(International Print/Online Journal)

SJIF IMPACT FACTOR: 6.829
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 9, Issue 3, Page No: 371-375
May-June 2026

IJMSCR

Ca- CLIP : Calcium -Clinically Linked Immersive Pedagogy . An Artificial Intelligence Lecture Lesson Plan

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction With the declining attention span of Generation Z learners, traditional lectures requires innovation to remain effective. Artificial Intelligence (AI) offers novel opportunities for designing structured, engaging, and interactive lesson plans. Ca-CLIP (Calcium – Clinically Linked Immersive Pedagogy) was conceptualized as an AI-assisted lecture lesson plan to enhance student engagement and learning. This study aimed to implement Ca-CLIP and evaluate students' perceptions of its effectiveness.

Materials and Methods A lecture was scheduled at 8:00 am for first year MBBS students.An AI-generated lesson plan was developed using ChatGPT through structured prompts to create an interactive, time-bound session incorporating clinical case scenarios, quizzes, and activities. Following the session, students' perceptions was collected using a 5-point Likert scale (1–5) assessing Content, Comprehension, Clinical Relevance, Communication, and Continuation. An open-ended question was included to obtain qualitative feedback. Descriptive statistical analysis was performed using Jamovi software, and thematic analysis was applied to the qualitative responses.

ResultsThe overall mean perception score was 4.66, with a mode of 5, indicating high student satisfaction. Among the evaluated domains, Communication received the highest mean score (4.77), followed by Content (4.72) and Continuation (4.71). Qualitative feedback revealed interesting themes

ConclusionThe AI-assisted Ca-CLIP lesson plan was well received by students . Incorporating AI tools in lesson planning can enhance interactivity, clinical relevance, and learner engagement for contemporary medical education.

Keywords: Artificial Intelligence, Lesson plan, Medical education ,Students

Introduction

Lesson plans are structured outlines that enhance clarity, focus and learning engagement in medical education. A lesson plan is a structured document that outlines the objectives, content, instructional methods, resources and assessment strategies for a particular teaching session[1]. It serves as a roadmap for educators, ensuring that learning goals are systematically addressed, classroom activities are organized and student learning is effectively monitored. Medical educator who adopts systematic planning have been reported to experience higher level of confidence and instructional efficiency, thereby fostering improved academic achievement among learners. A well-structured lesson plan promotes clarity, consistency and efficiency in the delivery of educational content. They assist instructors in maintaining focus, adhering to time constraints and cooperating with active learning strategies[2]. Student perception is crucial, as it

directly influences teaching methods, levels of participation and overall learning efficacy. Understanding how students view the role of lesson plans in enhancing their educational experience may offer valuable insights for curriculum development, faculty training and structural design. A medical teacher makes himself or herself more organized to attain the highest level of learning outcomes. As per "Oxford Languages," a lesson plan means "*a teacher's plan for teaching an individual lesson*.It has the following components 1. Set induction 2.Framing specific learning objectives 3. Building an introduction 4. Assessment to check if students understand or not.5.Summary of the whole class 6. Timeline needs to be maintained.The teacher should keep the plan of teaching ready in his/her mind or preferably in a physical medium (i.e., in the diary, electronic media)[3].

Artificial Intelligence (AI) is revolutionizing lesson planning, enabling educators to create vibrant, engaging, and tailored learning environments. This technology acts as a powerful tool, transforming the traditional approaches of lesson design and execution[4] . Artificial Intelligence (AI) offers novel opportunities for designing structured, engaging, and interactive lesson plans Chat GPT is the most favoured and widely used AI tool that is easy to comprehend , quick and user friendly[5]. Ca-CLIP (Calcium – Clinically Linked Immersive Pedagogy) was conceptualized as an AI-assisted lecture lesson plan to enhance student engagement and learning. Student perception is crucial, as it directly influences teaching methods, levels of participation and overall learning efficacy This study aimed to implement Ca-CLIP and evaluate students' perceptions of its effectiveness.

Materials and methods

A Biochemistry lecture was scheduled at 8:00 am for first year MBBS students and the topic was Calcium metabolism. As alignment is judiciously implemented in the curriculum , Physiology classes on Calcium was completed the previous day. It was important to complete the biochemical aspects of the topic ,keeping in mind to avoid repetition .Student engagement was vital as it was a first hour lecture class. An AI-generated lesson plan was developed using Chat GPT through structured prompts indicated by asterix as follows .

*Create a lesson plan for one hour lecture for first MBBS students on Calcium metabolism in Biochemistry.

Within few seconds a structured template with an appropriate headings namely Theme,content, method to be followed and the appropriate time to be taken was generated.as shown in table 1.

Table 1- AI generated structured template

Time	Theme	Content	Method
0-5min	Introduction and Motivation	Clinical case	Pre class MCQ questions discussion
5-15min	Concept building	Distribution,Absorption ,functions	Interactive lecture with diagrams, flow chart
15-20min	Recap and Recall	Taught content	Quiz based activity
20-35min	Regulation	PTH,Vitamin D,Calcitonin actions on bone, kidney, intestine	Diagrammatic teaching, Role play
35-45min	Clinical correlation	Hypo and hypercalcemia	Case snippets
45-55min	Active learning	Peer discussion	Think,pair,share

A suggestion was asked to the author by Chat GPT at the end of the tabular column

Do you want an apt title for this lesson plan .

The prompt written by the author was *Yes

A title was given which read as follows.

Ca-CLIP :Clinically Linked Immersive Pedagogy .

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This statement was followed by a suggestion

Do you want to know students perception on the class .

The author replied with the prompt *Yes ,based on clinical relevance .

The AI tool was quick to respond with the reply

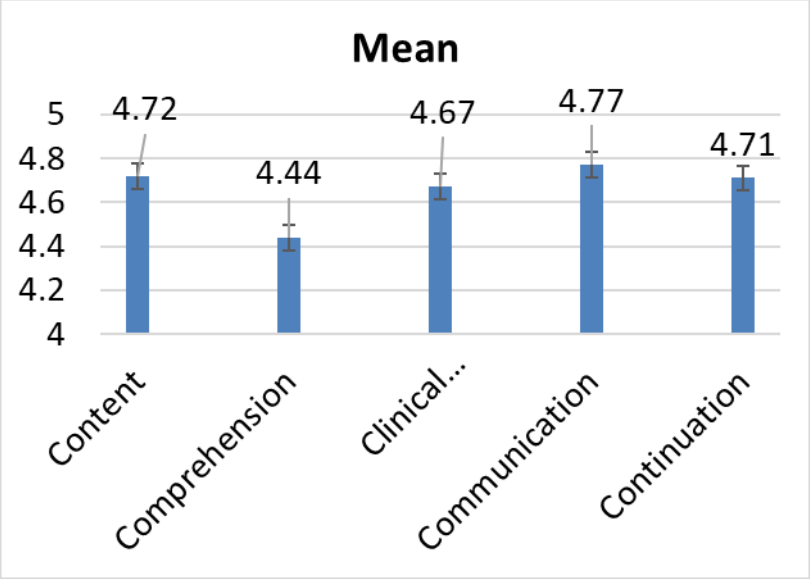
Content, Communication, Clinical relevance on a Likert score of 1 to 5 .

With the AI generated lesson plan the author created an interactive lecture on Calcium metabolism .It included time bound sessions incorporating clinical case scenarios ,quizzes and activities . Following the session, students' perceptions was collected using a 5-point Likert scale (1–5) assessing Content, Comprehension, Clinical Relevance, as suggested by Chat GPT. Communication by the teacher , and Continuation of similar classes was added . Thus the students perceptions were obtained after informed consent based on 5 domains all starting with C namely Content ,Comprehension ,Clinical relevance, Communication ,Continuation .An open-ended question was included to obtain qualitative feedback.

Results

Out of 148 students who attended the class , perceptions were obtained from 130 students giving a response rate of 87% . Descriptive statistical analysis was performed using Jamovi software. The mean for the different domains is represented in fig 1 . The overall mean perception score was 4.66, with a mode of 5, indicating high student satisfaction .Among the evaluated domains, Communication received the highest mean score (4.77), followed by Content (4.72) and Continuation of similar classes (4.71).

Fig 1



The answers to the open ended questions were obtained from 100 students . A thematic analysis was applied to the qualitative responses. It revealed the following themes .

a.Interesting and interactive class b. Paid attention and understood the concept c. Want more classes like this d. Madam can you share the slides of the class .

Discussion

Lesson planning is an essential tool to direct and achieve the goal of teaching. A medical teacher makes himself or herself more organized to attain the highest level of learning outcomes [3,5]. Surveys and interviews with educators in previous studies revealed that AI tools significantly reduce teacher workloads, enhance lesson quality, and increase student engagement. While designing a lesson plan it is important to remember these five elements namely context, objective, constraints, differentiation and output format [6] .The year of study, topic ,prior knowledge and any misconceptions need to be included in context. The specific learning outcome with reference needs to be included for objective. The lesson duration ,

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resources ,types of activities planned are the highlight of constraints .Specific Learners needs and ability range helps to differentiate among the students and accordingly pace the topic during a lecture. A final structured format of lesson plan will be the output.

The use of AI in medical education is widespread in several Western countries, and this needs to be advocated in developing countries, too. AI in medical education offers numerous potential benefits, including improved curriculum design and evaluation and the ability to implement innovative educational methods in clinical settings, providing innovative, efficient, and cost effective solutions and leading to the promotion and acceleration of student education[7] . AI can perform formative and summative assessment processes with less time cost and also by providing feedback to students. AI into medical education allows for distance learning and makes medical education more accessible in remote areas [8] .However financial resource limitation is one of the challenges. The potential of AI to improve the quality of education is acknowledged, although experts have concerns regarding its widespread adoption in medical education due to the potential for increased cheating and plagiarism.

The contributions elaborated mainly or solely by medical students strongly call for the inclusion of AI education in medical curricula. The use of AI-assisted learning was a common theme in teaching visually oriented subjects such as anatomy, histopathology, radiologic image interpretation, and fundoscopic examination. AI served as a personalized feedback tool via automated assessment systems.AI can be used for most of the subjects of medicine in different ways. In Anatomy for Virtual Dissection ,in Physiology for evaluation of test questionnaires ,in Radiology for assisting medical imaging ,in most of the surgical subjects like Ophthalmology and Gynaecology [9] .In Biochemistry ChatGPT can be used as a self learning tool. AI has been explored as a personalized learning tool in flipped class rooms within the basic sciences. AI can enhance teaching materials by creating slides, generating images for learning, or writing case vignettes. Flipped classroom models were also described, where students reviewed theoretical material independently and class time was used for active engagement, allowing students to apply learned concepts and develop higher-order clinical skills with faculty guidance.

In this study it is clear that using AI for framing the lesson plan helped the lecture to be more organized and interactive . The students perception was there is better communication, comprehension and interaction with such a lesson plan. The students comments that more similar classes were needed was encouraging to the author .Clinical cases preparation ,assessment questionnaires were more structured using the AI tool. In medical biochemistry, while ChatGPT was overall found to be a helpful knowledgeable tool, some content quality and answer accuracy needed improvement.

Adequately preparing faculty through targeted training is crucial for fostering effective educational practices and promoting the broader adoption of AI-based methods. The growth of AI tools, presents both opportunities and challenges. There are increasing calls to ensure that medical students and faculty are trained on how to use AI[10].

Conclusion

The Artificial Intelligence AI –assisted Ca-CLIP : Calcium –Clinically Linked Immersive Pedagogy lesson plan was well received by students. Incorporating AI tools in lesson planning can enhance interactivity, clinical relevance and learner engagement for contemporary medical education

References:

1. Agrawal P, Singhal A, Banu N, Saxena A, Singh S, Chandra S, Shefali I, Srivastava A. Pre-Lecture Lesson Plans and Learning: insights from Undergraduate Medical Students (PLP-UMS). *BMC Med Educ*. 2025 Nov 14;25(1):1601. doi: 10.1186/s12909-025-08144-0. PMID: 41239293; PMCID: PMC12619165
2. Samuel S. How to design a comprehensive lesson plan. *MedEdPublish* 2014;3:1 8
3. Pal D, Taywade M, Alekhya G. Designing a comprehensive lesson plan: A crucial aspect in improving the teaching learning process. *Curr Med Issues* 2022;20:48 51.
4. Tambi R, Bayoumi R, Lansberg P, Banerjee Y. Blending Gagne's instructional model with Peyton's approach to design an introductory bioinformatics lesson plan for medical students:

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Proof of concept study. *JMIR Med Educ* 2018;4:e11122.
5. Belloula, S. (2025). Empowering educators: Leveraging AI to revolutionize lesson planning. *International Journal of Research in Education and Science (IJRES)*, 11(2), 264-280. https://doi.org/10.46328/ijres.1295
6. Nerli RB, Ghagane SC. Artificial intelligence in medical education. *J Sci Soc* 2025;52:103 4.
7. Simoni et al. BMC Medical Education (2025) 25:1609
8. Narayanan S, Ramakrishnan R, Durairaj E, Das A. Artificial intelligence revolutionizing the field of medical education. *Cureus*. 2023;15:e49604. https://doi.org/10.7759/cureus.49604
9. Lee J, Wu AS, Li D, Kulasegaram KM. Artificial intelligence in undergraduate medical education: A scoping review. *Acad Med*. 2021;96:S62–70.
10. Gordon M, Daniel M, Ajiboye A, Uraiby H, Xu NY, Bartlett R, et al. A scoping review of artificial intelligence in medical education: BEME guide 84. *Med Teach*. 2024;46:446–70.
11. Sallam M, Salim NA, Barakat M, Al-Mahzoum K, Al-Tammemi AB, Malaeb D, et al. Assessing health students' attitudes and usage of ChatGPT in jordan: validation study. *JMIR Med Educ*. 2023;9:e48254.
12. Abouammoh N, Alhasan K, Raina R, Malki KA, Aljamaan F, Tamimi I et al. Exploring perceptions and experiences of ChatGPT in medical education: A qualitative study among medical college faculty and students in Saudi Arabia. medRxiv. 2023
13. Kansal R, Bawa A, Bansal A, Trehan S, Goyal K, Goyal N, et al. Differences in knowledge and perspectives on the usage of artificial intelligence among doctors and medical students of a developing country: A cross sectional study. *Cureus* 2022;14:e21434
14. Ahmed Z, Bhinder KK, Tariq A, Tahir MJ, Mehmood Q, Tabassum MS, et al. Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross sectional online survey. *Ann Med Surg (Lond)* 2022;76:103493.
15. Zarei M, Mamaghani HE, Abbasi A, Hosseini MS. Application of artificial intelligence in medical education: a review of benefits, challenges, and solutions. *Medicina Clínica Practica* 2024;7:100422.
16. Batmanabane G. Linking lesson plan to teaching learning principles. *Ann SBV* 2013;2:1 2.
17. Milkova S. Strategies for effective lesson planning. Center for Research on learning and Teaching. 2012;1(1):1 29.

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