

FLIPPED CLASSROOM APPROACH FOR TEACHING - LEARNING IN BIOCHEMISTRY FOR UNDERGRADUATE MEDICAL STUDENTS

Biochemistry

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ABSTRACT

Medical education is taking a turn from traditional teaching to student-centered teaching that actively engages students. This study investigated students' perception for flipped classroom method of teaching-learning in Biochemistry for undergraduate medical students. This was aimed to improve student's interaction in class and thereby improve teaching quality and learning efficiency. A total of 134 first year MBBS students participated. Responses were collected by online survey monkey questionnaire based on Likert scale and open-ended questions. Results showed that flipped classroom method enhance students' learning effectiveness, motivated them for self-directed learning, improved their higher order thinking and enhanced their level of engagement in class activities. Hence, flipped classroom approach is an effective teaching-learning method in health profession.

KEYWORDS

Flipped Classroom, Undergraduate Medical Students, Interactive Class, Medical Education, Biochemistry

INTRODUCTION

There is an increasing trend towards transcending from traditional teaching to student-centered teaching that actively engages students. The Medical Council of India in 2019 has implemented competency-based curriculum. This competency-based medical education (CBME) is student centered, outcome-based curriculum and various domains of teaching including teaching-learning methods (TLM) and assessment form the framework of the competencies. In the CBME curriculum, interactive teaching has received a major thrust and it is mandated that two-thirds of the teaching-learning schedules must comprise of interactive teaching sessions while didactic lectures must be limited to not more than one-third of the schedules.¹

Student-teacher interaction is considered important in creating a fruitful learning environment. It is helpful for the learner's development.² Many higher education institutes now employ blended learning; whereby students learn in part at a supervised face-to-face location on campus, and in part through the internet with some elements of student choice over place and pace.³ Of the many different models of blended learning in practice, the use of flipped classroom (FC) approach has become increasingly widespread.^{4,5}

The "flipped" or inverted" classroom is a pedagogical model first described by Lage, Platt, and Treglia in 2000 and later popularized by Bergmann and Sams in 2012 in which the traditional course components – an "in-person" classroom lecture and an "at home" assignment – are reversed.⁶⁻⁸ In a typical traditional classroom, students listen to lectures in class and complete most of their homework after class. In the flipped classroom (FC) model, learners are first exposed to educational content prior to formal class sessions via readings, videos, or other electronic exercises that have been formally assigned. Given that students have already acquired knowledge through this initial "homework" phase, the subsequent classroom time can then be dedicated to activities that allow students to apply their knowledge to challenging problems in a setting that promotes collaboration with peers and feedback and direction from teachers. In terms of Bloom's revised taxonomy, the traditional lecture has largely invested classroom time (where teachers and students interact face-to-face) in promoting lower level cognitive work (gain and comprehension of factual knowledge), whereas the flipped classroom offers the opportunity for students to engage in higher order cognition (application, analysis, evaluation, and synthesis of knowledge).⁹

The flipped classroom represents an essential component in curricular reform. Technological advances enabling asynchronous and distributed learning are facilitating the movement to a competency-based paradigm in healthcare education. Flipping the classroom is a practice of assigning the students with didactic material before the class, which are traditionally covered in lectures. In the class face-to-face time is further used for more engaging and active learning strategies. As medical educators can successfully flip a lecture, they can gain new teaching perspectives, and this is very essential to effectively engage in curricular reform.¹⁰⁻¹²

The aim of this study focuses on analyzing students' perceptions on

flipped classroom approach to see its learning effectiveness in improving active interaction of the learners.

MATERIALS AND METHODS

The present study was conducted in the Department of Biochemistry in Assam Medical College of Assam, India. This was an observational prospective qualitative study. The study was conducted in time span of six months.

Inclusion criteria: All students enrolled in the first year MBBS course were included in the study (200 students' capacity)

Exclusion criteria: students who did not fill the questionnaires and who were absent in the class.

Five class lectures assisted by flipped classroom were taken. Pre-reading materials in form of power point presentation, reading material and video lecture were provided to the students one to three days prior to the face-to-face class through WhatsApp or email with some home assignments. In the face-to-face class (lasted for 60 minutes), activities like small group discussion, reflection, case-based learning (CBL) was done where students actively participated and then they were assessed by MCQs on the respective topics.

Students perception on flipped classroom approach for teaching-learning method were collected via survey monkey questionnaire based on Likert scale and open-ended questions.

RESULTS

Out of 200 students, 134 responses were received via survey monkey questionnaires. 75% students agreed that adequate time was provided to spend on the pre-reading materials before the flipped classroom (FC) (Figure 1). 75% students agreed that FC session inspired them to pursue further learning for the module (Figure 2).

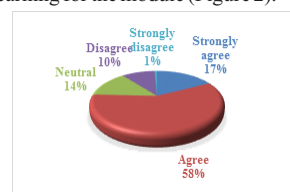


Figure 1: Adequate Time Provided For Pre-reading Materials For FC

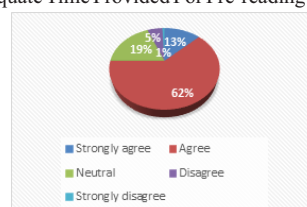


Figure 2: Flipped Classroom Inspired To Pursue Further Learning For The Module

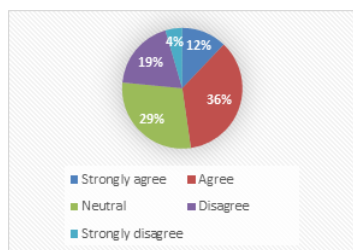


Figure 3: Preference For FC Method To Traditional Didactic Lecture As Teaching-learning Tool

48% students preferred flipped classroom method to the traditional didactic lecture for teaching-learning tool (Figure 3). 56% students agreed that FC improved their critical thinking/ higher order thinking (Figure 5). 60% students agreed that flipped classroom improved student's motivation, participation, and engagement in the classroom activities (Figure 6).

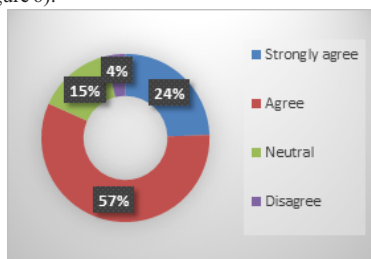


Figure 4: Flipped Classroom Method Of Teaching-learning Motivated For Self-directed Learning

Only 75% students went through the pre-reading materials sent prior to the flipped classroom (Figure 7). 67.2% students agreed that flipped classroom should also be introduced by other first year MBBS subjects.



Figure 5: FC Improved Student's Critical Thinking

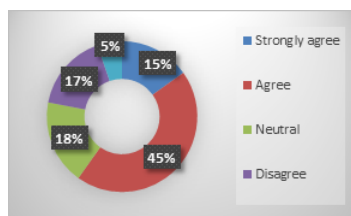


Figure 6: FC Improved Student's Motivation And Engagement In The Class Activities

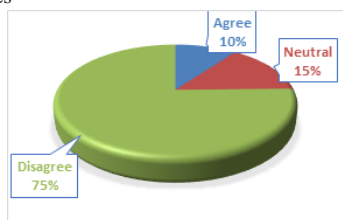


Figure 7: Pre-reading Materials Sent Prior For FC Not Read By The Students

Open-ended question's responses to what did the students liked the best in flipped classroom method were that, 'it improved teacher-

student interaction', 'gives flexible environment for study time', 'give a good grasp of the topic', 'opportunity for instant doubt clearance', 'class becomes interesting', 'MCQs given after the class motivates to study more', 'pre-reading materials helps to go through the topic before it is being taught and thereby making it better understanding in the class'.

Another descriptive question was, 'how would you like to improve this method further?' Responses received were 'to provide more you tube videos', 'more MCQs as assessment', 'should provide pre-reading materials at least 3-4 days prior to the class'. Some students were not comfortable with the FC approach, and they preferred the traditional approach, which they were used to before.

DISCUSSION AND CONCLUSIONS

It is found that interactivity makes the students more attentive and enthusiastic. Incorporation of interactivity in lectures has been found to improve teaching-learning process by educators who utilized interactivity in classroom teaching.

In this study 48% of students preferred flipped classroom to the traditional didactic lecture, so it shows that all students are not comfortable with the flipped classroom method. All students did not go through the pre reading materials sent prior to the FC. They had accepted that FC enhanced their active interaction in the class activities and motivated them for self-directed learning and improves their critical thinking.

As per a study by A Chaudhuri et al, flipped classroom assisted lectures and traditional lectures found to be equally effective for first year MBBS students. Lack of interest of students in study materials provided to them for the flipped classroom and deficiency of time were the main cause of this outcome.¹³

It is important to note that positive student perception toward flipped classroom does not necessarily imply that this instructional approach will significantly improve student learning.¹⁴ In some studies there was no significant difference in students' performance on quantitative assessment comparing traditional format to the flipped classroom format, despite students reporting a positive perception of the flipped course.^{13,15,16} The flipped format did allow for greater flexibility and applied learning opportunities at home and during discussions sections.¹⁴

In a review of learner perceptions of flipped classrooms in health professions education, students expressed high levels of satisfaction with pre-class video lectures because the videos can be accessed at any time and as often as they desire. Students also highly regarded the use of small group discussion-based activities in flipped classroom, face-to-face sessions because these sessions help increase their motivation to learn, enhance their level of engagement, and interest in the subject matter.¹⁷ In this study also students preferred for pre-class video lectures and FC approach improved their engagement in class activities.

Judicious incorporation of interactivity in lectures leads to improvement in students-teacher and student-student interactions, which makes teaching-learning process easier, interesting, and fruitful.

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