

Effectiveness of Active Learning Strategy on Learning of Undergraduate Medical Students

Dr Fareha Khaton

Era's Lucknow Medical College and Hospital

Dr Parul Sinha

Era's Lucknow Medical College and Hospital

Dr Ayesha Ahmad

Era's Lucknow Medical College and Hospital

Dr Amrita Singh

Era's Lucknow Medical College and Hospital

Dr Shoadashi Saxena (✉ shoadashi@gmail.com)

Baba Raghav Das Medical College

Research Article

Keywords: Flipped classroom, Active learning techniques, Competency Based Medical Education, Exams, Performance

Posted Date: February 22nd, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1343593/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: With the vast heterogeneity of teaching methods, there remains a dilemma on what works best for teaching medical students. Keeping this in mind, we have conducted a qualitative study on flipped classroom technique-an active learning method. Active teaching learning strategies are learner oriented, helps students in application, analysis, evaluation and synthesis of knowledge.

Methods: This study was conducted at a Tertiary care hospital in North India over a period of 2 months, amongst 2nd year undergraduate medical students attending classes in the Department of Obstetrics and Gynaecology. In a weekly class for 25 students, 6-7 were randomly selected for active learning sessions. Every week a different set of students were taken. 50 students from a class of 150 were enrolled for the sessions.

The initial 60 minutes was given to read the assigned topics, in the next 60 minutes relevant discussion on clinical aspects and application was done and a feedback form was filled by the students. It consisted of questions on usefulness of the session, content and overall performance based on four level rubric grading system. Data was entered into Microsoft Excel sheet and analyzed on the basis of frequency distribution.

Results: 29(58%) students found the method excellent, 18(36%) were also receptive towards it (scoring it 7 to 8 in terms of usefulness). None of the students found this method to be bad for learning and retaining. 32(64%) students found it excellent in terms content and teaching, 15(30%) students found it good with respect to content and 14(28%) with respect to teaching. Few students (6% and 8%) found it average in both aspects. Overall performances indicate that 68% students scored it as excellent; 24% as good and 8% as average. At the end of the session, 72% students felt an increase in confidence levels; 20% were unsure whether they had benefitted and 8% did not find any increase in confidence levels. Majority of students (76%) found these classes more interactive and easy to comprehend.

Conclusions: Active teaching learning based on Flipped classroom pattern finds good satisfaction amongst students.

Background

Good teaching has been defined as

" Getting most students to use the level of cognitive processes needed to achieve an intended outcome, that the more academic students use spontaneously".

As the National Medical Council is promoting Competency Based Medical Education in the new curriculum, it has become important to organize our teaching strategies with focus on efficient student learning. Teaching methods range from traditional didactic lectures to active teaching learning technologies such as clinical decision making (CDM), Clinical Skills, Flipped Classroom Method, Problem

based learning (PBL), Case studies, assignments, lectures with or without teaching aids, Seminars, Team Based Learning (TBL), Small Group Discussion (SGDs), etc. With the vast heterogeneity of teaching methods in usage, teachers remain in a dilemma on what works best for medical students.

Active teaching learning strategies are learner oriented, involve higher order thinking and promote more student engagement and self-directed learning which remain the pillars for a successful competency-based curriculum. Psychologists believe that the manner in which a student prefers to learn is the single most important factor affecting academic performance. Active learning strategies provide students an opportunity to participate, self-direct and engage in their own learning process and have been shown to be beneficial for long term learning and self-directed learning (SDL) skills.

Traditional teaching methods are being fast replaced by such interactive teaching methodologies. In terms of Bloom's revised taxonomy (2001) it is noted that traditional methods invest a large portion of the class time in promoting lower level of cognitive work such as comprehension of knowledge, while active teaching learning strategies help students in application, analysis, evaluation and synthesis of knowledge, hence promoting better standards of learning. Several of the world's leading universities have implemented and studied the performance and perception of the flipped classroom model in several student cohorts.

There are eight such strategies including Reciprocal Questioning, Three Step Interviews Pause Procedure, Muddiest Point Technique, Devil's advocate approach, Peer Teaching activities, Game based learning, Rotating chair group discussions as per active teaching learning course module of various foreign universities .

Similarly, there are various methods to apply these strategies on the basis of Large group teaching, Small group teaching and teaching at individual level. These could be Fish bowl method, snowball to Peer review and one-minute paper reflections depending upon the number of students.

With these things in mind we conducted our research to know whether an active strategy like providing the resource material and content about the subject before the class based on flipped classroom pattern followed by group discussion and involving the methods like reciprocal questioning, peer reviewing, and teaching are beneficial for our students.

Methods

This qualitative study was conducted at Era's Lucknow Medical College and Hospital, India over a period of 2 months. We aimed to evaluate effectiveness of Active Teaching Learning Strategy based on flipped classroom pattern amongst 2nd year undergraduate medical students attending classes in Dept. Of Obstetrics and Gynaecology. All methods were performed in accordance with the relevant guidelines and regulations and approval was taken from the Institutional Ethical Committee of Era's Lucknow Medical College And Hospital, Lucknow and informed consent to participate was taken from all students before filling the feedback forms.

In their weekly demonstration classes of 25 students, lots were drawn, and 6–7 students were randomly selected for the active teaching learning session. Prior written and informed consent was obtained. Every week a different set of students were selected by noting down roll numbers of those who had already attended the session. Over a period of 2 months, 50 students [from a class of 150] had been enrolled for the sessions.

In the demonstration class, the initial 60 minutes were given to the students to read up the assigned topic either individually or in a group. The students were encouraged for reciprocal questioning, peer teaching and reviewing and one-minute reflections after reading. The topic was taken up by the teacher in the next 60 minutes with relevant discussion on clinical aspects and application. At the end of the session, feedback was taken from the students. The feedback form included questions on usefulness of the session, content and overall performance. Students had to grade these parameters on a scale of 1–10, with 1–4 being poor performance, 5–6 average, 7–8 good and 9–10 being excellent performance based on four level rubric grading system.

The students were asked to evaluate their confidence levels with regards to the topic of discussion, enlist good aspects of the teaching and areas which could be improved. Data was entered into Microsoft Excel sheet and analyzed on the basis of frequency distribution.

Results

Of the total 50 students enrolled 31(62%) were girls and 19(38%) were boys. 29(58%) students found the method excellent, 18(36%) were also receptive towards it with a scoring between 7 to 8 in terms of usefulness. 3(6%) did not find this new method any different from traditional teaching methodologies. None of the students found this method to be bad for learning and retaining.

The content and teaching were found relevant by a majority of the students; 32(64%) students found it excellent in terms content and teaching, 15(30%) students found it good with respect to content and 14(28%) students scored it good with respect to teaching. Few students (6% and 8%) found it average in both the aspects. Table 1 shows scores of overall performances of the method. 34(68%) students scored it as excellent; 12(24%) as good and 4(8%) as average.

At the end of the session, 72% students felt an increase in confidence levels; 20% were unsure of whether they had benefitted and 8% did not find any increase in confidence levels. [Table 2] Majority of students (76%) found these classes more interactive and easy to comprehend. There were many suggestions for more frequent sessions of a similar nature.

Table 1
Score Distribution by students on Active Teaching Learning Strategy

Score	Usefulness	Content	Teaching	Overall Performance
1–4 (poor)	0	0	0	0
5–6 (average)	3(6%)	3(6%)	4(8%)	4(8%)
7–8 (good)	18(36%)	15(30%)	14(28%)	12(24%)
9–10 (excellent)	29(58%)	32(64%)	32(64%)	34(68%)
Total	50	50	50	50

Table 2
Perception of confidence levels among students after the session

Confidence in the Subject	N = 50	Percentage (%)
Yes	36	72
No	4	8
Unsure	10	20

Discussion

The Active Teaching Learning model based on flipping was first documented for teaching students in 2012 by Jonathan Bergmann and Aaron Sams, two high school chemistry teachers from Colorado, USA.⁷ A successful flipped classroom can help stimulate development of a deeper understanding of the topic, increasing student participation and engagement in class discussion making it student-centric. It helps cut down on wastage of time and energy for both teachers and students.

Mclaughlin et al in 2014 conducted a study on pharmacy students and concluded that students preferred learning the content prior to class, thus having more class time for applied learning with faculty. 95.6% students felt that teaching and learning methods promoted understanding and application of key concepts.^v The findings were similar to our observation where 94% students graded flipped classroom as good / excellent. Davies et al (2013) also showed superiority of flipped classroom methodology to other instructional strategies.⁸

In another study by Nouri (2016), 75% of students expressed a positive attitude to flipped classrooms after completion of the course.⁹ As the method promotes active learning, it is rapidly replacing traditional lectures as the mode of imparting knowledge in institutes of higher education. The students have sufficient time to discuss and clarify any doubts that emanate from prior reading. This helps understand and simplify complex knowledge. The key to success of this approach remains with students as the

quality of reading in the allotted timeframe determines the degree of usefulness of the latter part of the session.

Veeramani et al (2014) found positive responses to flipped classroom methodology and observed that the approach enhanced performance in exams.¹⁰ In our feedback, 72% of students felt confident about the topics, which agrees with observations noted by other investigators.

In a meta-analysis of 225 studies, active learning in undergraduate science courses resulted in a 6% improvement in student performance. An interesting observation that came up was that students participating in classes using traditional methods of teaching were 50% more likely to fail in the examination.¹¹ This reinforces what other studies¹¹ have found that flipping increases class time for more engaging instruction, increased student engagement and focused classroom discussion.¹²

Conclusion

Active teaching learning based on Flipped classroom pattern with combination of reciprocal questioning and peer reviewing finds good satisfaction amongst students.

Strength Of The Study

This is a new method of teaching sandwiching flipped class room pattern with active teaching leaning methods in a small group discussion. Selection of the participants was randomized, and the outcome assessment was on a rubric grading system excluding the selection and subjective interpretation bias.

LIMITATION OF THE STUDY

Small sample size and no comparison with a proper control group. In our study the same group of students compared their experience with this newer method from the usual traditional method of didactic lecture in demonstration class and responded to our questionnaire.

Declarations

All methods were performed in accordance with the relevant guidelines and regulations and approval was taken from the Institutional Ethical Committee of Era's Lucknow Medical College And Hospital, Lucknow and informed consent to participate was taken from all students before filling the feedback forms.

Consent for publication has been taken from all five authors.

Availability of data and materials I do not wish to share my materchart as all findings inferred from it have already been summed up in the tables provided in the manuscript.

Competing interests NA

Funding NA

Author's contributions F.K. ,P.S. ,A.A. designed and reviewed the article, A.S. and S.S. wrote the main manuscript text and all authors reviewed the manuscript.

Acknowledgements NA

References

1. J. Biggs and C. Tang, Teaching for Quality Learning, Open University Press, 2007.
2. M. A. Bhat, "Understanding the Learning Styles and its Influence on Teaching/Learning Process," International Journal of Education and Psychological Research , vol.3, no. 1, pp. 9-13, 2014.
3. Ramnanan, C. and Pound, L., 2017. Advances in medical education and practice: student perceptions of the flipped classroom. *Advances in Medical Education and Practice*, Volume 8, pp.63-73.
4. Brame CJ. Flipping the classroom. Vanderbilt University Center for Teaching; 2013.[Accessed January 18, 2021]. Available from: <https://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/>
5. McLaughlin JE, Roth MT, Glatt DM, Gharkholonarehe N, Davidson CA, Griffin LM, Esserman DA, Mumper RJ. The flipped classroom: a course redesign to foster learning and engagement in a health professions school. *Acad Med* 2014;89:236-43
6. Raudys, J., 2022. 8 Active Learning Strategies and Examples [+ Downloadable List]. [online] Prodigygame.com. Available at: <<https://www.prodigygame.com/main-en/blog/active-learning-strategies-examples/>> [Accessed 9 February 2022].
7. Enfield J. Looking at the impact of the flipped classroom model of instruction on undergraduate multimedia students at CSUN. *Tech Trends* 2013;57:14-27.
8. Dean DL, Davies R, Ball N. R.S. Davies, D.L. Dean, Nick Ball (2013). "Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course," *Educational Technology Research and Development (ETR&D)*, 61:4, pp. 563-580. 2013;61(4):563-80.
9. Nouri J. The flipped classroom: for active, effective and increased learning – especially for low achievers. *International Journal of Educational Technology in Higher Education*. 2016;13(1). Available from: <http://dx.doi.org/10.1186/s41239-016-0032-z>.
10. Veeramani R, Madhugiri VS, Chand P. Perception of MBBS students to "flipped class room" approach in neuroanatomy module. *Anatomy and Cell Biology*. 2015;48(2):138-43.
11. Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H. and Wenderoth, M., 2014. Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), pp.8410-8415.
12. Milman N. The flipped classroom strategy: What is it and how can it be used? *Distance Learn* 2012;9:85-7.