

RESEARCH ARTICLE

Learning style preference-based lecture: A novel large group teaching method in medical education

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ABSTRACT

Background: There are four primary types of learners: Visual, auditory, reading/writing, and kinesthetic (VARK). However, a traditional didactic lecture (TDL) used in medical education does not take into account these learning style preferences (LSPs). Many a times faculty may use a teaching method which does not correspond to the preferred learning style of the majority of the students in the class and hence, students with a particular learning need may be at the losing end. **Aims and Objectives:** This study was planned to develop and evaluate a learning style preference based lecture (LBL) as a large group teaching method. Objectives were to compare students' performance after TDL and LBL and to know their perception about an LBL. **Materials and Methods:** A total of 149 1st-year medical students were participated in this study. Their LSPs were determined by the VARK questionnaire. Then, students were divided into two groups (75 each) based on their marks in the first mid-term exam by systematic random sampling. One group was taught a core topic from physiology by an LBL and the other group by a TDL. Students' performance was assessed by pre- and post-test and their perception by a pre-validated questionnaire. **Results:** Students' performance significantly improved after an LBL as compared to the TDL. Majority of the students found LBL interesting, engaging, motivating, and better for understanding, and preferred LBL as teaching method over TDL. **Conclusion:** LBL is more effective and well-accepted teaching method than a TDL for large group teaching in medical education.


KEY WORDS: Learning; Medical Education; Visual, Auditory, Reading/Writing, and Kinesthetic; Physiology; Students; Faculty; Teaching

INTRODUCTION

Physiology is a basic medical science subject taught in 1st year of undergraduate MBBS curriculum, along with anatomy and biochemistry, in India. The quality of physiology teaching to these undergraduates is of utmost importance as it forms

the basis of understanding other medical subjects such as pathology, pharmacology, and medicine; and of future postgraduate course and medical practice. Hence, there is a need to improve physiology learning and retention during undergraduate MBBS teaching.

Recently, many researchers have discovered that students differ in their learning style preferences (LSPs).^[1-4] However, in the current Indian scenario, physiology is taught by didactic lectures which most of the times do not take into account these preferences. A traditional didactic lecture (TDL) used to teach physiology is in aural form and includes PowerPoint (PPT) presentation with text and few diagrams/flow charts. Shah *et al.*^[5] concluded that to meet the learning

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needs of different types of learners, a variation in teaching-learning methods must be implemented or else students with a particular learning need may be at the losing end. Stirling^[6] found that sometimes, faculty may use a teaching method which does not meet the preferred learning style of many of the students in the class. Urval *et al.*^[7] suggested that, although many teachers use a combination of teaching methods, an active effort is lacking in determining whether these methods adequately address the diverse types of learners. Carroll^[8] also suggested that physiology teachers need to adapt to the different LSPs of medical students to improve their learning and retention.

Ankad *et al.*^[9] reported that PPT is an effective teaching tool for students with different LSPs and is suitable for mixed-sex classrooms. Hence, this study was planned to find out whether a learning style preference based lecture (LBL) by PPT is more effective in teaching medical physiology than a TDL by PPT.

MATERIALS AND METHODS

This interventional study was carried out in the Department of Physiology, Gujarat Adani Institute of Medical Sciences (GAIMS), Bhuj. After obtaining approval from the Institutional Ethical Committee of GAIMS, 1st-year undergraduate medical students of GAIMS were invited to participate in the study and informed consent was obtained from the willing participants ($n = 150$).

The visual, auditory, reading/writing, and kinesthetic questionnaire version 7.1 (Flemming)^[10] was used to determine the LSPs of the students. Students were divided into two groups (Group A and B) based on their performance in the first mid-term exam by systematic random sampling. "Classification of Immunity" was selected as the topic for teaching. Group A was taught by a TDL whereas Group B was taught by an LBL [Figure 1].

Both TDL and LBL were taken by the same faculty using PPT presentation with 30 min of instructional material on the topic. In TDL, PPT contained mainly text matter with few diagrams and pictures, delivered mainly by reading the text matter with some explanation. In LBL, the PPT was modified according to the LSPs of the students to include diagram/s, video/s, text, and group exercise.

An Multiple Choice Question (MCQ) test with 10 items (1 min for answering each item, 5 "Knows" level, and 5 "Knows How" level MCQs) was administered at the beginning (Pre-test) and the end (Post-test) of both lectures. Students were not informed about this test beforehand and the marks obtained were not considered in any assessment formative/summative. Furthermore, students' perception was taken by a pre-validated questionnaire (Cronbach's alpha = 0.89) on a

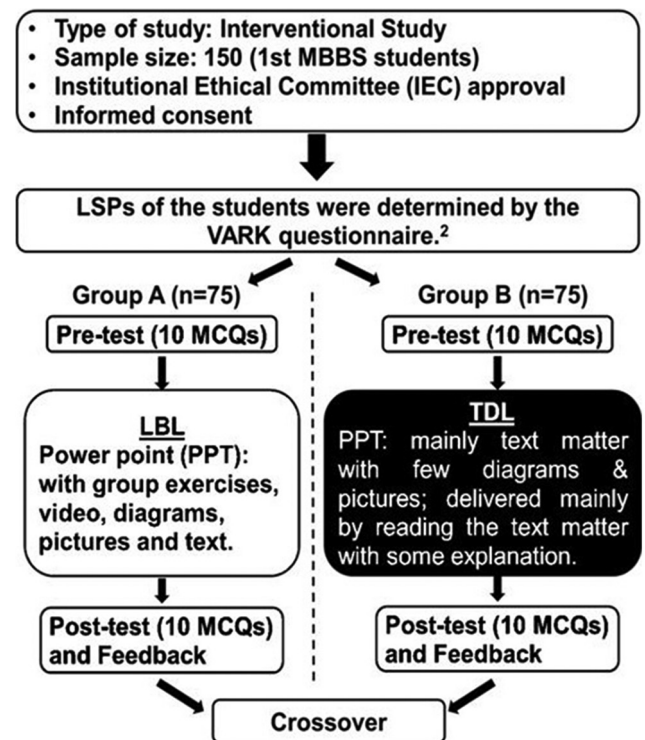


Figure 1: Study protocol

5 point Likert's scale with open-ended section for comments/suggestions.

After a week, a crossover teaching was planned and Group A was taught by an LBL whereas Group B was taught by a TDL to bring groups to an equal level. The MCQs and questionnaires were administered by a faculty other than the investigator to minimize bias. TDL, LBL, MCQ tests, and questionnaires were all designed and validated with the help of subject experts and MEU faculty.

Students' performance on these tests was compared using unpaired Students' *t*-test. Statistical analysis was done using SPSS version 20. The alpha error was set at 5% and $P < 0.05$ was considered significant.

RESULTS

Table 1 shows students' grouping by systematic random sampling. There was no significant difference in their first mid-term exam marks, and hence, both groups were comparable.

Figure 2 shows the LSPs of both groups. In both groups, the most common learning style was Kinesthetic (K) followed by audio-visual, whereas reading was the least prevalent learning style.

Table 2 shows students' performance in MCQ tests. There was a statistically significant difference ($P < 0.05$) in students'

gain after an LBL compared to the TDL. This shows greater improvement in students' performance after the LBL.

Table 3 shows students' perception regarding LBL, the new teaching method introduced to them. It is evident from Table 3 that the majority of the students found LBL interesting, engaging, motivating, and better for understanding, and preferred LBL as teaching method over TDL.

DISCUSSION

Kharb *et al.*^[11] reported that students differ in their LSPs; the majority being multimodal learners. However, as medical educators, we hardly consider this fact while planning a large group teaching session. To be a successful medical teacher, we should address learners' needs and recognize the variations in LSPs of medical students.^[12] Hence, we planned this study to develop a new teaching method, named LBL, that can effectively meet the LSPs of a large group of students, and compare its effectiveness with a TDL in large group teaching of physiology to 1st-year undergraduate medical students.

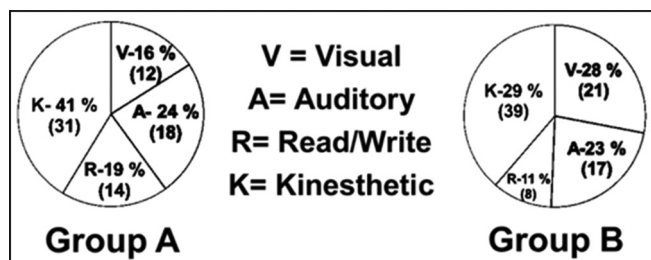


Figure 2: Learning style preferences of students

As depicted in Figure 2, we found that the majority of the students were kinesthetic learners followed by visual preferences. This clearly indicates that a TDL, which is mainly in aural form, is grossly mismatched teaching method for this group. We found that students' performance improved significantly [Table 1] after an LBL as compared to the TDL. Furthermore, the majority of the students found LBL interesting, engaging, motivating, and better for understanding, and preferred LBL as teaching method over TDL [Table 2]. Thus, LBL was found to be more effective and better-accepted teaching methodology than TDL. As the majority of our teaching is in lecture form, we recommend that medical educators' may strive to understand the various LSPs of the students and to align the teaching methods and learning styles to create an effective learning environment for all the students in a class.

Limitations and Directions for Future Research

As we compared TDL and LBL on a single occasion, more such studies should be done to generate larger evidence. Studies should be planned to investigate long-term retention of information in the students after an LBL. Similar studies should be done for other medical subjects also, other than physiology, and in other educational streams also.

CONCLUSION

Learning style preference based lecture (LBL) is a more effective and well-accepted teaching method than a TDL.

Table 1: Students' grouping by systematic random sampling

Marks obtained in first mid-term exam	Group A (n=75) (Mean±SD)	Group B (n=75) (Mean±SD)	P-value (unpaired students' t-test)
	47.59±12.49	46.91±12.84	0.74

SD: Standard deviation

Table 2: Students' performance in MCQ tests

Variables	LBL (n=75) (Mean±SD)	TDL (n=74) (Mean±SD)	P-value (unpaired students' t-test)
Pre-test score	4.24±1.70	4.03±1.65	
Post-test score	8.16±1.36	7.28±1.77	
Gain (post-test score - pre-test score)	3.92±2.08	3.25±2.07	0.0057 [#]

*One student in Group B remained absent on the day of TDL. [#]P<0.05=Statistically significant. SD: Standard deviation, TDL: Traditional didactic lecture, MCQ: Multiple choice questions

Table 3: Students' perception regarding LBL (n=149)

Variables	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
Interesting	56	36	5	2	0
Engaging	50	37	12	1	0
Better understanding	55	36	7	1	1
Motivating	32	46	21	1	0
Preferred	55	30	13	2	1

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