

Flipped Classroom and Insight of Students: Progress in Medical Education and Practices

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ABSTRACT

In the past few years, the concept and approach of Flipped Classroom (FC) has been increasingly opted for the undergraduate medical students. The first route for exposure to content is through online resources for the students in FC application. Then, for promotion of active learning, subsequent face to face/ offline classes are held for student-centered activities. Even though this approach of FC has been handsomely adopted by students from different contexts, the insight of medical students is still unclear regarding this approach. This review paper provides perception of medical students towards FC, its benefits, and limitations for them. For pre-class preparation activities, medical students have shown positive expression along with occupying, interactive mini classroom projects, especially when they are also given concise and easily accessible online tools. However, concerns were reported by some students with the FC approach. They stated that inferior student preparation and inappropriate direction in online and active learning sessions can restrict the student-centered perks. Despite the high ratio of students who states that FC is a healthy approach for enhancement of knowledge and learning, it has not been conclusively depicted by assessment tools. Nevertheless, the perceptions of students show that self-directed life-long expertise are improved by FC. In the nutshell, the initial application of the approach of FC for undergraduate medical students has depicted great satisfaction among students who prefer it for lecture-based instructions.

Key words: Students insight, Perceptions, Flipped classroom, Medical student, Undergraduate, Case-based learning

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INTRODUCTION

In this modern arena, traditional classroom lecture system is still very common for teaching undergraduate medical students. However, this traditional system is considered productive based on teacher-centered strategies for passive learning abilities [1]. Contrarily, strategies encapsulating active learning like student's participation, self-direct and engagement in their own educational tasks, have proved to be more beneficial when it comes to lone-term learning and development of self-centred skills. Moreover, it is also supported by adult learning theories [2,3].

Recent studies and theories have depicted that it is more productive for students to work in active learning environment so that they will be able to establish their independent identification, personality, appraisal, analysis, and absorption of knowledge. Latest accreditation standards officially demand the provision of such environments which will in turn produce better-modern

physicians [4]. At present, after recent advances in the previous decade, the emphasis upon formal medical curricula encapsulating the development of competencies based on professionalism, the humanities, the ethics, inter-personal collaboration, and other features. This has decreased the importance of face-to-face curricular time which was once devoted to general clinical sciences [4].

By looking at the secular side of FC, its empowerment and various pedagogical reflection in the section of undergraduate medical education, various features of the flipped classroom (FC) are being applied by the medical scholars and they have also opted these strategies in their teaching methods. When the conventional classroom model is discussed, professor-centered, didactic learning appears over the picture where students are subjected to such methods. Following these methods, learning is further fortified with the home assignments. The purpose of such post-lecture assignments is to let the students independently implement their freshly imbibed knowledge without the interference of their teachers or other classmates. In the FC model, before formal class sessions, readings, videos, and other electronic source-based exercises are the assigned way to expose students to educational content. By the application of this initial

“homework” process, students get a chance to gather knowledge and then implement them for solving challenging problems in collaboration with their colleges in the classroom and to get feedback and appropriate guidance from their teachers. For instance, from the perspective of Bloom’s revised taxonomy, lower level of cognitive work (attain and perception of fact-based knowledge) has largely promoted by traditional lecture system which invests in classroom time (teacher and students’ direct interaction). On the other hand, opportunities to gather and enhance higher cognition features like analysis, synthesis are provided to the students by FC [5].

In various disciplines, the data shows that faculty’s enthusiasm, students’ positive attitude and the urge to gain via learning has remained great, but for undergraduate medical students the implication of FC strategies remain merky [6,7]. Therefore, the aim of this review literature is to throw some light upon the implications of FC strategies in undergraduate medical learners. This review paper will encapsulate both the in-class and pre-class phases of the implications. Moreover, the insight of medical students will be specifically discussed and defined in this review paper along with the impacts of FC system upon learners.

Modus operandi

The review framework designed by Arksey and O’Malley has been used to review the literature for exploration of FC applications in undergraduate medical education system. Literature was deeply studied, more data from hospitals was gathered and synthesized to address the following question regarding the topic:

- For pre-clinical and clinical medical students, what kind of content has been gathered and conveyed via FC approach?
- What kind of strategies and tools have been used by teachers for pre and during-class sessions in medical education?
- What is the insight of students, their way of imbibing this FC approach (strength and weaknesses)?
- What is the effect of FC approach upon medical learners?

It is imperative to first define the FC method to indulge further in details of the literature. Multiple definitions of FC approach exist outside the horizon of medical education, however, the core principles of the FC method holds: 1) the task of preparatory work via videos or other electronic resources that comes under e-learning, that can be viewed again and again upon demand and analysed asynchronously before proper classroom phase, which are arranged to deliver the relevant content, 2) active learning classroom activities under the guideline and feedback from teachers [8].

RESULTS

In the initial attempt of gathering information through different resources, 123 original papers were studied,

however, after abstraction of the abstract information, only 43 remain eligible for addition. The main reason of exclusion was that many of the learners, added in the literature were not medical students, no appropriate data for evaluation was given, and enough information for character development of the classroom strength as active learners was also not given [9].

Courses added in pre- and clinical FC strategies

Various contexts have been subjected to FC approaches like biochemistry, anatomical sciences in basic sciences. In medical anatomy, classes are designed in a way to minimize their curricular time used in teaching the subjects directly. Other pre-clinical implications included humanities, rheumatology, epidemiology, Hematology and POCUS. These topics are considered important for modern physicians, but in traditional lecture system, it is difficult to find time to teach these subjects. Therefore, FC approach isn’t just helpful in enhancing active learning of students within their curricular, rather, it will be helpful in giving them a valuable concept outside their curricular zone.

Insight of medical students: Does the FC approach leaves valuable impacts?

Several studies have reflected positive impacts of FC approach when it comes to knowledge and its learning. However, many studies are also found, in contrast, which demonstrate that FC approach does not valuably, significantly, and consistently leaves purposeful impacts upon performances and education. For instance, the assessment of EBM competencies showed no prominent increases in scores on the Berlin objective even though students’ grasp over skills increased [10,11]. Moreover, in an obstetrics-gynaecology clerkship, an improvement in performance and professionalism was observed in students in comparison to traditional lecture learners, but when it came to specifically gynaecology linked items, incomprehensibility led to decline in performance. Other two studies revealed that on the National Board of Medical Examiners (NBME) assessments, the performances of students didn’t show any significant improvement who had FC learning approach [12,13]. Another example holding students from advanced FC/TBL approach in anatomy laboratory classes didn’t show much better performance in comparison to faculty-based approach.

The question here rises that, why such discrepancies are present despite the benefits observed by the assessment tools. The problem might be here, is not in the approach, but in the assessment tools themselves. In the pre-clinical anatomy course, when FC strategies were implemented, the performance of the medical students did not enhance on knowledge assessment items like low cognitive abilities. Contrarily, when isolating features were used that assessed analysis, students who were in the FC approach system, performed better than those who were from conventional learning system.

Insight of medical students: Caveat of the FC

A survey has showed that medical students are usually comfortable with in-class active learning feature of the FC. However, a small group of students have suggested some points that can be added up in the flipped classroom approach to improve the system. For some students, active learning tasks do not fulfil the purpose of learning objectives. Similarly, in one case students' reviews depicted that inefficiency do exist in the active learning feature of the FC was accredited to face-to-face lecture time which is arranged to discuss the content which has already been covered via pre-class resources [14]. These inefficiencies were, however, highlighted by those students who had inadequate preparations. In addition, the active learning aspect can benefit students who are less vocal and less dominant, when they will discuss in small groups while interacting with those students who are more dominant and participate more.

In some cases, where learning is impacted due to some issues or difficult in imbibing the specific topic, students recommended that direct interaction with faculty would provide extra support in gaining optimal results. However, some teachers who are excessively instructive in the context of active learning, may disengage the students and later the benefits of student-centered approaches. Eventually, another study depicted that huge online open-course and FC strategy to medicine as a business both yielded equal positive student feedback. These results showed that under various circumstances, active learning, student centered, face-to-face environments could be changed without impairing student satisfaction levels.

DISCUSSION

Even though the concept of flipped classrooms has been in exercise for many years, but its implications upon undergraduate medical students is quite new. In this review, FC applications and its importance is highlighted, and here it is also observed that students have received various elements of this system appropriately. However, based on student's feedback, it is quite clear that some aspects of the FC approach need to be improved for 100% satisfaction of the learners.

Medical undergraduate students have generally depicted positive response towards FC and its pre-class preparatory content like relevance, accessibility, multimodality, and conciseness which is based upon modern technical assisted theories. However, some cases were reported in which students were asking for improvement between perplexity and elaboration of pre-class preparatory material and of active learning corresponding sessions. This reason shows that why some of the studies in the literature were limited. On the other hand, teachers would need extra time and must put extra effort in arranging relevant content to their curricula, as specific content will be optimal for students. Even though, the response of the faculty members towards the FC approach was not recorded in the literature, however, it was proposed that investment of

extra time and effort to provide appropriate resources might have been acted as a great hindrance towards adopting the flipped teaching method [15].

The appropriate direction and guidance by the teachers could easily handle the concerns of those students who didn't show enough satisfaction over this approach. In some of the local implications of defined TBL to the anatomy laboratory, students were unable to receive appropriate support and direction regarding active learning and gaining the learning objectives. In addition, many students also mentioned that their group activities were not much productive because faculty used to dominate the content discussions. Therefore, FC approach proved helpful here as the role of faculty converted into more that of a facilitator, as facilitators provide the basic guideline structure to achieve the learning objectives.

Even though, FC approach is considered helpful and beneficial to undergraduate medical students, this aspect is limited due to the presence of minimal evidence in its favour as many of the surveys were culled. The question here rises that is FC approach helpful and productive in improving learning. For instance, the literature showed no significant improvement when it came to the students of anatomy, however students showed higher level of performances who received FC when it came to the assessment of higher cognitive levels. This evidence showed that dire need to update the assessment tools, because the FC approach isn't defected but the assessment tools are. Moreover, despite increase in examination score owing to the content distributed via flipped approach, it is also expected to enhance lifelong learning abilities which are important in developing modern competent physicians. However, further study is required to collect evidence that either FC enhances the competencies or not in medical school.

CONCLUSION

Till now, the response of the undergraduate medical students towards FC approach is quite appreciating. The students have so far depicted positive satisfaction ratio among the learners with pre-class learning resources which are designed through learning theory based upon electronic technology. Moreover, many students have preferred active learning elements over traditional lecture-based system. Despite high satisfaction ratio, there are minority group of students who have shown concerns over FC approach owing to lack of self-preparedness. However, these concerns can be addressed by making improvements in some aspects of the FC strategies that will enhance accountability, and student-centeredness in various tasks. These improvements included appropriate training of teachers who carryout small group active learning components of FC. The evidence isn't strong enough to show that FC enhances learning, but this reflects the inefficiency of the assessment tools not the system itself. Nevertheless, the benefits of FC on academia and examination, FC does not hamper the learning process, in-fact it enhances lifelong skills in undergraduate learners. For these reasons, many

medical colleges now prefer to continue their system based on FC approach.

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