

Flipped classroom: A promising teaching approach for medical education

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The era of coronavirus disease-2019 (COVID-19) pandemic posed a greater challenge for continuing education in various fields including medical education. The “paradigm shift” from physical to online modes demanded exploration of innovative techniques for justifying the efficiency of teaching-learning methods. The pandemic situation and already existing ongoing concern about the ability of current curricula to equip health care professionals with adequate knowledge and skills suggest reformation in education approach.¹ Considering the apparent deficiencies in existing educational models, various attempts have been made to improve medical education and proposed wide range of solutions.¹ The traditional didactic teacher-centred learning has been improved with various student-centred learning approaches. One such alternative to traditional in-class lecture-based, tutorial, or seminar methods is flipped classroom (FC) model.¹⁻⁶

Flipped classroom has become a part of the updated lexicon in 21st century health care education.^{1,7} However, medical educators are still unfamiliar with this term. In this model, the course content is offloaded to students to learn on their own and class time is dedicated to engaging students in student-centred learning activities like problem-based learning and inquiry-oriented strategies.¹ Flipped classroom is a type of blended learning approach where instead of classroom, teaching takes place outside of the traditional classroom via online videos using computers, technologies, and internet.^{4,8} It can encompass reading, watching videos, listening to podcasts, or playing games.⁷ This way students learn the course material beforehand.⁷

Education experts point out that learning process is influenced by interaction with others and the reflection of interactive process by the individual.⁸ Theoretically FC benefits are rooted in active learning and social constructivism.² Active learning takes place when students are more actively involved in the learning process compared to the teacher. Flipped classroom is a type of active learning method based on the principle that students must be active during the class and learning takes place by their own processing of information and activities.^{8,9} Here, the typical in-class lectures are replaced with student-centred activities.⁷ Unlike teacher-centred pedagogy system, here, the teacher stops teaching while students work on tasks or problems to understand the topic, embracing the concept of learner-centred andragogy.^{8,10} The learning processes requiring higher level cognitive abilities such as assignments, homework, projects, etc. can still be carried out in traditional classroom.⁸

The FC model is more student-centred and promises improved learning outcomes with enhanced student engagement and increased motivation.⁷ Since the contents of the lesson are communicated via online videos, in the FC setup, it emphasises students completing course material before traditional face-to-face learning session.⁷ During class time of the flipped classroom, any

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active learning methods can be used as in-class activities such as: discussion, problem solving, brainstorming, concept mapping, students' presentations, gaming, etc.⁸

One major drawback to the easy application of FC model in medical education is lacking upgraded skill among educationists and inadequate infrastructure support at teaching health institutions. Pressing clinical duties of busy medical educators towards patient management can be another concern of extra time allocation to adopt innovative ideas like FC model.

There also exist very little data regarding superiority of one method over another in medical and dental education.^{2,4} Educationists also point out that just taking lesson content out of traditional face-to-face approach and transferring information via videos may not be effective.⁸ Employing a co-operative learning method is suggested for using class time in the flipped classroom method.⁸

Research is still ongoing regarding FC and no clear roadmap is accepted to date.⁸ Some studies suggest long-term retention of learning in flipped method^{7,8} while others show mixed results with not much significant improvement over traditional lectures.^{2,4} Data in undergraduate studies have shown significant effect, however studies regarding health education and knowledge gain performance in graduate medical education remain sparse.² One such study reported improved class attendance, students' learning, and the perceived value of flipped classroom model following

its implementation. The authors suggested flipped classroom as good alternative to health educators to enhance learning, improve outcomes, and fully equip students to address health care needs of modern times.¹ The students have given positive feedback towards the change from traditional methods to flipped classroom.⁴ Recently educators in medicine are supporting the flipped classroom approach, adopting in preclinical, clinical, and graduate medical education.^{1,2}

In summary, learning gained in either traditional lecture format or flipped classroom approach is dependent on active learning and social constructivism.² In FC model, the lecture material is consumed at home via videos and in-class time is focussed on application, simulation, case-based discussion or problem solving.^{2,7,8} Elements of co-operative learning methods: positive interdependence, individual accountability, face-to-face promotive interaction, interpersonal and small group skills, and group processing, in classroom environment of flipped method can help achieve upper-level cognitive learning.⁸ Research shows it has positive impact on students' academic success. Class time should be hence structured for more communication and interaction among students themselves.

Considering the apparent deficiencies in existing educational models, among the various attempts to improve medical education and wide range of proposed solutions, flipped classroom seems like a very good alternative (Table 1). There is enough evidence for medical educators to not hesitate to incorporate

Table 1: General characteristics of traditional and flipped classroom

S.N.	Traditional classroom	Flipped classroom
1.	Didactic manner	Interactive discussion
2.	Teacher is responsible for completing course content	Course content is offloaded to students
3.	Students learn during teacher's time	Students learn on their own time
4.	Teaching/learning takes place inside the classroom	Teaching/learning takes place outside classroom via online videos, using computers, technologies, internet
5.	Students learn course material in the class as per teaching style of the teacher taking class	Students learn course material beforehand by reading, watching videos, listening to podcasts, or playing games
6.	Interaction among students may or may not be present	More interaction among students is required and promoted
7.	Passive learning	Active learning
8.	Teacher at the centre of learning	Students at the centre of learning
9.	Curriculum guides learning	No clear road map on how to incorporate flipped classroom components in curriculum
10.	Current infrastructure at teaching institutions sufficient for traditional approach	Lack of infrastructure support for flipped classroom methods
11.	Less time consuming	Can be more time consuming initially to adapt innovative ideas

flipped classroom model to enhance student learning. To motivate learners, the advancing technology can be utilised to incorporate activities before the traditional

classroom lectures. However, the information should be transferred in engaging and interactive format for better learning outcomes.

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