is innovative and an interesting teaching method which is student centered. It enhances self directed learning which encourages deeper understanding and active participation

Some limitations must be mentioned here. Though the flipped classroom is an innovative and interesting teaching methodology and has several advantages, there are some limitations. Teacher has to take extra efforts in preparing for the flipped classroom study materials which require extra time and the basic requirement of student's self responsibility to read the provided reading material before the class. Most of the students were in need of constant reminder at the beginning to come to class with preparation. The pre-class reading material should comprise of more videos or power points. Initially, there was problem of non availability of smartphone for some students due to financial constraints which was solved by asking them to use internet service of the college library. There was internet problem too and thus all students could not download the given reading material and do additional search too. This was one of the major limitations. Even the teachers required lot of

preparation and need to search for appropriate videos, ppts, additional reading material and then download them.

Overall, flipped classroom was found to be very much interesting to the students which enhanced their learning, made them more participative and interactive. After introduction of the flipped classroom, students were more enthusiastic and indulged in self directed learning as it is a necessary ingredient for the pre class activities. There are several activities to be performed during the in-class activities which would enhance student's learning and better understanding of the topic.

During group activity, lots of interaction takes place to clear doubts and more opportunity for student-student interaction, students-teacher-student's interactions for completing the class assignments and better understanding is seen. The major problem was that few of the students were not interested in reading the material and even some of the faculties discouraged them to do so. May be because this was a new teaching method for them or they didn't want to complete their assignment. It's a real challenge to overcome this roadblock which requires extra effort on the teacher. With hard work and repeated practice of conducting flipped classroom, the procedure would be easy in near future.

However, it needs some adaptation by existing teachers as the topics need to be prepared in the form of power point and videos much before and provide the materials to the students before a week and subsequently send the trigger question in the form of short questions and MCQ about three days prior to the actual class and ask them to bring along the answer sheet in the class. In-class activities could be later changed to presentation rather than just question answers. Moreover, different activities may be given to different groups to break the monotony.

The road ahead lies in making the flipped classroom very innovative and interesting using new teaching methodology and student-centred approach which enhances the students learning and encourages them to be interactive, as well as encouraging other colleagues to use this method.

CONCLUSIONS

It is necessary to introduce innovative teaching methods for medical students to increase their interest, understanding and attention in the class. As there is limited study in the use of flipped classroom in surgery, more research should be done on flipped classroom especially in surgery before its

implementation, so that we can use this teaching learning approach in future for the betterment of medical students.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

REFERENCES

- [1] Bergmann J, Sams A. Flip your classroom: reach every student in every class every day. International Society for Technology in Education, 21 Jun 2012.
- [2] Lage MJ, Platt GJ, Treglia M. Inverting the classroom: a gateway to creating an inclusive learning environment. *The Journal of Economic Education* 2000;31(1):30-43.
- [3] Jacot MT, Noren J, Berge ZL. The flipped classroom in training and development: fad or the future? *Performance Improvement* 2014;53(9):23-28.
- [4] Strayer JF. The effects of the classroom flip on the learning environment: a comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system (Doctoral dissertation, The Ohio State University). 2007.
- [5] Mok HN. Teaching tip: the flipped classroom. *Journal of Information Systems Education* 2014;25(1):7-11.
- [6] Phillips CR, Trainer JE. Millennial students and the flipped classroom. *Journal of Business and Educational Leadership* 2014;5(1):102-112.
- [7] Tang F, Chen C, Zhu Y, et al. Comparison between flipped classroom and lecture-based classroom in ophthalmology clerkship. *Med Educ Online* 2017;22(1):1395679.
- [8] Nouri J. The flipped classroom: for active, effective and increased learning – especially for low achievers. *Int J Educal Tech in High Educ* 2016;13:33-44.
- [9] Sreegiri S, Madhavi BD, Kumari L. Student's perception of flipped classroom teaching method in Andhra Medical College, Visakhapatnam. *J Dent Med Sci* 2018;17(2):6-9.
- [10] Hung HT. Flipping the classroom for English language learners to foster active learning. *Comput Assist Lang Learn* 2015;28(1):81-96.
- [11] Pierce R, Fox J. Vodcasts and active-learning exercises in a "Flipped Classroom" model of a renal pharmacotherapy module. *Am J Pharma Educ* 2012;76(10):196.