

Comparison of Voice Over PPT and Artificial Intelligence Tool in Flipped Classroom Method: A Cross Sectional Study Among Nursing Students in a Tertiary Care Hospital

Dr. Sofia S¹, Dr. Dhivya Elango^{2*}, Dr. B. R. Asokan³

¹ Junior Resident, Department of Pharmacology, Trichy SRM Medical College Hospital and Research Centre.

Email: sofiasenthil123@gmail.com

^{2*} Assistant Professor, Department of Pharmacology, Trichy SRM Medical College Hospital and Research Centre (Corresponding Author). Email: dhivya.tvmc2008@gmail.com

³ Professor and Head of the Department, Department of Pharmacology, Trichy SRM Medical College Hospital and Research Centre. Email: branmd09@gmail.com

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ABSTRACT

Background:

Rapid technological advancements have transformed the teaching of concepts and critical thinking in health sciences. Although the flipped classroom approach has been successful in nursing education, using Artificial Intelligence (AI) tools like ChatGPT can create opportunities for learning while still adhering to traditional teaching practices. This study aims to compare the effectiveness of flipped classroom using PowerPoint presentation (PPT) with AI tool versus voice over PPT alone for nursing students.

Methodology:

After obtaining informed consent, students were divided into 2 groups. Group 1 (n=50) students were given a Voice-over PPT and Group 2 (n=50) received a standard PPT with prompts to be used in ChatGPT AI for interactive session on the same topic. In the next lecture class, group discussion was conducted separately for the two groups. In each group, students were divided into small subgroups and were evaluated by two subject experts. Performance was scored based on the clarity, comprehension and presentation of the topic. Students' feedback regarding the session was collected using Google forms.

Results and Discussion:

Scores for the two groups were not statistically significant ($p > 0.05$). In Group 1, 89% (45) of students responded that the Voice-over PPT method is effective for learning. In Group 2, 30% (15) of students felt the addition of ChatGPT AI to the Voice-over PPT method was effective in supporting their learning. Group 1 reported a higher effectiveness rate; Group 2 experienced technical challenges and a lower engagement rate with the ChatGPT AI tool.

Keywords: Medical education, Flipped classroom, ChatGPT, Nursing students, technology enhanced learning

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Introduction

Medical education has shifted from traditional lecture based teaching to more self-directed, engaging and productive use of technology as the primary means of engagement for learners [1]. Conventional continuing

medical education approaches have been weakened by passive learning, leading to the use of interactive methods like simulation and active learning strategies [1,3]. The Flipped Classroom model in higher education has shown significant advantages such as student

Comparison of Flipped Classroom Method with Voice-over PPT and Artificial Intelligence Tool:A Cross sectional study

motivation, autonomy from class, and critical thinking skills [4,5]. Flipped classrooms have been shown to improve both student perception and academic performance in nursing and medical education, highlighting their effectiveness in training healthcare professionals. The transformation of higher education is being fueled by the rapid growth and innovation in digital technologies and artificial intelligence (AI). Learning management systems like TES BlendSpace, and AI tools such as ChatGPT are now being widely used to assist asynchronous learning, personalized feedback, and innovative teaching strategies [8,10]. Studies that combine flipped classrooms with Artificial Intelligence enhanced voice-over presentations demonstrate an improvement in educational outcomes. Chatbots powered by Artificial Intelligence have been utilized to promote self directed learning, extending beyond academic settings. By combining both, these approaches highlight the potential of flipped classroom and Artificial Intelligence to create dynamic medical education frameworks that are ready for future use [11].

Materials and Methods:

A cross-sectional study was conducted with 100 second-semester B.Sc. Nursing participants at the tertiary care centre. Institutional approval and informed consent were obtained before enrollment. **IEC Approval:Ref. No:** 691/ TSRMMCH&RC/ME-1/2025 - **IEC No:** 107 **Dated:** 08.05.2025. The eligible students were those who were willing to give informed consent and those attending the entire flipped classroom session, but not those absent or partially attended, had previous exposure to similar content through AI or voice-over PPT, or did not have smartphones. A simple randomization was used to divide the participants into two equal groups (n=50). Pre-test was conducted to assess the participants baseline knowledge of the given topic, flipped classroom method, and the use of Artificial Intelligence in their academics schedule. Preliminary session was conducted for both the groups. Group A received instructions regarding use of Voiceover PPT and Group B had a session about the use of ChatGPT. Then each group received their presentation. The presentation was a voice-over PPT in mp4 format for Group A prepared by the principle investigator. While Group B received the same PowerPoint slides with additional ChatGPT prompts to interact regarding the

topic. Each group was divided into five subgroups to conduct in-class discussions. Two subject experts assessed student performance by measuring four criteria: content, clarity, conceptual understanding, and retention capacity. Each subgroup was scored separately using an analytical rubric scoring system. At the end of the session, feedback on learning experiences and interactivity were collected from the students using a Google form.

Sample size calculation:Through flipped teaching, Andargeery et al., (2024) [2] demonstrated that the learning outcomes of nursing education were improved by an average Standard Deviation score of 83.34 for the interventional group. 9.81. For a 90% power and 5% significance level, 40 students were needed per group, and with 10% expected dropouts 50 students were enrolled per group. Data were analyzed using SPSS , IBM version 26.0.

Statistical Analysis:

Data were analyzed using **SPSS (IBM version 26.0)**; continuous data were expressed as mean \pm standard deviation or median with interquartile range depending on distribution. Pre-test and post-test performance scores between the two groups were compared using the **Independent t-test**, while within-group comparisons were done using the **Wilcoxon signed rank test**.Categorical data were presented as **frequencies** and **percentages** and analyzed using the **Chi-square test**, with **p < 0.05** considered statistically significant.

Results :

The pre-test scores for both groups were statistically not significant, with **Group A (Voice-over PPT)** having a mean score of **9.8 (\pm 1.9)** and **Group B (ChatGPT + PPT)** having a mean score of **9.6 (\pm 2.1)**. The p-value was greater than 0.05, confirming there was no significant difference in their baseline knowledge(Table 1). Students have known about the flipped classroom method even though they have not participated in any similar teaching learning session. 95% of the students were unaware of the use of ChatGPT and even the remaining 5% of the students have not used AI tool for their learning purpose.

The Voice-over PPT group demonstrated significantly better performance, with a mean score of **16.4 (\pm 2.0)**, compared to the ChatGPT + PPT group's mean score of **12.2 (\pm 2.3)**. The p-value was more than 0.05, indicating this difference was not statistically significant. (Table 2)

Comparison of Flipped Classroom Method with Voice-over PPT and Artificial Intelligence Tool:A Cross sectional study

A vast majority of students in the Voice-over PPT group found their method effective for learning (89%) and reported improved clarity (86%). In contrast, only 30% of the ChatGPT + voice over PPT group found their method effective and only 42% reported improved clarity. Additionally, 30% of students in Group B reported the AI tool was useful (Table 3).

Students in the AI + PPT group cited several challenges: 20% reported complexity in using the AI tool, 18% experienced lag or internet issues, 14% felt there was a lack of clear instructions, and 12% did not engage with ChatGPT (Table 3).

There was a notable difference in learning preferences. A majority of students in the ChatGPT + voice-over PPT group (62%) preferred group discussions than using a digital tools. The Voice-over PPT group showed a more distributed preference across various teaching learning methods like technology enhanced learning (41%), small group discussion (26%), bidirectional/interactive (16%), and self-directed learning (20%) (Table 5).

Discussion:

The study compared a voice-over PPT method with an AI-assisted (ChatGPT + PPT) method for nursing students. While both groups showed improvement from a similar pre-test baseline (Table 1), Group A achieved a significantly higher performance mean score (16.4 ± 2.0) compared to Group B (AI-assisted) (12.2 ± 2.3) during the in classroom session. This suggests that the structured voice-over PPT approach was more effective for learning among nursing students. These findings are consistent with prior research emphasizing the importance of well-organized, structured content for effective learning. The reason for the difference in performance is likely tied to student perception and usability about digital tools. A large majority of Group A students found their method effective (89%) and reported improved clarity (86%), whereas only a small fraction of Group B students felt the same (30% and 42%, respectively). Students in the AI-assisted group faced significant challenges, including complexity in using the AI tool, internet issues (Table 4). These technical and usability barriers hindered engagement and learning, despite a preference for interactive methods like group discussions. The results highlight that the success of AI in education depends heavily on factors like adequate training, digital literacy, and a robust technical infrastructure, which were not sufficiently

met in this study.

Our results are consistent with **Barranquero-Herbosa et al. (2022)**^[12], who concluded that structured flipped classrooms significantly improve learning in nursing education, and with **Van Alten et al. (2019)**^[13] who demonstrated through meta-analysis that flipped classrooms enhance outcomes and satisfaction when content is well-organized. Similarly, **Suwartono and Furqon (2021)**^[14] emphasized the importance of structured presentation formats for comprehension, aligning with Group A's superior performance. In contrast, studies such as **Namaziandost (2025)**^[15] and **Katona & Gyonyoru**^[16] (2025) reported enhanced engagement and metacognitive awareness when AI was integrated effectively, while **Dung (2024)**^[17] and **Mir et al. (2023)**^[18] showed that AI in education can be beneficial if supported by adequate digital literacy and training. These discrepancies suggest that the success of AI-enhanced flipped classrooms depends heavily on contextual readiness. Limitations of our study include its single-center design, short intervention period, and brief training session for group B. Future directions should include evaluation of long-term retention, and hybrid models combining voice-over PPT clarity with AI interactivity. As **Kohnke et al. (2025)**^[19] highlighted, building AI literacy among educators and learners, along with investment in robust digital infrastructure, will be essential for realizing the full potential of AI in medical education.

Conclusion

Our study findings highlight that structured, accessible formats remain more effective in the current educational context, whereas the integration of AI requires stronger digital infrastructure, user training, and contextual adaptation. The results demonstrate that flipped classrooms are beneficial for nursing education, but the success of AI-enhanced methods depends heavily on contextual readiness.

IEC Approval:

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References:

- [1] Ataei M, Saffarian-Hamedani S, Zamani F. Effective teaching model in continuing medical education programs. Journal of Mazandaran University of Medical Sciences. 2019 Sep 10;29(176):202-7.
- [2] Andargeery SY, Bahri HA, Alhalwani RA,

Comparison of Flipped Classroom Method with Voice-over PPT and Artificial Intelligence Tool:A Cross sectional study

Alahmedi SH, Ali WH. Using a flipped teaching strategy in undergraduate nursing education: Students' perceptions and performance. *BMC Medical Education*. 2024 Aug 26;24(1):926.

[3] Hamadani SS, Zamani F, Ataei M. Effective Methods in Medical Education: From Giving Lecture to Simulation. *specialty journal of psychology and management*. 2018;4(4-2018):9-17.

[4] Zainuddin Z, Perera CJ. Supporting students' self-directed learning in the flipped classroom through the LMS TES BlendSpace. *On the Horizon*. 2018 Nov 26;26(4):281-90.

[5] Baig MI, Yadegaridehkordi E. Flipped classroom in higher education: a systematic literature review and research challenges. *International Journal of Educational Technology in Higher Education*. 2023 Nov 30;20(1):61.

[6] Jeet V, Sahotra P. Active learning through the flipped classroom: Strategies to improve students' learning and performance. *Pakistan Journal of Life and Social Sciences*. 2025;23(1):2395-405.

[7] Sadiq MW, Akhtar MW, Huo C, Zulfiqar S. ChatGPT-powered chatbot as a green evangelist: an innovative path toward sustainable consumerism in E-commerce. *The Service Industries Journal*. 2024 Mar 11;44(3-4):173-217.

[8] Malik AR, Pratiwi Y, Andajani K, Numertayasa IW, Suharti S, Darwis A. Exploring artificial intelligence in academic essay: higher education student's perspective. *International Journal of Educational Research Open*. 2023 Dec 1;5:100296.

[9] Sanchez-Gonzalez M, Terrell M. Flipped classroom with artificial intelligence: Educational effectiveness of combining voice-over presentations and AI. *Cureus*. 2023 Nov 6;15(11).

[10] Salih S, Husain O, Hamdan M, Abdelsalam S, Elshafie H, Motwakel A. Transforming education with AI: A systematic review of ChatGPT's role in learning, academic practices, and institutional adoption. 2025 Mar 1;25:103837.

[11] Haleem A, Javaid M, Qadri MA, Suman R. Understanding the role of digital technologies in

education: A review. *Sustainable operations and computers*. 2022 Jan 1;3:275-85.

[12] Barranquero-Herbosa M, Abajas-Bustillo R, Ortego-Maté C. Effectiveness of flipped classroom in nursing education: A systematic review of systematic and integrative reviews. *International Journal of Nursing Studies*. 2022 Nov 1;135:104327

[13] Van Alten DC, Phielix C, Janssen J, Kester L. Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. *Educational Research Review*. 2019 Nov 1;28:100281.

[14] Suwartono T, Furqon M. Presentation Content Structuredness: How does It Affect the Audience?. *Scientific Journal of Education and Learning*. 2021 Aug 2;5(3):446-54.

[15] Namaziandost E. Integrating Flipped Learning in AI-enhanced Language Learning: Mapping the Effects on Metacognitive Awareness, Writing Development, and Foreign Language Learning Boredom. *Computers and Education: Artificial Intelligence*. 2025 Jul 15:100446.

[16] Katona J, Gyonyoru KI. Integrating AI-based adaptive learning into the flipped classroom model to enhance engagement and learning outcomes. *Computers and Education: Artificial Intelligence*. 2025 Jun 1;8:100392.

[17] Dung LQ. The Effectiveness of the Integration of ChatGPT into Flipped Classrooms from Teachers and Learners Perspectives. *English Language Teaching*. 2024;17(7).

[18] Mir MM, Mir GM, Raina NT, Mir SM, Mir SM, Miskeen E, Alharthi MH, Alamri MM. Application of artificial intelligence in medical education: current scenario and future perspectives. *Journal of advances in medical education & professionalism*. 2023 Jul;11(3):133.

[19] Kohnke L, Zou D, Ou AW, Gu MM. Preparing future educators for AI-enhanced classrooms: Insights into AI literacy and integration. *Computers and Education: Artificial Intelligence*. 2025 Jun 1;8:100398.

Tables:

Table 1. Comparison of Pretest Scores Between Groups

Parameter	Group A (Voice-over PPT) (n=50)	Group B (ChatGPT + PPT) (n=50)	p Value
Pre-test scores (Mean ± SD)	9.8 ± 1.9	9.6 ± 2.1	>0.05

Table 2. Comparison of Performance scores Between Groups

**Comparison of Flipped Classroom Method with Voice-over PPT and Artificial Intelligence Tool:A
Cross sectional study**

	Group A (Voice-over PPT) (n=50)	Group B (ChatGPT + PPT) (n=50)	p Value
Performance score (Mean ± SD)	16.4 ± 2.0	12.2 ± 2.3	>0.05

Table 3. Student Perception of Learning Effectiveness

Table 4. Challenges Reported in Group B (AI + PPT)

Parameter	Group A (n=50) %	Group B (n=50) %
Reported method effective for learning	89	30
Improved clarity/understanding	86	42
Reported AI tool useful	-	30
Reported Issue	Students Affected (n=50)in percentage	
Complexity in use of AI tool	10(20%)	
Lag / internet issues	9(18%)	
Did not engage with ChatGPT	6(12%)	

Table 5. Student Preferences in Teaching-Learning Methods

Preferred Method	Group A, n=50, n(%)	Group B n=50, n(%)
Group discussion	9 (18)	31 (62)
Small group discussion	13 (26)	5 (10)
Bidirectional/interactive	8 (16)	5 (10)
Self-directed learning	10 (20)	4 (8)
Technology enhanced learning	10 (20)	5 (10)