ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 07 | July - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EVALUATING PHYSIOLOGY TEACHING METHODS THROUGH STUDENT FEEDBACK FROM DIVERSE ALLIED HEALTH SCIENCE STUDENTS.

Physiology

Dr. Ankita Priya*
MBBS, MD Physiology, M.MED Family Medicine, Dip IBLM Assistant Professor, Department Of Physiology, Soban Singh Jeena Govt. Institute Of Medical Sciences And Research, Almora, Uttarakhand, India. *Corresponding Author

ABSTRACT

Background: Human physiology is a fundamental component of the academic curriculum for Allied Health Science (AHS) students. This study aimed to evaluate three modified lecture-based teaching methods—PowerPoint presentations, structured handouts with blackboard teaching, and student seminar-based teaching—used in place of traditional didactic lectures for teaching three topics. **Method And Result:** Feedback from 34-36 students per lecture series was collected using a 5-point Likert scale for objective feedback and open-ended questions for subjective feedback. Statistical analysis revealed no significant difference in ratings between Method 1 (PowerPoint presentations) and Method 2 (structured handouts with blackboard teaching). However, significant differences were found between Method 1 vs Method 3 (p=0.002) and Method 2 vs Method 3 (p=0.001), with Method 3 being the student seminar-based teaching. Specifically, 36% of students appreciated the use of animations and pictures in Method 1, while 30% found the diagram labelling activity effective in Method 2. In contrast, 44% of students reported that Method 3 improved group interactions and dynamics and encouraged them to consult additional resources for learning. **Conclusion:** Overall, PowerPoint presentations and structured handouts with blackboard teaching emerged as the preferred teaching methods among first-year AHS students based on their feedback. Combining traditional lectures with structured resources optimizes teaching effectiveness, while ongoing student feedback informs continual improvement strategies and supports diverse learning approaches.

KEYWORDS

Teaching methods, Physiology, Allied Health Science

INTRODUCTION:

Teaching human physiology at the undergraduate level is a crucial component of the academic curriculum for certain Allied Health Science (AHS) students. Typically, the didactic lecture is the predominant mode of instruction. However, due to constraints in time and space, implementing innovative teaching methods can be challenging. Nonetheless, simple modifications in lecture styles can significantly enhance student interest and attention. To improve the teaching of physiology to AHS students, we introduced and evaluated three different teaching methods. Student feedback was collected and analysed to determine the most favoured teaching approach among students from various AHS programs.

Background:

Over the past decade, educators have increasingly sought to replace traditional didactic lectures with student-centred learning methods, with numerous studies reporting enhanced student learning and performance as a result. The average concentration span among medical students is approximately 30 minutes (1), rendering the passive nature of traditional didactic lectures less effective. Active learning methods can be integrated within traditional teaching frameworks to encourage student participation (2). Implementing innovative ways of teaching within the lecture hours has been recommended by many authors (3). It has been suggested that interactive lectures (4) and a combination of traditional lectures with self-directed learning approach are the most acceptable and best methods in teaching physiology (5). Although self-directed learning has been associated with improved student performance, students often feel they learn less with this method (6). Additionally, some alternative teaching approaches can limit adequate content coverage. The Flipped classroom based models as described by Hawks et al. (7) was found to be effective in improving the performance outcome (8) with adequate content coverage in teaching physiology (9). Self-directed learning encourages students to take responsibility for acquiring foundational knowledge, which is then discussed with the tutor. The student seminar-based approach in our study aligns with this method. Lectures using technical tools like PowerPoint have found favour with a lot of Indian students (10) (11). However, several authors have suggested that a combination of blackboard teaching and use of PowerPoint presentations via large projector screens is a method preferred (12) (13) (14) (15) (16) by the students. To evaluate the usefulness and effectiveness of the newer teaching methods that have been implemented, the teaching methods employed must be reviewed and assessed at regular intervals through student feedbacks.

Aim And Objective:

To compare by subjective and objective student feedback, the three different teaching methods i.e., PowerPoint presentation, structured handouts with blackboard teaching and student seminar-based teaching for teaching of general physiology and blood, reproductive and gastrointestinal physiology respectively.

MATERIALS AND METHOD:

Thirty-six students from various Allied Health Science programs (5 from Bachelor of Prosthetics and Orthotics, 3 from BSc Nuclear Medicine, 4 from BSc Radiotherapy, 9 from BSc Radiology and Imaging Technology, 10 from BSc Optometry, and 5 from MSc Medical Physics) at a renowned medical college in South India participated in the study. As part of their undergraduate human physiology curriculum, three different teaching methods were employed: PowerPoint presentations, structured handouts with blackboard teaching, and student seminar-based teaching. These methods were used to teach three topics: general physiology and blood, reproductive physiology, and gastrointestinal physiology, respectively. The topics were chosen for their similar difficulty levels and comparable lecture hours (6-10 hours). To ensure impartiality, the same instructor taught all the topics.

Method 1: Lectures on general physiology and blood were delivered using Microsoft Office PowerPoint version 2016 and presented via a projector to the entire class. The presentations incorporated animations for certain concepts and included a substantial number of relevant images along with text.

Method 2: Structured handouts containing essential information about reproductive physiology were distributed as printed hardcopies. These handouts were designed to allow students to label diagrams and write key points in the provided spaces during a blackboard-based lecture.

Method 3: One week prior to the scheduled lecture on gastrointestinal physiology, student volunteers were asked to prepare short seminars of approximately 5-10 minutes each. Following each seminar, the tutor led a brief discussion and provided explanations of the concepts. This method emphasized a self-directed learning approach.

Each of the aforementioned lecture series was supplemented with notes and handouts corresponding to the respective topics. The content of the notes and presentations was reviewed by the senior faculty member in charge of the course before being distributed to the students, ensuring uniformity in the material provided.

At the conclusion of each lecture series, anonymous and voluntary written feedback, both subjective and objective, was collected from the students. The feedback metrics included clarity of concepts, engagement and interest, accessibility and flexibility, perceived

effectiveness in understanding and retaining information, and overall satisfaction. Subjective feedback comprised two open-ended questions: "What did you like best about the lectures?" and "What can be improved about the lectures?" Objective feedback was gathered using a Likert rating scale from 1 to 5 (1 - "Strongly Disliked," 5 - "Strongly Liked").

RESULT:

34-36 students provided the feedback for each lecture-series. The Mean ± SD of overall rating for Method 1 (PowerPoint presentation), Method 2 (structured handouts with blackboard teaching) and Method 3 (student seminar-based teaching) were 4.59 ± 0.7, 4.62 ± 0.6 and 3.97 ± 0.8 respectively. The Median (IQR) for the Method 1, Method 2 and Method 3 were 5(4, 5), 5(4, 5) and 4(4, 4.75) respectively (Figure 1). The three methods were compared using the Wilcoxon signed rank test. There was no significant difference in the ratings between Method 1 and Method 2 which were the PowerPoint presentation and structured handouts with blackboard teaching respectively. The students equally liked these methods. However, there was a significant difference between the ratings of Method 1 vs Method 3 (p=0.002) and Method 2 vs Method 3 (p=0.001), Method 3 being the student seminar-based teaching. About 86% and 97% of the students gave an overall rating of '≥4' for Method 1 and 2 respectively which indicated that majority of them preferred these methods. About 78% students gave an overall rating of '≥4' for Method 3 which indicated it was the least preferred method (Figure 2).

Through subjective analysis of the feedback, approximately 44% of the students indicated that Method 3 (student seminar-based teaching) enhanced both inter- and intragroup interactions and dynamics, providing opportunities to consult more books and deepen their understanding of the topic. Comments such as "Method in which students could also become teachers" and "got a chance to discover our teaching skills" were noted for Method 3. However, students also reported issues such as a lack of flow and depth in the content, challenges in time management, and the absence of high-quality pictures and animations, which they felt were better managed by a teacher.

Method 1 (PowerPoint presentation) was well-received by many students, with 36% particularly enjoying the animations and pictures. Comments included "Animations are easy to remember" and "funny pictures help us remember and think fast during exam."

Method 2 (structured handouts with blackboard teaching) was the most favored approach. Students found it more effective, felt more active and less sleepy while completing the handouts, and about 30% appreciated the diagram-labeling activity as a valuable learning tool. They also valued the small revision quiz at the end of the lecture. Feedback included comments such as "Lecture was very interactive, I was able to concentrate and understand well through the lectures" and "as we could make our own notes, I felt this is more efficient." However, some students expressed a desire for supplemental slides to review after the lectures.

DISCUSSION:

Our study results are consistent with previous studies which suggest PowerPoint presentations as one of the preferred modes of teaching (10) (11). The subjective student feedback highlights how the use of technical tools like PowerPoint is advantageous in terms of its multimedia capabilities. PowerPoint presentations can be an effective way of teaching if made well with adequate pictures and animations. The use of technology can make things simpler through animations that can make difficult concepts easy to understand. Every teacher attempting a PowerPoint based teaching should understand the basics of a good presentation technique and should take care to include pictures and animations relevant for the topic.

Structured handouts and blackboard together are effective as it holds the attention of the students by continuous interaction and promotes active participation by filling in the handouts. The students provided the highest rating for this mode of teaching due to the active participation that this mode of teaching offered. Blackboards although a traditional way of teaching is still held with high regard by the students because the first-year students are more used to this type of teaching from their school days. However, the skill of the teacher, clarity in writing and drawing pictures on the board are of utmost importance in this method. PowerPoint slides supplementing the lectures running along with the lecture could make the lectures more effective as has been described by many previous Indian studies (12) (13) (15) (16).

Student- seminar based teaching is a self-directed active learning process by the students and is a relatively new and less used method because majority of the teachers believe in the traditional methods of teaching in India. Also, our first-year students are more used to learning passively from their school days and could have been the reason for this being less preferred by the students. This approach is a challenge for their minds and some students may take up the challenge well and some may not. Essential points to focus in such a method are well co-ordinated approach, assigning specific topics and roles to students based on their competencies, summarizing and discussion by the teacher in the end. This method is similar to other self-directed learning methods like problem based learning (PBL) and flipped classroom (7).

Limitations:

The major limitation of our study is low sample size and we have not compared preference of male and female students separately or evaluated the student performance based on teaching by each method. Also, since the topics were different for each method, comparisons are very subjective and depended on individual liking by the student but since it was taken by the same teacher in three different styles, the chances of bias due to the teacher were eliminated.

CONCLUSION:

We conclude that most of the Allied Health Science students preferred teaching in Physiology through structured handouts with blackboard teaching and PowerPoint presentation. Student seminar-based teaching though an active learning process may be less favoured in the first year of teaching Physiology. Combining traditional lectures with structured handouts or modules will help capitalize on the strengths of each method. Regularly collecting and analysing student feedback is necessary to adapt and improve teaching strategies. Providing additional resources and support for students engaging in seminars or problem-based learning would help to address challenges related to these methods.

Figures And Legends:

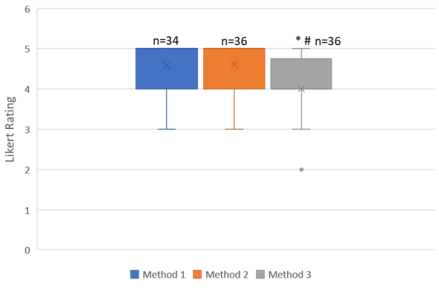

Figure 1 : Comparison of Likert scale rating of the three methods using Wilcoxon signed rank test. *p=0.002, comparison between Method 1 vs Method 3. #p=0.001, comparison between Method 2 vs Method 3.

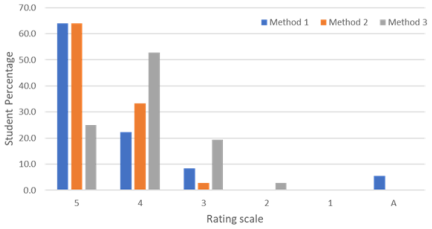

Figure 2: Student percentage versus rating for each method. 'A' is number of absentees.

REFERENCES:

1. Stuart J, Rutherford RJ. Medical student concentration during lectures. Lancet Lond Engl. 1978 Sep 2;2(8088):514–6.
2. Richardson D. Don't dump the didactic lecture; fix it. Adv Physiol Educ. 2008 Mar;32(1):23–4.
3. Michael J. Where's the evidence that active learning works? Adv Physiol Educ. 2006 Dec 1;30(4):159–67.
4. Ernst H, Colthorpe K. The efficacy of interactive lecturing for students with diverse science backgrounds. Adv Physiol Educ. 2007 Jan;31(1):41–4.
5. Richardson D, Birge B. Teaching physiology by combined passive (pedagogical) and

active (andragogical) methods. Adv Physiol Educ. 1995 Jun;268(6):S66.
6. Lake DA. Student performance and perceptions of a lecture-based course compared with the same course utilizing group discussion. Phys Ther. 2001 Mar;81(3):896–902.
7. Hawks SJ. The flipped classroom: now or never? AANA J. 2014 Aug;82(4):264–9.
8. Marsh DS, Gurski DN. Flipped teaching as a method for boosting engagement and performance. 2016;8.
9. Gopalan C. Effect of flipped teaching on student performance and perceptions in an Introductory Physiology course. Adv Physiol Educ. 2019 Mar 1;43(1):28–33.
10. Dr Vaishali Bansode, Dr Sachin Mulkutkar. A Prospective Observational Study To Evaluate Preferred Mode Of Teaching In First Year Medical Students. Indian Journal of Applied Research. 2017;7:12.
11. Baruah M, Patel L. Evaluation of different teaching methods used in physiology lectures. Indian J Basic Appl Med Res. 2014;4(1):271–6.
12. Amin A, Sailesh KS, Mishra S, Reddy UK. Teaching aids and teaching methods in Neuro- Physiology: Views of Post graduate students. ASIAN Pac J Health Sci. :3.
13. Dash SK, Patro S, Behera BK. Teaching Methods and Its Efficacy An Evaluation by the Students. 2013;35(4):4.
14. RautSayali, E. "Teaching methods in Physiology: Students' Feedback." IOSR Journal of Research & Method in Education 4 (2014): 63-67.
15. Kulkarni S, Sailesh KS, Chillarge C. Students' preference towards use of different teaching methods for medical microbiology. 2015;3:3.
16. Nagothu RS, Indla YR, Paluru R. Effective physiology teaching methods: from the perspective of first year MBBS students. Indian J Clin Anat Physiol. 2016;3(3):336.