

Flipped Classroom As Blended Teaching Methodology In Ayurveda Medical Education – An Observational Study.

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I.Introduction

Teaching patterns in Ayurvedic Science is trying to evolve with the recent advancement information technology and advancing artificial intelligence. Most of the Ayurveda faculties follow the traditional and established teaching methods such as chalk and talk, lectures. The present demands and the cohort of students pursuing Ayurveda for their graduation exhibit a proficiency in technology. Consequently, instructors should incorporate innovative, technology-driven interactions to facilitate the transition of higher education towards flexible, efficient, dynamic, and student-cantered teaching methods, alleviating the constraints of conventional transmittal education models. KAHER's Shri BMK Ayurveda Mahavidyalaya is pioneering in equipping the faculties with modern techniques in teaching methodologies through their UDEHP and DAME departments. one such teaching methodology which was adopted by department of roganidana was flipped class room. The topic Chosen for flipped classroom was "Hetu/Nidana"¹. Hetu/ Nidana (causative factors) is one among the Nidana Panchaka and First step in Ayurvedic disease diagnosis Process (Roga Pareeksha). Sushruta acharya states "Nidana Parivarjana" as best treatment². Hence knowledge of hetu is really important for both diagnosis and treatment of diseases. Knowledge of Hetu also intergral role in disease prevention.

" Flipped class room" or "inverted classroom" is an instructional approach that allows educators to reduce the extent of direct instruction in their teaching methods while optimizing opportunities for individualized interaction.³ Educators have been implementing the Flipped Classroom approach since the late 1990s⁴. This teaching method has received considerable media coverage, with reports in well-known outlets like USA Today⁵, The Globe and Mail⁶, Washington Post⁷, and CNN⁸, all of which highlighted it as an emerging teaching model in 2011-12. The swift growth of online education and its associated technologies offers educators a significant chance to create courses that captivate students by leveraging technology. When employed effectively, technology can cultivate student involvement in the educational journey a benefit that many students appreciate. Furthermore, research has demonstrated that this approach can reduce dropout rates, enhance learning results, and boost student contentment⁹. The flipped classroom model offers the potential for more extensive interactive engagements among students and between students and teachers. These heightened opportunities for communication hold significance in education, as supported by the studies conducted by Yee

and Hargis¹⁰ and Dunlap and Lowenthal¹¹. These researchers emphasize the essential role of student-faculty communication both inside and outside the classroom in fostering robust student motivation and active participation.

The aim of this module was to offer understanding regarding the Flipped Classroom, its impact on learning with a specific focus on how students perceive it.

II. Materials and Method: Single centric observational study with 91 sample size and purposive sampling.

i. Case Study:

The flipped classroom was conducted for second year ayurveda undergraduates by the department of Roganidana, as a part of departmental activity under purview of Department of Ayurveda Medical education as new teaching learning methodology in September-October 2023. It was scheduled as 1 hour, once-a week class that lasted for 1 months.

Pre-requisites: A qualified team from the Department of Roganidana was made for the flipped class which was led by a professor and one coordinator. The coordinator organized sessions and prepared relevant materials, including PowerPoint presentations, videos, Samhita references, and articles on Hetu (Nidana) with the help of the team.

The participants, comprising 100 2nds professional BAMS students, were informed about the implementation of the flipped learning method in the course. They were made aware of pre- and post-tests designed to assess immediate impact and collect feedback on their perceptions and satisfaction with the flipped class. Among the participants, 90 students attended the flipped class, and for in-class activities like group discussions, they were randomly assigned to one of 10 groups, each consisting of 9 students.

To ensure student understanding, two classes were conducted each week before the scheduled flipped class. These classes provided orientation on the nature and conduct of a flipped class, with one class specifically addressing students' doubts about the approach. The prepared materials were shared through the Google Classroom platform and a WhatsApp group one week before the flipped class's commencement. The coordinator was instructed to resolve any issues related to the flipped class through an online forum throughout the entire schedule. Before each session, instructors (coordinators) encouraged students to engage in self-directed study by consistently reminding them to complete pre-class learning tasks.

Coordinator designed pre-tests consisting of seven simple multiple-choice questions closely aligned with the pre-class materials. Importantly, the main purpose of these pre-tests was to aid student preparation and assess the impact, not to assign grades. At the beginning of the first class, students underwent a 10-minute pre-test, during which group discussions and questions were prohibited.

Process of Flipped Class Session: In the flipped class sessions, in-class materials comprised ten questions, including six short-answer questions, one multiple-choice question, and three case scenarios. These questions were distributed to ten groups, each assigned to address one question in a predetermined sequence. Students were encouraged to handle these questions through active group discussions and online research, drawing from knowledge acquired in the pre-class materials. During this phase, tutors actively circulated among assigned groups to assess if students faced difficulties, answered questions, and provided detailed explanations when necessary. After 15 minutes, students summarized their answers to the assigned questions in front of other groups. Other groups actively engaged by posing questions and seeking explanations for the answers provided. The coordinator intervened as needed to ensure the discussion stayed on track. At the end of each session, each group was required to individually write a report answering the questions covered and submit it to the coordinator. The coordinator promptly assessed group reports upon submission, aiming to identify any misunderstandings of crucial concepts and common errors among students. Additional comments and a final summary of key issues discussed in each session were included in the reports, which were then returned to the students on the same day.

Post-Test and Feedback: Following the flipped class, a post-test, consisting of the same seven questions, was administered. In the initial session, students received mark reports from the pre-test to self-assess their knowledge. Those scoring in the lower percentile received alerts emphasizing the importance of focusing more on class materials. To conclude the flipped class, a feedback session was conducted to gain insights into students' perceptions and evaluate the overall effectiveness of the flipped class.



Figure 1. Students engaged in Flipped Classroom



Figure 2. Q & A session in the Flipped Classroom

ii. Results: Pre -post test scores comparison by T-Test: Paired Two Sample for Means

Variables	Pre-test score	Post test
Mean	5.59	6.42
Variance	1.53	1.07
Observations	91	91
Pearson Correlation	-0.131	
Hypothesized Mean Difference	0.0001	
Df	90.000	
t Stat	-4.647065134	
P(T<=t) one-tail	5.73095E-06*	
t Critical one-tail	1.661961084	
P(T<=t) two-tail	1.14619E-05*	
t Critical two-tail	1.986674541	

*Highly significant

Pre-test to post-test there is difference in mean score signifying the improvement in post test scores of the students hence the topic (hetu) is understood better in flipped class. Shows there is highly significant immediate impact of flipped classroom and considered as one among the effective methods of teaching learning.

iii. Student feedback on flipped class

A) Contribution to learning(skill/knowledge)

Level of skill/knowledge	Poor	Fair	Satisfactory	Very good	Excellent
At start of orientation	5.5(5)	30.8(28)	35.2(32)	15.4(14)	13.2(12)
At end of orientation	1.1(1)	6.6(6)	34.1(31)	28.6(26)	29.7(27)

B) Mc-nemer test to test the significance in per and post-test improvement -whether you have complete knowledge of hetu

	After flipped no	After flipped yes	x ²	pvalue
Before flipped no	5	45	34.30612	<0.005
Before flipped yes	4	39		

Since the p value is less than 0.005 hence there is significant change from pre flipped class to post flipped class on knowledge of hetu, hence the flipped class proved to be effective in improving the knowledge of hetu.

C) Student Skill and responsiveness in flipped class

	Agree % (n)	Neutral% (n)	Strongly agree % (n)	Strongly disagree % (n)	Grand Total % (n)
Flipped class room session was an effective lecturer/demonstrator	48.4(44)	2.2(2)	38.5(35)	11(10)	100(91)
Flipped classroom was clear and organized	47.3(43)	7.7(7)	35.2(32)	9.9(9)	100(91)
Flipped classroom stimulated student interest	40.7(37)	6.6(6)	40.7(37)	12.1(11)	100(91)
Instructor availability was helpful	27.5(25)	2.2(2)	60.4(55)	9.9(9)	100(91)
Grading was prompt and had useful feedback	38.5(35)	9.9(9)	42.9(39)	8.8(8)	100(91)

D) Flipped classroom conduction

	Strongly Disagree% (n)	Disagree% (n)	Neutral%	Agree% (n)	Strongly Agree% (n)	Total
Flipped classroom Learning objectives were clear	8.8(8)	1.1(1)	3.3(3)	48.4(44)	38.5(35)	100(91)
Flipped classroom was organized and well planned	9.9(9)	1.1(1)	7.7(7)	47.3(43)	34.1(31)	100(91)
Flipped classroom allow all to participate fully	9.9(9)	3.3(3)	3.3(3)	49.5(45)	34.1(31)	100(91)

E) Effectiveness of flipped classroom

	Flipped Classroom	Traditional Methods (Chalk N Board)	Regular Theory Audio-Video Lecture	Grand Total
Which method of learning you think was more effective	75.8(69)	11.0(10)	14.3(13)	100(91)

F) What aspects of this Flipped classroom were most useful or valuable?

More than 70% students opined that Cross questioning, brainstorming on concepts and practical based discussions were highlights of the flipped class and were very useful. The whole idea of learning the topic and gather their own meanings, then explore the topic and create their meanings or exclude their misconceptions through group discussion first and through cross questioning and clarification of the doubts through peer discussion under expert guidance was really new and good experience, students also suggested these sessions to be repeated for more difficult topics in future.

III. Discussion

The recent study with implementing the flipped classroom approach in an undergraduate Roganidana course yielded encouraging outcomes concerning student readiness, active engagement in class, and their grasp of the subject matter. Upon completing the flipped classroom, students demonstrated a solid understanding of how the flipped classroom operates and were well-equipped to achieve the learning objectives related to problem-solving proficiency in addressing Hetu. The present study placed a high value on the interactions with their peers and coordinator, considering it instrumental in enhancing their comprehension of the class material. Furthermore, their willingness to actively participate in class discussions and presentations saw a significant improvement. Tufan Aslı Sezer et al ¹²study suggests no significant difference compared to online traditional lecturing, while the present study emphasizes the positive outcomes in terms of understanding and problem-solving proficiency. These differences might be attributed to variations in the subjects, educational contexts, or specific learning objectives targeted by each study. It's important to consider that the effectiveness of the flipped classroom can vary depending on factors like the subject matter and the implementation process. Both studies highlight that student generally had positive perceptions of the flipped classroom approach. This depicts that, even if there are variations in academic outcomes, students may adopt and appreciate the dynamic and interactive nature of the flipped classroom. Also, to emphasize the importance of interactions with peers and instructors, which contribute to enhanced comprehension and active participation. This brings in a common thread in successful flipped classroom implementations: creating an engaging and interactive learning environment.

Upon comparing the pre-test and post-test scores, a noticeable difference in the mean scores emerged, indicating an improvement in the post-test scores of the students. This suggests that the topic (hetu) is better understood in the flipped class. It demonstrates a highly significant immediate impact of the flipped classroom, underscoring its effectiveness as a teaching and learning method. The survey of different processes indicates the implementation of the effective system depends on the ease of the process employed in the teaching methodologies as per the needs of the receiving end. The bibliometric analysis offers a broader perspective, while the parametric study highlights the immediate impact and challenges within a particular educational context. Both approaches provide valuable insights for educators considering the implementation of the flipped classroom approach.

The feedback received was overwhelmingly positive, with many students expressing their preference for the flipped class teaching method. However, there was a substantial portion of students who found it time-consuming. Additionally, it was noted that not all students actively participated, despite the instructor's efforts to ensure the engagement of every individual in group discussions, class interactions and debate. This was attributed to the large group size and time constraints, making effective management challenging. On the bright side, the feedback regarding the improvement in skills and knowledge components yielded very positive results. While the effectiveness of the flipped class was found to be significant in our study when compared to other methods of teaching and learning. Similarly in study by Kang HY et al explores a blended learning strategy that combines the flipped classroom with team-based learning in the context of public healthcare education. It suggests that this approach can produce positive learning outcomes and may be an effective alternative to traditional methods. The common thread in both studies is the positive feedback from students regarding the flipped classroom approach, which underscores the appeal of this method. The challenges related to time constraints and student participation are also noted in both studies, suggesting that these are recurring issues that educators should address when implementing the flipped classroom. Both studies contribute to our understanding of the flipped classroom's effectiveness.

Conducting and managing the flipped class proved to be a challenging endeavour, primarily due to the involvement of only one instructor. However, the number of students who expressed dissatisfaction with the way it was conducted was quite minimal, accounting for less than 5% of the total strength participated in the study. Given that this approach was being implemented by the department for the first time, it is possible that there were a few shortcomings in terms of effective communication. Nevertheless, it was undeniably a valuable experience for both the teacher and the students. The study has a couple of limitations. Firstly, only one instructor was involved in conducting the flipped class. Secondly, there was no assessment conducted regarding the utilization and use of the reference materials shared before the flipped class. The same can be expanded with a standard operating procedure being put up for the same to have a widespread effect of implementing the flipped classroom techniques.

IV. Conclusion

Our study affirms the practicality of implementing the flipped classroom model, even in the confines of a traditional and heavily regimented undergraduate ayurveda medical curriculum. This method has proven its effectiveness in elevating students' readiness and active participation in their courses. It fosters self-directed learning and yields improved learning outcomes, cultivating attributes such as in-depth learning, self-confidence, self-guided learning (SDL), teamwork skills, and the critical examination of fundamental principles. The flipped classroom embodies an educational transformation that is anticipated to exert a significant influence within a year or less. It reshapes the learning environment into a more dynamic and collaborative space where students can engage in crucial discussions and collaborate on problem-solving tasks. With respect to Student's perception, they expressed a positive appreciation for the integration of technology-based active learning approaches. Significantly, students place a high value on using a wider range of shared (online & textual) resources, experiencing increased interactions not only between teachers and students but also among peers. Additionally, they highly regard innovative approaches to knowledge and content management. Hence blended learning is poised to contribute to holistic student development, resulting in improved outcomes in the future.

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