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Exploring the Impact of Powerpoint Lectures in Pharmacology: Insights from Phase II Medical Students

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Abstract

The integration of technology in medical education has significantly enhanced the teaching and learning experience. Visual aids, in particular, play a key role in improving the learning process. PowerPoint (PPT) has become a popular tool for the effective presentation of lecture content. However, research has shown that students' opinions regarding its effectiveness vary widely. This study aimed to explore the perspectives of phase II MBBS students on the use of PowerPoint presentations in pharmacology lectures at our institution. An observational, cross-sectional, questionnaire-based online study was conducted by the Faculty of Pharmacology among phase II medical students at Bharati Vidyapeeth Medical College, Pune, with a sample of 124 students. The results revealed that 71% of the students preferred PowerPoint presentations along with a whiteboard as an effective teaching method. While the students generally had a positive view towards PPTs, recognizing their utility in various aspects, 62% stated that PPTs should not replace traditional lecture classes. To increase their effectiveness, 75% of students recommended making PPTs available on the students' portal, and 18% suggested providing more time to note down the content. PPTs were less favored when presentations were too fast-paced (60%), contained too much information or too many slides (29%), were delivered monotonously (32%), or lacked interaction (27%). Furthermore, 47% of students believed that the level of interaction during lectures is more dependent on the teacher than on the teaching tool itself. Overall, PowerPoint is considered the best teaching tool, provided that it is used effectively to ensure interactivity and appropriate pacing.

Keywords: Medical education, Perception, PowerPoint, Pharmacology lectures

Introduction

In the modern technological era, advancements in technology are deeply embedded in everyday life, influencing how we communicate, learn, and think. Medical education, in particular, has increasingly adopted technology to improve the effectiveness of teaching and learning [1, 2].

Lectures have historically been the most common method for large-group instruction [3]. The traditional chalk and board have evolved into the use of whiteboards, overhead projectors, and, more recently, PowerPoint presentations [4, 5]. In the Indian context, the challenge of large class sizes (often exceeding 100 students) and limited faculty resources has made lecture-based teaching a necessity [6].

The integration of visual aids significantly enhances the learning experience [7]. Various tools are employed to assist with visual learning in lectures. Studies have found that each teaching method has its own set of benefits and limitations [8]. While the chalk-and-board approach remains effective, it is now largely supplemented or replaced by PowerPoint presentations, which allow for a more dynamic and efficient delivery of lecture material [9]. Teachers often favor PPTs because they make it easier to present images, videos, graphs, diagrams, and textual information in a single, organized format, making lectures more engaging and informative [7].

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Despite the widespread use of PowerPoint in educational settings, it is essential to evaluate whether students truly benefit from this approach. Several studies have highlighted that while PowerPoint is generally considered an effective teaching tool, students' views on its usefulness are often divided [10-12]. Therefore, this study aims to explore the perspectives of phase II MBBS students on the use of PowerPoint presentations in pharmacology lectures at our institution.

Materials and Methods

An observational, cross-sectional study was conducted using an online questionnaire among phase II MBBS students of Bharati Vidyapeeth (DTU) Medical College, Pune, during the academic year 2021-2022. The institution is well-equipped with infrastructure, including a backup generator, ensuring a consistent power supply during lectures.

Inclusion criteria

Phase II MBBS students enrolled in pharmacology lecture sessions.

Exclusion criteria

1. Students who did not provide informed consent.
2. Questionnaires with incomplete or missing data were excluded from the analysis.

Study design

The study was approved by the Institutional Ethics Committee (BVDUMC/IEC/206). A pre-validated questionnaire was used to assess the perceptions of phase II MBBS students regarding the use of PowerPoint in pharmacology lectures. The 16-question questionnaire, including 13 multiple-choice and 3 open-ended questions, was distributed through Google Forms. Students were provided with sufficient time to read, understand, and complete the survey. The collected data was presented using percentages, pie charts, and bar graphs.

Assumption

It was assumed that the PowerPoint presentations prepared by the department followed standard guidelines for content, font size, and color contrast.

Results and Discussion

Out of the 150 phase II medical students who were sent the online questionnaire, 126 responded. However, two questionnaires were incomplete and were excluded from the analysis, resulting in a final sample of 124 students.

The majority of students (71%) expressed a preference for a combined teaching approach using PowerPoint and a whiteboard, viewing this as the most effective method for delivering lectures. All participants agreed that PowerPoint presentations should be shared on the student portal. There was, however, some variation in opinion regarding the optimal timing for sharing these presentations, as depicted in **Figure 1**.

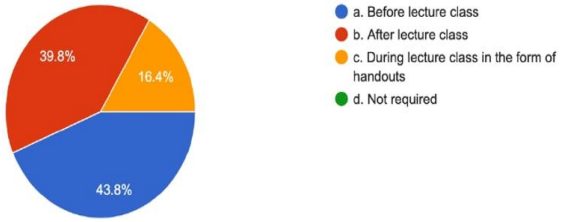

Figure 1. Perception of students about sharing PPTs

Table 1. Advantages of PowerPoint presentations

Observed parameters	N (%)
Holding attention	40 (31%)
Recalling the topic	69 (53%)
Simplified explanation of topics	101 (79%)
Improved understanding of the subject	86 (67%)

As per the responses, 62% of students felt that PowerPoint presentations should not replace traditional lecture classes, while 23% disagreed with this view, and 14% remained neutral.

When it came to PowerPoint features that helped recall content during exams, students favored bullet point text (69%), visual images (66%), and animated graphics (63%).

For improving the impact of lectures, 75% of students supported the idea of sharing PPTs on the student portal, while 18% believed more time should be allocated during lectures for noting down PPT content. Some students also suggested making audio versions of the PPTs available after the lectures.

PPTs were less favored when the presentation speed was too fast (60%) when the content was too extensive (29%), and when the delivery lacked engagement or was monotonous (32%) or interactive (27%).

Regarding downloading habits, 73% of students downloaded all PPTs for their topics, 22% only

downloaded the most important ones, and the remaining students downloaded PPTs less frequently.

As for the pacing of the lectures, 62% of students felt it aligned well with their ability to grasp the material, while 18% disagreed, and 18% were neutral. Additionally, 57% of students felt they did not have enough time to take down notes or diagrams from the PPT during lectures.

Lastly, students were asked to rank their preferred study materials for exam preparation in descending order **(Figure 2)**.

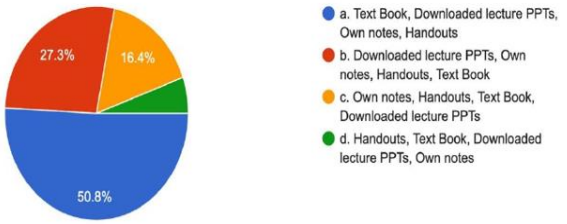

Figure 2. Student's preference for Reference material during exam preparation

Student-teacher interaction and preferences

47% of students felt that the level of student-teacher interaction during lectures was more influenced by the teacher's approach than by the teaching tools used. In contrast, 24% believed PowerPoint presentations enhanced interaction, while 25% felt that both PowerPoint and traditional chalk-and-board methods offered similar levels of engagement. Furthermore, 69% of students expressed that animated content in PowerPoint presentations would aid a better understanding of the material.

Open-ended feedback

Students were asked to share their thoughts on the positive and negative aspects of PowerPoint presentations in lectures, as well as provide suggestions for improvement. The majority of students responded positively, appreciating the use of videos, diagrams, flow charts, and bullet points within the PPTs, which helped simplify complex topics and improve comprehension. They also noted that PPTs enabled instructors to deliver large amounts of information quickly and clearly.

However, 50% of students reported difficulty in taking notes during lectures due to the fast pace of the presentations. Students also expressed dissatisfaction with the lack of interaction when the content was presented too quickly or without adequate explanation. The excessive amount of content on some slides was another drawback mentioned.

Several students offered valuable suggestions, including the inclusion of more visuals, questionnaires, and multiple-choice questions (MCQs) at the end of lectures. They also recommended using case-based approaches for certain topics and adding summaries of pharmacotherapy at the end of each lecture. Additionally, students requested that PPTs be made available after class to aid in revision during exam preparation.

Teaching and learning process

Teaching and learning is a dynamic process that becomes more effective when both the teacher and students actively engage with each other [13]. In traditional didactic lectures, students tend to be passive learners. To enhance lesson effectiveness, educators use a variety of tools such as chalk and board, PowerPoint presentations, and overhead projectors. PowerPoint, in particular, is widely used with the expectation that it will boost visual engagement in lectures.

However, it is essential to determine whether this assumption holds in practice. Does the use of PowerPoint truly benefit students, and does it reflect their learning experience? This study aimed to gather insights into students' perceptions to improve teaching practices and make necessary adjustments.

Comparison with previous studies

Several comparative studies have examined the effectiveness of different teaching tools. In our study, we explored students' opinions on the utility of various teaching methods. The results revealed that most students (71%) preferred a combined approach, using both PowerPoint and the blackboard, as the most effective teaching method. Some studies have found that students favor PowerPoint presentations [4, 6, 14-17], while others lean towards traditional chalk and board methods [18-20]. Our findings align with studies by Nirmalya *et al.* [21] and Choudhary *et al.* [22], who also found that a combined approach was preferred.

Given the large class sizes, PowerPoint has become the preferred tool for many instructors. Our study specifically focused on the effectiveness of PowerPoint in pharmacology lectures. The findings indicate that PowerPoint presentations helped simplify topics, improved subject understanding, and made the lessons more engaging **(Table 1)**. Similar results were observed in studies by Seth *et al.* [6].

Challenges with note-taking

Note-taking is an essential part of the lecture process and plays a key role in students' future studies. In our study, 57.8% of students reported that they did not have enough time to take notes, likely due to the fast pace or the overwhelming amount of content being covered. Previous studies have noted that PowerPoint presentations facilitate note-taking due to the legible and organized content [12]. They also help manage time effectively, ensuring that lessons are more structured than when content is written on the board [23].

While the chalk-and-board method allows more time for students to take notes, it can be time-consuming for teachers, as highlighted by DeSa and Keny [10]. Some students mentioned that they are more accustomed to using whiteboards and are more comfortable with them. Given the compressed timeline in the CBME curriculum, with phase II now lasting only one year instead of one and a half years, there is pressure on teachers to cover a vast syllabus in a short amount of time. This leads to faster-paced lectures, which restrict students' time for note-taking. To address this issue, we began sharing PPTs on the student portal and responding to students' requests for easier access to materials. We were interested in understanding whether students were utilizing these PPTs as a learning resource, which led us to further explore their perceptions of PowerPoint.

Advantages of PowerPoint and its impact on learning

One notable benefit of PowerPoint presentations is the ability for students to download or receive handouts, which can reduce the time spent taking notes during lectures and provide useful material for self-study [24]. Our study supports this, as most students stated that sharing handouts or PowerPoint slides on the student portal would enhance the impact of the lecture topics. A majority of students regularly downloaded the PPTs for exam preparation, often using them as a primary resource after textbooks **(Figure 2)**, while a few only downloaded essential topics. These findings align with those reported by Garg *et al.* [25].

Although the goal of sharing PPTs is to make the content accessible to students, it should not be viewed as a replacement for attending lectures. The slides must serve as guidelines rather than comprehensive notes, encouraging students to attend lectures for full learning. In our study, 62% of students did not consider PPTs a substitute for lectures, while 23% did. The key to effective learning during lectures is not merely receiving the pre-made slides, but truly understanding the topic at hand.

Enhancement of engagement and understanding

PowerPoint presentations offer various design elements, such as animations and images, which can enhance student engagement. They simplify complex topics, particularly in subjects like Pharmacology, by illustrating concepts like drug mechanisms. Our study found that students preferred bullet point text, visual images, and animations in PPTs, a preference consistent with findings from Seth *et al.* [6].

However, maintaining interactivity during lectures is crucial to keep students engaged. A major downside of using PowerPoint is that lectures can become monotonous without proper interaction. Without engagement, students tend to become passive learners [26]. Several studies have pointed out that traditional chalk-and-board methods tend to encourage better interaction, as teachers can make eye contact with students and gauge their understanding in real time. With PowerPoint, teachers often find themselves looking at the screen rather than the students, leading to reduced interaction [25, 27]. Conversely, a few studies suggested that interaction may be better with PowerPoint since teachers have more time to engage with students rather than writing on the board [23].

In our study, students valued both PowerPoint and chalk-and-board methods equally for fostering interactivity. Most students felt that the level of interaction largely depended on the teacher rather than the teaching tool itself. This observation aligns with studies by Ahmad C. and others [28]. PowerPoint can be an effective tool when used judiciously, but when mishandled by a less discerning teacher, it can detract from the learning experience [29, 30]. The effectiveness of PowerPoint largely depends on the teacher's ability to make the most out of the tool [31].

Balancing the learning process

Achieving a balance between listening, reading, and writing during lectures is challenging. The chalk-and-board method naturally facilitates this balance due to pauses and breaks, allowing students to remain fully engaged throughout the session [32]. A skilled teacher can replicate this balance while using PowerPoint, though it requires careful planning and execution.

From the feedback provided in open-ended responses, students generally appreciated PowerPoint presentations

for simplifying complex topics, aiding in revision and recall, and providing a wealth of information in a short time. Diagrams, pictures, and videos were particularly helpful in clarifying concepts.

However, students expressed dissatisfaction when PowerPoint presentations were delivered too quickly, monotonously, or without adequate explanation. Simply reading off the slides without providing further explanation or allowing time for note-taking were considered the most frustrating aspects of PowerPoint lectures.

Attention span and engagement strategies

Since research shows that attention spans tend to decline every 10-15 minutes, it is crucial to incorporate attention-grabbing elements such as multiple-choice questions (MCQs), pictures, diagrams, and puzzles to help refocus students' minds during lectures.

Students provided several useful suggestions to enhance learning. They recommended increasing interaction during lectures, using more visuals, incorporating revision slides, and including MCQs at the end of each lecture. Additionally, students expressed a desire for mnemonics to be included in PowerPoint presentations to aid in memorization. They also suggested that PowerPoint slides should be shared immediately after the class rather than with a delay of several days, ideally before regular tutorial sessions. A few students recommended integrating relevant case-based problems into the PPTs to further enhance learning. These suggestions are valuable for improving the overall teaching-learning process.

Study limitations

The study had certain limitations, including that it was conducted in a single institution and focused solely on one subject—Pharmacology. Therefore, the findings may not apply to other institutions or disciplines.

Conclusion

The results of this study indicate that students preferred lectures that combined the use of PowerPoint presentations and whiteboards. They found that PowerPoints helped simplify the subject, improve understanding, and aid in recalling information. Additionally, students expressed a strong preference for having PowerPoint presentations shared as reference material. However, from a teaching perspective, it might be more effective to share key highlights of the lecture rather than the entire PowerPoint, providing students with a concise guideline for their studies. Overall, PowerPoint proved to be the most effective teaching tool when used appropriately to make lectures interactive and well-paced.

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