

Preference of Chalkboard or PowerPoint Teaching as a Teaching Tool in Undergraduate MBBS students in Anatomy: A Comparative Study

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ARTICLE HISTORY

Received : Sep 10, 2023

Accepted: Nov 9, 2023

ACCESS THE ARTICLE ONLINE



DOI: <https://doi.org/10.37080/nmj.169>

ISSN : 2645-8438

KEYWORDS

Anatomy teaching methods;
integrative teaching approach;
powerpoint vs chalkboard

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CONFLICT OF INTEREST : None

ACKNOWLEDGEMENTS: None

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ABSTRACT

Introduction: Traditional chalkboard lectures and modern PowerPoint presentations are integral components of medical education, each possessing distinct attributes and advantages. The primary objective is to ascertain whether students exhibit a preference for one method over the other in terms of facilitating better understanding and ensuring long-term retention. This study investigates the preferences of 2nd and 3rd-year Bachelor of Medicine, Bachelor of Surgery students at B.P. Koirala Institute of Health Sciences, Dharan, Nepal, regarding the teaching methods employed in anatomy classes.

Methods: The study was conducted in the Department of Human Anatomy of B.P. Koirala Institute of Health Sciences as a part of coursework. The research duration extended from April 21st to May 18th, 2019. Ethical clearance was obtained, and data collection utilized a pre-validated questionnaire, employing simple random sampling with an expected size of 120 among the 150 students. Statistical analysis was performed using Statistical Package for the Social Sciences version 11.5.

Results: The study revealed varied student preferences for chalkboard and PowerPoint teaching methods. PowerPoint was favored for structured lectures, content clarity, and visual aids, while chalkboards were preferred for natural pauses, facilitating note-taking, and promoting long-term retention. Advantages cited included simplicity, interest stimulation, and ease of note-taking or diagram creation.

Conclusions: The analysis of data led to the conclusion that both methods have unique merits in anatomy teaching. PowerPoint excels in clarity, organization, and visual aids, while chalkboards shine in student engagement, note-taking, and lecture continuity. A holistic, integrative approach that harnesses the strengths of both methods is recommended for optimal understanding and effectiveness in teaching anatomy.

INTRODUCTION

"Education is the most powerful weapon which you can use to change the world" (Nelson Mandela). Teaching anatomy in medical schools involves employing various methods, including traditional chalkboard presentations and modern PowerPoint lectures.¹ The current educational landscape at B.P. Koirala Institute of Health Sciences (BPKIHS) integrates both approaches, raising questions about the preferred method for effective learning. While traditional methods, such as chalkboard presentations, are favored by some, the advent of technology has introduced PowerPoint presentations as a dynamic alternative.²

How to cite (Vancouver Style)

Gupta A, Nepali A, Pujara S, Sinha A, Pokhrel C. Preference of Chalkboard or PowerPoint Teaching as a Teaching Tool in Undergraduate MBBS students in Anatomy: A Comparative Study. Nepal Med Jor. 2023;6(2):11-17.

To address this ongoing debate, we conducted a cross-sectional study aiming to understand whether medical students of Bachelor of Medicine, Bachelor of Surgery (MBBS) in their 2nd and 3rd years at BPKIHS preferred the PowerPoint or chalkboard method in terms of better comprehension and long-term retention. The study sought to explore the perceptions of students regarding these teaching methods and aimed to distribute a pre-structured questionnaire to gather comprehensive insights. By analyzing the obtained data, we intended to contribute valuable perspectives to the discourse on effective teaching methodologies in medical education.

The rationale for this study lies in the evolving dynamics of medical education, where the choice between traditional and modern teaching methods significantly impacts the learning experience. As technology continues to shape educational practices, understanding students' preferences can inform strategies to enhance the delivery of complex medical content. This study's findings may guide educators in refining teaching approaches, ultimately improving students' overall learning experiences in medical colleges.

METHODS

The study involved undergraduate medical students from 2nd and 3rd year at B.P. Koirala Institute of Health Sciences, Dharan, Nepal. The participants were selected through simple random sampling, with a total sample size of 150 students. Inclusion criteria encompassed consent and enrollment in the specified academic years, while students from other streams and those not providing consent were excluded. The rationale for age, sex, and academic year criteria was to ensure relevance to the study's focus on medical education preferences. The study obtained ethical clearance from the institute's medical ethics committee, adhering to ethical standards for research involving human subjects. Informed consent was obtained from all participants.

The study followed a cross-sectional design, conducted within the Department of Human Anatomy from April 21st to May 18th, 2019, after securing ethical clearance. Data collection involved a pre-validated questionnaire administered in the class, capturing students' experiences with PowerPoint presentations and chalkboards.³ The data were recorded in MS Excel 2016 and analyzed using SPSS (Statistical Package for the Social Sciences) version 11.5. The sampling technique, sample size estimation, and statistical methods were based on established practices and prior research.⁽⁴⁻⁷⁾ Descriptive statistics, such as percentages, were utilized to present

findings. The study considered a 95% confidence interval and 80% power for sample size estimation. Emphasis was placed on avoiding reliance solely on statistical hypothesis testing, with a preference for conveying effect size through quantified findings and appropriate indicators of measurement error or uncertainty, such as confidence intervals. According to the study done by Petimani and Adake, 2015, the preference for PowerPoint learning method was 39.56%.⁷

Now using the following formula to estimate the sample size:

Sample size (n) = z^2pq/d^2

Where, z = 1.96 at 95% CI p = 39.56%

q = $100 - p$ = 60.44

d = 20% of p = 7.91

Then, n = 146.71

Where,

n : Required sample size

z : Z-score, indicating confidence level

p : Estimated proportion or probability

q : Complement of p (probability of event not occurring)

d : Margin of error, as a percentage of p

The total number of students in 2nd year (98) and 3rd year (115) MBBS students was 213, therefore 150 students were taken for the study with 75 students from each year.

RESULTS

In the comparison of teaching methods, both PowerPoint (PPT) and chalkboard demonstrated distinct advantages and drawbacks across various parameters. The results were significantly different among various age groups as shown in table 1. Among the total 150 students, 60.7% preferred PPT for organized and structural lectures, citing benefits such as clarity in content, better understanding of new terms, and enhanced visibility of diagrams. Additionally, 75.3% favored PPT for increased visibility, better integration of text with figures, and overall satisfaction.

Table 1: Age of the students

Students	Frequency	Age (Mean $\pm$ SD)
Total Students	150	21.45 $\pm$ 1.196
Year		
Second	75	21.03 $\pm$ 1.174
Third	75	21.88 $\pm$ 1.065
Gender		
Female	51 (34%)	20.98 $\pm$ 0.969
Male	99 (66%)	21.70 $\pm$ 1.233

On the other hand, chalkboards were favored by 39.3% of students for organized lectures, with 54% preferring chalkboards for clearer lecture content. Chalkboards were appreciated for natural pauses, facilitating note-taking (70%), better pronunciation (66.7%), and continuity of lectures (50.7%).

Breaking down preferences by year, out of 75 second-year students, 34.7% favored chalk, while 65.3% preferred PowerPoint (PPT) for organizing lectures. The majority (58.7%) found PPT better for clarity, and 66.7% favored it for new terms and spelling. Regarding diagrams, 72% preferred PPT. For the third year, out of 75 students, 44% preferred chalk for organization, 50.7% for clarity, and 33.3% for new terms. Conversely, 76% favored PPT for visibility, and 81.3% found it more interesting. While 58.7% preferred PPT for reproducibility, 76% found it easier to make notes and diagrams with chalk. Chalk prevailed in continuity (62.7%) and overall satisfaction (69.3%).

These findings highlight a nuanced preference shift toward PPT for certain aspects among third-year students.

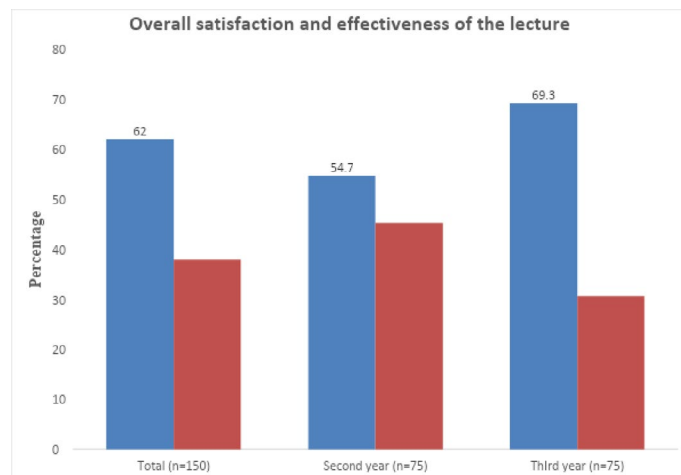


Fig 1: Shows the overall satisfaction and effectiveness of the lecture among total students was 62% for chalkboard lecture and 38% for powerpoint lecture. The preference for chalkboard lecture was 54.7% and for powerpoint lecture was 45.3% among second year students. Similarly, among the third-year students, the preference for chalkboard lecture was 69.3% and for powerpoint lecture was 30.7%

The statistical analysis utilized descriptive statistics, highlighting percentages and frequencies across various parameters. A detailed breakdown of preferences among students, categorized by year, was presented in Tables 2 and 3.

Table 2: Preference among Total students (n=150)

QUESTIONS	Frequency(n)	Percentage
• With which method lectures was more organized and structural?		
Chalkboard	59	39.3%
PPT	91	60.7%
• Which method was clearer regarding the lecture contents?		
Chalkboard	69	46%
PPT	81	54%

Clarity of new terms and spelling was better with which method?		
Chalkboard	50	33.3%
PPT	100	66.7%
Clarity of diagram was better with which method?		
Chalkboard	42	28%
PPT	108	72%
Method which increased the visibility of lecture?		
Chalkboard	37	24.7%
PPT	113	75.3%
Which method was more understandable and had better pronunciation?		
Chalkboard	100	66.7%
PPT	50	33.3%
Which method was more interest stimulating?		
Chalkboard	108	72%
PPT	42	28%
Which method had more reproducibility of text and diagram?		
Chalkboard	61	40.7%
PPT	89	59.3%
In which method you were able to take notes/diagrams more easily?		
Chalkboard	105	70%
PPT	45	30%
Which method was able to integrate more text with figure in a better way?		
Chalkboard	45	30%
PPT	105	75%
Which method had better continuity of lecture?		
Chalkboard	76	50.7%
PPT	74	49.3%
Overall satisfaction and effectiveness of the lecture?		
Chalkboard	93	62%
PPT	57	38%

Table 3: Preference among 2nd and 3rd year students

QUESTIONS	Frequency(n)		Percentage	
	Frequency	Percentage	Frequency	Percentage
• With which method lectures was more organized and structural?				
Chalkboard	26	34.7%	33	44%
PPT	49	65.3%	42	56%
• Which method was clearer regarding the lecture contents?				
Chalkboard	31	41.3%	38	50.7%
PPT	44	58.7%	37	49.3%
• Clarity of new terms and spelling was better with which method?				
Chalkboard	25	33.3%	25	33.3%
PPT	50	66.7%	50	66.7%
• Clarity of diagram was better with which method?				
Chalkboard	21	28%	21	28%
PPT	54	72%	54	72%
• Method which increased the visibility of lecture?				
Chalkboard	19	25.3%	18	24%
PPT	56	74.7%	57	76%
• Which method was more understandable and had better pronunciation?				
Chalkboard	47	62.7%	53	70.7%
PPT	28	37.3%	22	29.3%
• Which method was more interest stimulating?				
Chalkboard	47	62.7%	61	81.3%
PPT	28	37.3%	14	18.7%
• Which method had more reproducibility of text and diagram?				
Chalkboard	30	40%	31	41.3%
PPT	45	60%	44	58.7%

• In which method you were able to take notes/diagrams more easily?				
Chalkboard	48	64%	57	76%
PPT	27	36%	18	24%
• Which method was able to integrate more text with figure in a better way?				
Chalkboard	19	25.3%	26	34.7%
PPT	56	74.7%	49	65.3%
• Which method had better continuity of lecture?				
Chalkboard	29	38.7%	47	62.7%
PPT	46	61.3%	28	37.3%
• Overall satisfaction and effectiveness of the lecture?				
Chalkboard	41	54.7%	52	69.3%
PPT	34	45.3%	23	30.7%

These findings offer comprehensive insights into the nuanced preferences of medical students, emphasizing the importance of tailoring teaching methods to specific academic years and considering the diverse aspects of lecture delivery.

DISCUSSION

Anatomy holds paramount importance in medical education, forming the cornerstone for clinical practice and success in competitive entrance exams for specialization. Effective teaching methods are crucial for developing a profound understanding of this subject among medical students^{7,9}. In the contemporary educational landscape, chalkboard and PowerPoint presentations stand out as popular teaching tools. This study delved into the preferences of 2nd and 3rd-year MBBS students at BPKIHS regarding these methods, shedding light on their distinctive advantages and drawbacks.

Diagrams play a pivotal role in anatomy education, aiding in comprehension and long-term retention. The study reveals a consensus among students, with a majority expressing a preference for PowerPoint presentations due to their enhanced clarity and reproducibility of diagrams^{8,10}. This aligns with findings in literature, emphasizing the effectiveness of visual aids in modern teaching methods. Note-taking is a critical aspect of learning. Interestingly, the study highlights a divergence in preferences, with a majority

favoring the traditional chalkboard method for its ease in taking down notes and diagrams¹⁰. This contradicts some previous studies that found PowerPoint presentations more conducive to note-taking¹¹. The diversity in student preferences underscores the need for a flexible teaching approach.

The study resonates with existing comparative studies, emphasizing the advantages of PowerPoint presentations in enhancing diagram understanding.³ However, it also acknowledges dissenting views, with some students finding chalkboard teaching more amenable for note-taking. When it comes to overall satisfaction and effectiveness of lectures, a majority of medical students in this study favored the chalkboard method⁹. This finding aligns with a broader sentiment emphasizing the enduring value of traditional teaching aids. However, limited by single institution focus, small sample, and subjective preferences, the study on anatomy teaching methods lacks broader generalizability.

In summary, the study adds valuable insights to the ongoing discourse on teaching methodologies in anatomy, highlighting the need for a flexible and adaptive approach to cater to the diverse learning preferences among medical students.

CONCLUSION

In aligning with the objectives of this study, a nuanced

exploration of teaching methodologies among second and third-year MBBS students sheds light on the multifaceted dynamics between PowerPoint presentations and chalkboard methods.

The objectives included assessing preferences for organizational structure, clarity of content, and effectiveness in conveying anatomy concepts. The findings indicate a preference for PowerPoint presentations in terms of structural organization, clarity of new terms, and diagrammatic reproducibility. Conversely, the chalkboard method excels in fostering better comprehension, interest stimulation, and lecture continuity. It's crucial to underline that these conclusions are firmly grounded in the data collected from 150 participants, ensuring the validity and reliability of the study outcomes. The students' preference for specific aspects of each method is intricately linked to their learning experience and perception.

The study emphasizes the need for a judicious blend of both methods, recognizing PowerPoint's strengths in visual clarity and organization, and chalkboard's effectiveness in promoting understanding and sustaining interest. By aligning these conclusions with the study objectives, this research provides actionable insights for educators seeking an optimal balance in anatomy teaching methodologies.

ACKNOWLEDGEMENTS

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