National Journal of Physiology, Pharmacy and Pharmacology

RESEARCH ARTICLE

Student perceptions on activity-based learning in physiology

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Received: December 01, 2017; **Accepted:** December 20, 2017

ABSTRACT

Background: Concept building is very important for learning physiology. Active involvement of the students when a particular topic is being taught has been hypothesized to benefit the students to learn physiology effectively and overcome lack of self-directed learning. **Aims and Objectives**: To find students' perspectives regarding the activity-based teaching-learning method. **Materials and Methods**: An educational interventional study in physiology included 100 1st MBBS students and involved activities such as multiple choice questions, questions based on graphs, fill in the blanks, match the columns, and complete the flow chart; preceding and following seven lectures in endocrine system. Closed-ended questions in the prevalidated student perception questionnaire were analyzed on Microsoft Excel. **Results:** There was a positive feedback regarding the usefulness of the method in creating interest in the topics taught and also understanding of concepts. 76% of students also agreed that they were driven to resources in an attempt to solve the activities. **Conclusions**: Analysis of students' perceptions suggests the efficacy of this method to convert didactic teaching to active learning. Overall, students liked this method as a useful and interesting tool for learning physiology.

KEY WORDS: Active Learning; Large Group Teaching; Physiology

INTRODUCTION

Student learning is one of the primary goals of any institution which strives hard to bring out the best in them. It is imperative that educators apply appropriate teaching strategies to reach this goal.[1,2] Didactic teaching is the most cost-effective and efficient means of information delivery for preclinical teaching, but it is not abreast with the current trends in medical education which promotes student-centered learning and active learning.[3] Physiology involves lot of concepts which cannot be learnt without active involvement of the students.

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2018.8.1248218122017	

Knowles defined self-directed learning (SDL) as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes."[4] A study revealed that role of pre-clinical educators is not only teaching but also enabling students to learn on how to progress, retain, and apply what has been already taught.[5] Rao and Di Carlo compared traditional teaching with active learning groups and concluded that active involvement of the students in the learning process enhanced their academic performance.[6] A challenge for the teachers is to incorporate various methods to facilitate learner participation in the large group lecture setting.

Furthermore, several studies on comparing the effectiveness of didactic lectures with those of interactive, teaching styles have showed that student satisfaction, learning outcomes, deeper approach to learning, and knowledge retention are better following interactive lectures.[7] Any innovation needs

to be tested for its efficiency in serving its purpose. While designing an innovative method, teachers have to realize the difficulty of the new entrants in the professional field handling a large amount of syllabus compared to their previous ones within the limited time frame. Hence, in this study, simple exercises such as fill in the blanks, match the columns, and complete the flowchart were given to the students a day before and after the lecture. Feedback from learners is most fundamental aspect to assess innovative teaching-learning methods. Therefore, student perceptions were analyzed to find if the intervention served the purpose.

MATERIALS AND METHODS

The 1st MBBS students studying in Bharati Vidyapeeth Deemed University Medical College, Sangli, were included in the study. This educational intervention was carried out after permission from Institutional Ethical Committee.

Inclusion Criteria

Students who had attended at least five lectures and solved the related activities were included.

Exclusion Criteria

Incomplete questionnaires.

Intervention

Lectures of endocrine system were selected for intervention. In the first lecture, the students were explained about this intervention that would help them to understand each topic better. Activities such as multiple choice questions, questions based on graphs and photographs, fill in the blanks, and match the columns, for 7 lectures in endocrine system were prepared in such a way that the "must know areas'' in those topics were covered. Flowcharts with blanks were prepared in a way that concept regarding the mechanism of action of hormone or its release became clear. Based on prior experiences, topics in which majority of students' encounter confusion were used for true or false or choose correct answers from brackets. These activity sheets were given to them a day before the lecture wherein they were supposed to solve and return it the next day before starting of the lecture. Post-lecture another copy of the same sheet was given to them to be solved and returned immediately.

Data collection was done by student perception questionnaire which was validated by subject experts. It included four open-ended questions with 11 closed-ended questions to be answered based on 5-point Likert scale from strongly disagree to strongly agree. This was given to the students at the end of seven lectures. Statistical analysis was done by percentage calculation.

Outcome Indicator

Feedback was considered as positive if ≥80% students were in favor of the method.

RESULTS

Total 100 students were included in the study. Based on the inclusion and exclusion criteria, only 59 questionnaires were considered for evaluation. Table 1 summarizes the percentage of students in each unit of Likert scale for each item in the questionnaire. Table 2 summarizes the percentage of students giving positive feedback for each item in the questionnaire.

Table 1: Distribution of students in each unit of Likert scale for each item in the questionnaire

Item	Strongly disagree(%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)
I liked the activities	0	1.69	3.39	64.4	30.5
It helped me understand the concepts clearly	0	0	6.78	67.8	25.42
Different types of activities have helped me in retention of information	0	1.69	8.47	71.19	18.64
It will help me in answering SAQ's	0	1.69	5.08	71.19	22.03
It has created interest in the topic	0	3.39	11.86	55.93	28.81
It has evoked inquisitiveness about the topic because of which I have started reading the books	1.69	3.39	18.64	61.01	15.25
It is a waste of time	50.85	44.07	5.08	0	0
Such activities should be conducted for all topics in physiology	1.69	0	16.95	38.98	42.37
Activities given before the lecture are useful	1.69	6.78	6.78	61.02	23.73
Activities given after the lecture are useful	0	3.39	8.47	57.63	30.51
Both prior and after activities are useful	1.69	1.69	13.56	55.93	27.12

Positive feedback for all items except no. 7-agree to strongly agree, positive feedback item no. 7-disagree to strongly disagree. SAQs: Short answer questions

Table 2: It shows the percentage of students giving positive feedback for each item in the questionnaire

Items	Feedback (%)	
	Positive	Negative
I liked the activities	94.9	5.08
It helped me understand the concepts clearly	93.2	6.78
Different types of activities have helped me in retention of information	89.83	10.16
It will help me in answering SAQ's	93.2	6.77
It has created interest in the topic	84.74	15.25
It has evoked inquisitiveness about the topic because of which I have started reading the books	76.26	23.72
It is a waste of time	94.92	5.08
Such activities should be conducted for all topics in physiology	81.35	18.64
Activities given before the lecture are useful	84.75	15.25
Activities given after the lecture are useful	88.14	11.86
Both prior and after activities are useful	83.05	16.94

SAQs: Short answer questions

DISCUSSION

There was a positive feedback from the students for all items in the questionnaire except one. The item that stated, "It has evoked inquisitiveness about the topic because of which I have started reading the books" got a feedback score of 76% which is a relatively low positive feedback. The reason could be they did not have academic maturity to function as adult learners, especially with regard to their motivation to learn as revealed in students' experiences studying in the 2nd year of their undergraduate education.[8] In open-ended questions, students suggested the copies of the activities to be returned to them. It was returned to them after analysis of the questionnaire. Few of them commented not to give the sheets as homework. These comments are suggestive of their involvement in the process.

Various interactive techniques have been used by educators to enhance the involvement of students during teaching. Student's perceptions for problem-based learning and case-based learning in physiology were positive for clearing doubts, understanding concepts and invoke SDL similar to our study.[9-11] Purposeful engagement and active learning technique is a way to make the lecture effective and can change the nature of learning, while simultaneously improving knowledge gain and recall abilities. Educational games such as computer-assisted learning and cardiovascular drug fun cricket have been found to reinforce the lectures, enrich the learning experience.

It allows the students to personalize learning at their own pace within the time-tabled slots.[12,13] In our study, in an attempt to solve the activities, students not only refer to the topic before they attend the lecture but also develop curiosity about the unsolved activities. This sets a stage for the induction of interest in the subject during the lecture. Students find easy to solve activities after the lecture and they get insight into the learning process. Appropriate method for a topic under study should be identified and implemented for transforming passive to active learning. Various studies on student perspectives unveiled that active learning promotes better understanding, retention of the topic, clarifies the doubts better, development of communication skills, and better reproducibility comparable to our findings.[14-18] Unlike our study, many of the educational interventions have compared the innovative method with the traditional method by comparing the pre- and post-test scores. Such comparison cannot empower a particular method as it is the disturbance of monotonous passive learning which encourages engagement of the learner. Evidence supports adoption of active learning strategies to stimulate higher learning and enhance student motivation to learn.[15]

Such a simple approach can be a powerful tool to foster SDL; it was a source of inspiration to many faculty members to think of novel methods. This is a very effective way to bridge the gap between teaching-learning efforts and also to cover the "must know areas" in physiology. A limitation of the study was that only one faculty was involved in the process due to technical issues. Further study involving faculty perceptions and improvements suggested by students will help teachers become facilitators of learning.

CONCLUSION

The purpose of the study to foster SDL in students with the use of active learning technique was fulfilled as observed by the positive feedback given by students. Overall, students liked this method as a useful and interesting tool for learning physiology.

ACKNOWLEDGMENT

We are grateful to the Dean Dr. R. B. Kulkarni and the MEU Coordinator Dr. Y. R. Kadam, Bharati Vidyapeeth Medical College, Sangli for encouraging and supporting the medical education activities. Also, I'm grateful to the mentors of FIME workshop at KEM Hospital, Mumbai, for guiding at all levels from conception of the project to its implementation.

REFERENCES

1. Michael J. What makes physiology hard for students to learn? Results of a faculty survey. Adv Physiol Educ 2007;31:34-40.
2. Richardson D. Don't dump the didactic lecture; Fix it. Adv Physiol Educ 2008;32:23-4.
3. Thomas S, Subramaniam S, Abraham M, Too L, Beh L. Trials of large group teaching in Malaysian private universities: A cross sectional study of teaching medicine and other

disciplines. BMC Res Notes 2011;4:337.
4. Lesgold A, Rubinson H, Feltovich P, Glaser R, Klopfer D, Wang Y. Expertise in a complex skill: Diagnosing x-ray pictures. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
5. Lama P, Kulkarni J, Tamang BK, Sinha P. The impact and significance of small and large group teaching and learning in medical curriculum. SMU Med J 2015;2(2):175-82.
6. Rao SP, Di Carlo SE. Active learning of respiratory physiology improves performance on respiratory physiology exam. Adv Physiol Educ 2001;25:55-60.
7. Ernest H, Colthorpe K. The efficacy of interactive lecturing for students with diverse science backgrounds. Adv Physiol Educ 2007;31:41-4.
8. Luscombe C, Montgomery J. Luscombe and montgomery exploring medical student learning in the large group teaching environment: Examining current practice to inform curricular development. BMC Med Educ 2016;16:184.
9. Bennal AS, Pattar MY, Taklikar RH. Effectiveness of case-based learning in physiology. Natl J Physiol Pharm Pharmacol 2016;6:65-7.
10. Kumar A, Vandana N, Aslami AN. Introduction of "case-based learning" for teaching pharmacology in a rural medical college in Bihar. Natl J Physiol Pharm Pharmacol 2016;6:427-30.
11. Jagzape AT, Srivastava T, Quazi N, Rawekar A. Problem-based learning as a learning tool: Learners' perspective of an Indian medical school. Natl J Physiol Pharm Pharmacol 2015;5:291-5.
12. Govindaraja C, Jaiprakash H, Annamalai C, Vedhavathy SS. Computer assisted learning: Perceptions and knowledge skills of undergraduate medical students in a Malaysian medical school. Natl J Physiol Pharm Pharmacol 2016;1:63-7.
13. Joshi A, Ganjiwale J, Singh S, Palkar D. Cardiovascular drug fun cricket: Students perception on an innovative active teaching–learning method in pharmacology. Natl J Physiol Pharm Pharmacol 2016;6:68-73.
14. Kaur D, Singh JS, Mahajan A, Kaur G. Role of interactive teaching in medical education. Int J of Basic Appl Med Sci 2011;1:54-60.
15. Thaman RG, Dhillon SK, Saggar S, Gupta MP, Kaur H. Promoting active learning in respiratory physiology-positive student perception and improved outcomes. Natl J Physiol Pharm Pharmacol 2013;3:27-34.
16. Buch AC, Chandanwale SS, Bamnikar SA. Interactive teaching: Understanding perspectives of IIMBBS students in pathology. Med J D Y Patil Univ 2014;7:693-5.
17. Gupta A, Bhatti KW, Agnihotri PK. Implementation of interactive teaching learning methods. Indian J Pharm Pharmacol 2015;2:197-202.
18. Gupta S, Parekh UN, Ganjiwale JD. Student's perception about innovative teaching learning practices in forensic medicine. J Forensic Leg Med 2017;52:137-42.

How to cite this article: Parekh M, Munjappa H, Shinde S, Vaidya S. Student perceptions on activity-based learning in physiology. Natl J Physiol Pharm Pharmacol 2018;8(4):590-593.

Source of Support: Nil, **Conflict of Interest:** None declared.