

# Effectiveness of Teaching Medical Undergraduates Using Information Technology as Compared to Traditional Classroom Lectures: A Cross-Sectional Study

Rakesh Kumar Misra<sup>1</sup> & Ashish Vinodkumar Batra<sup>2\*</sup>

<sup>1</sup>*Professor, Department of Orthopaedics, Ananta Institute of Medical Science and Research Centre, Rajsamand, Rajasthan*

<sup>2</sup>*Assistant Professor, Department of Orthopaedics, Ananta Institute of Medical Science and Research Centre, Rajsamand, Rajasthan*

**\*Correspondence to:** Dr. Ashish Vinodkumar Batra, Assistant Professor, Department of Orthopaedics, Ananta Institute of Medical Science and Research Centre, Rajsamand, Rajasthan.

## Copyright

© 2019 Dr. Ashish Vinodkumar Batra, *et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: 02 September 2019

Published: 11 September 2019

**Keywords:** *Audio-Visual Aids; PPT Lectures; Oral Lectures; Medical Education; Teaching Faculty Efficiency*

## Abstract

### Introduction

The formal lecture is among the oldest teaching methods that have been widely used in higher education for generations. They are strong techniques that help get a large amount of theoretical information at once, give the ability to support a complementary study of books or other material, by amplifying or explaining key points. But it is ineffective in actively engaging the learners. Electronic resources are now widely acknowledged as an excellent means to support learning. The aim of this study was to investigate if the faculty using Information technology for teaching is more efficient in imparting knowledge to medical undergraduates as compared to those that give traditional classroom lectures.

## Methods

141 students were present on the day of the lectures. They were given 2 lectures. 1<sup>st</sup> lecture was given using the traditional method i.e. the oral narrative, while the 2<sup>nd</sup> lecture was given using Microsoft PowerPoint (PPT) presentation. Students' feedback was collected after both lectures had ended, through a pre-structured questionnaire. For each of the two methods, the students were asked to rank each item of the questionnaire on a five-point Likert scale.

## Results

141 MBBS students participated in the study, 69 Second year MBBS students and 72 Third year MBBS Students. Most students agreed that both methods of lectures were well organised, clear, audible, simulated their interest and understanding, advanced their understanding and found delivery interesting but on the lakert scale, students gave better ranking to PPT delivered lecture as compared to Oral lectures. 135 (95%) students felt that they were able to take notes and understand diagrams a lot better in PPTs, 126 (89%) students felt their flow of thought was a lot better in PPT lectures and 91% students felt that interaction between students and teachers was much better in PPT lecture. 96% students agreed that the Overall effectiveness of the study was better in PPT lectures while rest 4% felt that both methods were equally effective.

## Conclusion

The formal lecture is the most widely used teaching method for centuries which can be made effective by the use of AV aids. Our study demonstrates that lecture delivered using PPT was more appreciated and preferred by the students and therefore, the faculty using Information technology for teaching is more efficient in imparting knowledge to medical undergraduates as compared to those that give traditional classroom lectures.

## Introduction

The formal lecture is among the oldest teaching methods that have been widely used in higher education for generations [1]. Traditionally, formal lecturing meant delivery of a large "bolus" of knowledge, swallowed and frequently only partially digested by students [2]. This formal instruction was mostly given in the form of a didactic or authoritarian lecture. The word "lecture" is derived from the Latin word "lectus" [3] that means "oral discourse on a given subject before an audience for purposes of instruction." They are a one-way delivery of information that may be interrupted by questions and perhaps even some discussion. They are especially useful when a large number of learners are taught at the same time. They are strong techniques that help get a large amount of theoretical information at once. Another strength of lecture giving is the ability to support a complementary study of books or other material, by amplifying or explaining key points. Thus, in olden times, a well-organized lecture remained one of the most effective ways to integrate and organize information from multiple sources on complex topics [1].

However, there are many disadvantages inherent in a teaching system that is largely dependent on lectures. Delivery of a lecture by a teacher does not actively engage the learners. Students are usually passive participants in the process and often find it difficult to sustain interest in the subject over the duration of the lecture. A lecture delivered at a particular pace does not cater to all students in a class, as it is typically composed of individuals of diverse abilities. Academically weak students may find it difficult to keep pace with the lecturer as the lecture progresses. Hence, not all students are able to assimilate the content of a lecture to the same extent. Opportunities to ask questions are also limited in such a situation. In addition, the quality of a lecture primarily depends on the experience and skill of the teacher, which can be quite variable [4]. In view of the limitations associated with lecture-based teaching, which is nonetheless essential, it is imperative that medical teachers explore ways to overcome many of its inherent disadvantages. Over the last several years, the internet has had a growing influence on education. Electronic resources are now widely acknowledged as an excellent means to support learning [5,6].

Many leading universities have developed electronic learning (e-learning) material to supplement and enhance teaching. Further, using these resources delivering a lecture is made easy and better by use of audiovisual aids (AV aids) such as blackboard or whiteboard, an overhead projector (OHP), and PowerPoint presentation (PPT) [2]. Use of PPTs help in better understanding of topics and make the lectures more interactive and efficient.

The aim of this study was to investigate if the faculty using Information technology for teaching is more efficient in imparting knowledge to medical undergraduates as compared to those that give traditional classroom lectures.

## Material and Methods

After obtaining institutional ethical clearance, this qualitative study was conducted among 150 second-year and third year MBBS students in Ananta Institute of Medical Sciences and Research Centre, Rajsamand, Rajasthan, India. First year students were excluded from the study since we felt they were still in the transition mode of understanding the school and the course, which would skew our results. 141 students were present on the day of the lectures. They were given 2 lectures. 1st lecture was given using the traditional method i.e. the oral narrative, while the 2nd lecture was given using Microsoft PowerPoint (PPT) presentation. Students' feedback was collected after both lectures had ended, through a pre-structured questionnaire [Annexure 1]. For each of the two methods, the students were asked to rank each item of the questionnaire on a five-point Likert scale: strongly agree (1), agree (2), no opinion (3), disagree (4), or strongly disagree (5). A score of 5 was given to answers "strongly agree" while lowest 1 was given to answers "strongly disagree" to statically calculate responses. The students were also asked to give their opinions on the overall effectiveness of the study and regarding their preference of teaching aid. The questionnaire had following parameters to assess students' perception toward teaching aid:

1. The lectures were well organized, clear and audible
2. The lectures stimulated my interest
3. The lectures advanced my understanding

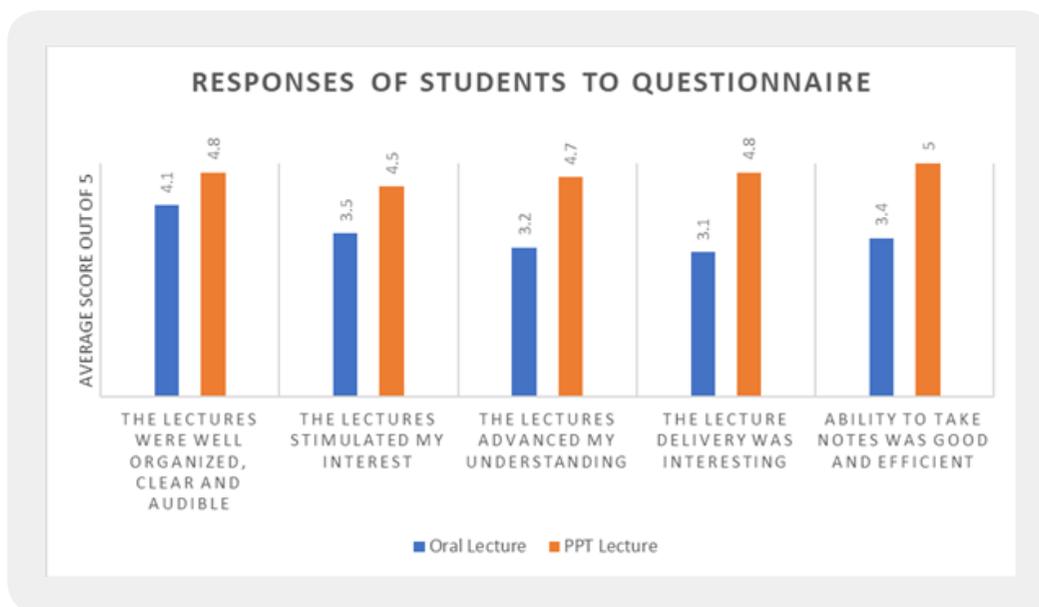
4. The lecture delivery was interesting
5. Ability to take notes was good and efficient
6. Flow of thought was better
7. Demonstrations of clinical conditions and diagrams were better
8. Facilitated interaction between student and teacher better
9. Overall effectiveness of study better

All of 141 students responded to both questionnaire. They were asked not to skip any question and if there were any doubts regarding any question they were clarified instantly. They were also asked to answer honestly and legibly and to encircle the appropriate answers wherever required. No personal identifying information was included.

Statistical calculations were done using SPSS 15.0 Software. Microsoft Word and Excel were used to generate tables. Correlations were made using subjective comments collected during survey to further measure the effectiveness of 2 methods of teaching.

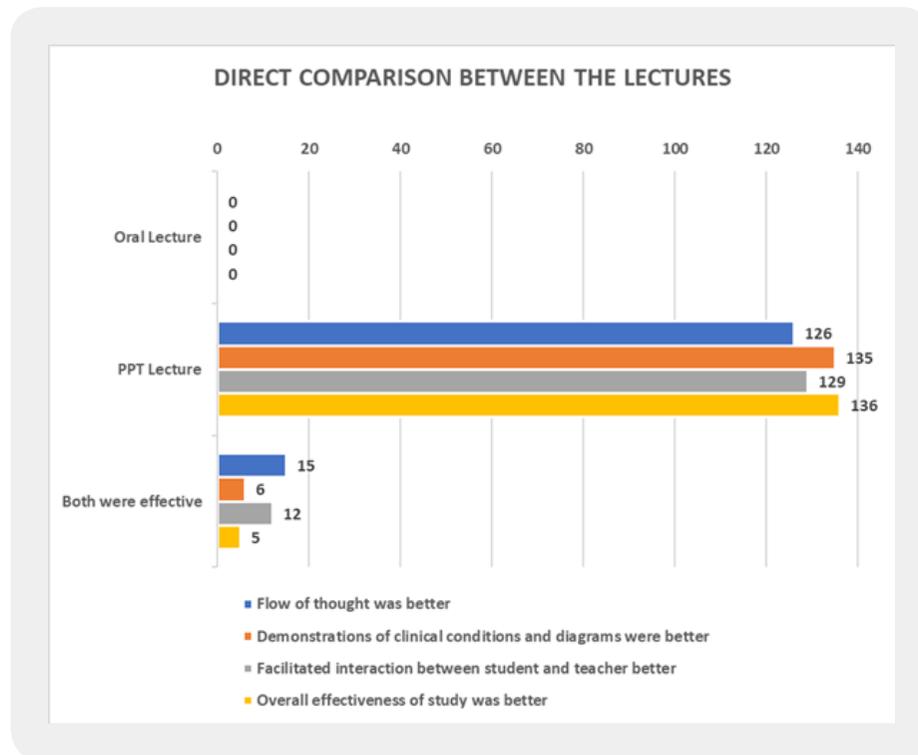
## Results

141 MBBS students participated in the study, 69 Second year MBBS students and 72 Third year MBBS Students. Most students agreed that both methods of lectures were well organised, clear and audible. They both simulated their interest and understanding, advanced their understanding and found delivery interesting but on the lakert scale, students gave better ranking to PPT delivered lecture as compared to Oral lectures (Figure 1).



**Figure 1:** Responses of Students to Questionnaire

135 (95%) students felt that they were able to take notes and understand diagrams a lot better in PPTs, since they were going to take the material back home. Some further commented saying that in oral lectures, they would miss content since they were trying to write notes and couldn't keep up. 126 (89%) students felt their flow of thought was a lot better in PPT lectures since they were able to concentrate on the content without having to worry about taking notes. Remaining students found both methods equally effective but none of the students favoured only Oral Lectures (Figure 2).



*Figure 2: Responses of Students to Questionnaire*

Students were heavily skewed towards PPT lectures when it came to demonstrations of clinical conditions and diagrams. 91% students felt that interaction between students and teachers was much better in PPT lecture. They felt in oral lectures, it was simply passive listening while in PPT lectures, they were able to better understand and question on cases presented (Figure 2).

96% students agreed that the Overall effectiveness of the study was better in PPT lectures while rest 4% felt that both methods were equally effective.

## Discussions

Mode of imparting medical education and training to students varies considerably across the world. Educational research is a vast subject that reviews and assesses various teaching methodologies that have been utilized in medical education to ensure improvement in quality education [7]. Various methods of

teaching include the traditional didactic oral lectures and the newer forms that use Information technology like practical experiments, AV aids, problem based learning methods, e-learning and clinical teaching.

A lecture can be used to arouse interest in a subject as it facilitates large-class communication. It encourages student teacher interaction by questions and discussion, but mostly hinders learning since it places students in a passive role rather than an active role. It focuses only one-way communication, and it requires the teacher to have or to learn effective writing and speaking skills [8]. Further, there is a lot of discrepancy based around the quality of lecture due to differences in individual teaching skills, communication skills, consistency of content, etc. Subjects ranging from preclinical and basic sciences such as anatomy, biochemistry, physiology, paraclinical subjects such as pharmacology, microbiology, pathology, forensic medicine, community medicine, and clinical subjects such as ophthalmology, ENT, medicine, gynecology, pediatrics, obstetrics, psychiatry, surgery and orthopedics are taught to UG medical students [9]. These subjects in traditional days were taught only through didactic lectures but in modern times, use of AV aids, PPTs, videos, e-learning modules for teaching and learning process also helped in the growth of the organization by facilitating a healthy atmosphere to the students as well as the teacher.

Apperson *et al.* [10] through their study found that AV aids were very helpful in improvising student's vocabulary and pronunciation. Brecht *et al.* [11] also in his study found AV aids to be very fruitful tutoring resource for the students. Kaur *et al.* [12] and Mathew *et al.* [13] through their study found these aids to play a significant role in overcoming the drawbacks of monotonous oral class. Of 230 students (first and second M.B.B.S.), 95% of the respondents stated that the use of AV aids stimulates thinking for further in depth reading and improves learning [14]. Kumar *et al.* [9] in his research indicated that lectures that use of combination of teaching tools are more effective in teaching students.

In our study, students showed a strong preference for PPT lectures [Figures 1 and 2]. There were multiple reasons given by students that included, a lecture taught using PPT with good explanation was more than sufficient for better understanding of the topic and especially PPT with dynamic images that could move or be maneuvered by the presenter had increased impact. Also, since the students did not have to worry about taking notes, they could concentrate more effectively on what was being taught. Further, all students would have similar notes to take back home for revision of the topic.

PPT lectures had better understanding, visibility. They were more interesting, time saving, had a meticulous approach, and the subject could be well understood using corresponding images and videos. Students further preferred PPT lectures over blackboard lectures since it avoided problems like the size of the letters written being too small, unclear handwriting, time wasted to draw complex diagrams, limitations of professors, etc. [15]. The disadvantage was that if there is no explanation and when slides are just read, then students would lose interest and get distracted. Multiple studies suggest that the use of PPT can be improved by explaining the concept using less text and not just read the slide. PPTs can be made more effective when each slide is well explained, thereby allowing students to take personal notes. PPTs can be loaded with more diagrams, three-dimensional pictures, and videos for better understanding. Student's consensus was that the use of visual aids should finally make the topic much more clear and understandable [16]. Generalized suggestions made to improve teaching were; teachers should interact more with students [17], asking questions every 15 mins to revise what was taught and tell some experiences or stories relating to the topic. Students do believe

that they enjoy teaching through these tools as it totally changes the atmosphere of the class and makes the class more interactive [18].

Chopra *et al* [19] study showed majority of students opined that PPT presentations should be the sole method of teaching. Students opined that the traditional teaching fulfilled the need of understanding the subject and reproducing diagrams whereas supplementation with power point enhanced understanding because of visualization of three-dimensional diagrams and real pictures of various clinical conditions. Further, PPT presentations avoided the issue of poor handwriting and dirty BBs. Study done by Saha *et. el.* [20] revealed that the majority of students favoured a mix of aids during the lecture classes as the inherent deficiency of one aid can be compensated by the other. Our study agreed with the study done by Chopra *et al* [19] since 96% students agreed that the Overall effectiveness of the study was better in PPT lectures while rest 4% felt that both methods were equally effective. Most students agreed that both methods of lectures were well organised, clear and audible. They both simulated their interest and understanding, advanced their understanding and found delivery interesting but students gave better ranking to PPT delivered lecture as compared to Oral lectures (Figure 1). Most students felt that their flow of thought was a lot better in PPT lectures. Students were heavily skewed towards PPT lectures when it came to demonstrations of clinical conditions and diagrams. They felt just verbal explanation of symptoms was not enough to make them visualise, while seeing it on screen made them understand the symptoms completely. Also, since PPTs allowed diagrams to be zoomed to specific areas of discussion, it intrigued interest in students and help them better understand the topics. This further lead to better interaction between students and teachers. They felt in oral lectures, it was simply passive listening while in PPT lectures, they were able to better understand and question on cases presented (Figure 2).

## Conclusions

The formal lecture is the most widely used teaching method for centuries which can be made effective by the use of AV aids. Our study demonstrates that lecture delivered using PPT was more appreciated and preferred by the students and therefore, the faculty using Information technology for teaching is more efficient in imparting knowledge to medical undergraduates as compared to those that give traditional classroom lectures.

## Bibliography

1. Large Classes: A Teaching Guide: Lecturing. Centre for the Integration of Research, Teaching and Learning: CIRTL Network.
2. Mohan, L., Sankar, P. R., Kamath, A., Manish, M. S. & Eesha, B. R. (2010). Students' attitudes towards the use of audio-visual aids during didactic lecture in pharmacology. *J Clin Diagn Res.*, 4, 3363-3368.
3. Medical Education.
4. Powell, K. (2003). Science education: spare me the lecture. *Nature*, 425(6955), 234-236.

5. Greenhalgh, T. (2001). Computer assisted learning in undergraduate medical education. *BMJ.*, 322(7277), 40-44.
6. Ruiz, J. G., Mintzer, M. J. & Leipzig, R. M. (2006). The impact of E-learning in medical education. *Acad Med.*, 81(3), 207-212.
7. Lecture.
8. Lecturing: Advantages and Disadvantages of the Traditional Lecture Method Adapted with Permission from the Office of Instructional Resources, University of Illinois-Urbana Champaign.
9. Kumar, A., Singh, R., Mohan, L. & Kumar, M. K. (2013). Student's views on AV aids used during didactic lectures in a medical college. *Asian J Med Sci.*, 4, 36-40.
10. Apperson, J. M., Laws, E. L. & Scepansky, J. A. (2006). An assessment of student preferences for power point presentation structure in undergraduate courses. *Comput Educ.*, 47, 116-126.
11. Brecht, H. D. (2012). Learning from online video lectures. *J Inf Technol Educ Innov Pract.*, 11, 227-250.
12. Kaur, N. (2012). Effectiveness of audio-visual aids for teaching english poetry at secondary level. *Int J Res Educ Methodol.*, 1(3), 47-49.
13. Mathew, N. G. & Alidmat, A. O. (2013). A study on the usefulness of audio-visual aids in EFL classroom: Implications for effective instruction. *Int J High Educ.*, 2, 86-92.
14. Kausar, G. (2013). Students' perspective of the use of AV aids in Pakistan. *Int Proc Econ Dev Res.*, 68, 11-13.
15. Shah, H. K. (2006). Overhead projector - A versatile teaching tool. *Indian J Community Med.*, 31(2), 108.
16. Golden, A. S. (1989). Lecture skills in medical education. *Indian J Pediatr.*, 56(1), 29-34.
17. Silverthorn, D. U. (2006). Teaching and learning in the interactive classroom. *Adv Physiol Educ.*, 30, 135-140.
18. Khan, A. S. (2013). Technology's Role on Student's Behavior. Vol. 24. Proceedings 10<sup>th</sup> International Conference on Statistical Sciences, 13-22.
19. Chopra, J., Rani, A., Rani, A., Deewan, R. K., Srivastava, A. K. & Sharma, P. K. (2014). Students' reflections on teaching methodology in anatomy. *Asian J Med Sci.*, 5(1), 47-51.
20. Saha Nirmalya, Kaushik, T. & Das, R. (2015). Students' opinion towards audio-visual aids used in lecture classes. *IOSR-JDMS.*, 14(4), 96-100.

**Annexure 1**

<b>Student's preference of PPT Lectures or Oral Lectures – A questionnaire based study</b>				
<b>Note:</b> Please do not skip any question. If there were any doubts regarding any question, please ask and they will be clarified instantly. Please answer honestly and legibly and encircle the appropriate answers wherever required. Personnel identity need not be revealed.				
<b>1</b>	<b>Which Lecture are you answering for?</b>			
	a. Oral Lecture	b. PPT Lecture		
<b>2</b>	<b>What Year of MBBS are you in?</b>			
	a. 2 <sup>nd</sup> Year	b. 3 <sup>rd</sup> Year		
<b>3</b>	<b>The lectures were well organized, clear and audible</b>			
	a. Strongly Agree	b. Agree	c. No opinion	d. Disagree
<b>4</b>	<b>The lectures stimulated my interest</b>			
	a. Strongly Agree	b. Agree	c. No opinion	d. Disagree
<b>5</b>	<b>The lectures advanced my understanding</b>			
	a. Strongly Agree	b. Agree	c. No opinion	d. Disagree
<b>6</b>	<b>The lecture delivery was interesting</b>			
	a. Strongly Agree	b. Agree	c. No opinion	d. Disagree
<b>7</b>	<b>Ability to take notes was good and efficient</b>			
	a. Strongly Agree	b. Agree	c. No opinion	d. Disagree
<b>8</b>	<b>Flow of thought was better</b>			
	a. Oral Lecture	c. PPT Lecture	e. Both were equally effective	
<b>9</b>	<b>Demonstrations of clinical conditions and diagrams were better</b>			
	a. Oral Lecture	c. PPT Lecture	e. Both were equally effective	
<b>10</b>	<b>Facilitated interaction between student and teacher better</b>			
	a. Oral Lecture	c. PPT Lecture	e. Both were equally effective	
<b>11</b>	<b>Overall effectiveness of study was better</b>			
	a. Oral Lecture	c. PPT Lecture	e. Both were equally effective	
<b>Comments Section:</b> Please give any comments or reasons for your answers above.				