Leveraging GPTutor in a Flipped Learning Activity to Improve Student Engagement

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Abstract

Student engagement with lecture content can be significantly enhanced through effective pre-class preparation. Traditionally, students often lack motivation to read assigned materials before attending class, which can hinder meaningful participation in discussions. To address this challenge, a flipped learning activity leveraging GPTutor, a generative AI chatbot, was introduced at a business school in Hong Kong. This innovative approach enables students to interact with the chatbot anytime and anywhere, allowing them to clarify concepts prior to class, thereby fostering a more active learning environment. A pilot test of this approach was conducted during the 2024–2025 academic year. Students were instructed to use GPTutor to review lecture topics and complete multiple-choice questions before class. The goal was to help students develop a foundational understanding of the content, enabling class time could be devoted to more interactive and meaningful discussions. Data were collected in December 2024 to assess students' perceived motivation towards using GPTutor, their enjoyment of the activity, and overall satisfaction with the flipped classroom model. Regression analysis was conducted to examine the relationships among these variables. Results showed that motivation to use GPTutor significant predicted enjoyment of the flipped learning activity, which contributed to high overall satisfaction. Findings from this pilot study indicate that GPTutor can serve as an effective learning platform for implementing innovative pre-class and post-class activities, enhancing student learning experiences and complementing the traditional lecture mode. This approach may offer potential benefits for wider adoption in future educational settings.

Keywords: flipped learning, GPTutor, higher education, student engagement

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Introduction

In higher education, instructors typically provide reading materials and encourage students to review them before class to ensure they gain a foundational understanding of the lecture content. This preparation allows students to engage more effectively in class discussions, particularly in universities that adopt a flipped classroom model. However, it is widely recognized that many students do not study the materials in advance, which can hinder the learning climate developed for an interactive classroom.

To address this challenge, a university in Hong Kong has adopted a Generative AI-powered platform, GPTutor, to serve as a supportive learning partner for students. A primary feature is the document chatbot, which allows students to ask questions about course materials uploaded by their instructors. The AI then answers these questions based on the relevant information found within the uploaded contents. Students can further explore the content using conversational prompts. This innovative approach enables students to interact with the chatbot anytime and anywhere, allowing them to clarify concepts prior to class, thereby fostering a more active learning environment both beyond and within the class time (Ko, 2025).

Prior to the full-scale implementation of the flipped learning model and the integration of GPTutor as a pedagogical tool, this pilot study examines student motivation, perceived enjoyment, and overall satisfaction with the flipped learning activities. The findings provide insights into enhancing student engagement with lecture content. By leveraging these results, instructors can design more effective and meaningful flipped learning interventions that foster proactive pre-class preparation. If the pilot proves successful, the model will be scaled across various subjects to evaluate its long-term institutional viability.

Literature Review

Flipped Learning

The flipped classroom has been widely adopted as an educational approach where reverses traditional instructional methods. In a traditional, didactic classroom, students passively listen to lectures was often deemed ineffective for long-term knowledge retention. In contrast, the flipped approach allows students to acquire foundational concepts independently before class, such as reading case studies, watching videos, or interacting with an AI tool like GPTutor. Class time is then dedicated to active learning activities such as discussions, problem-solving, and debates, with the instructor serving as a facilitator. While flipped learning may not be embraced by all students, it offers advantages for self-paced learning. For example, slower-paced learners can pause, rewind, or ask AI chatbot the same question multiple times without feeling embarrassed. By ensuring students know the basics before class starts, instructors can avoid basic lectures and focus instead on deeper, interactive learning.

GPTutor

In the realm of educational technology, instructors can leverage various tools to design pedagogical models that support flipped learning. At a university in Hong Kong, GPTutor, a Generative AI-powered learning platform, is utilized to enhance the student experience through self-directed learning (Bai et al., 2025; GPTutor, 2026; Lui et al., 2024). The platform offers features such as AI-generated summaries and automated responses based on lecture materials uploaded by instructors. By enabling students to initiate conversations, GPTutor encourages

them to actively explore course content and engage in deeper thematic inquiry. Additionally, the platform provides review questions to assess student knowledge and identify areas for improvement, while generating learning analytics to help instructors track progress. To examine how AI chatbots can enhance student learning and motivate them in self-directed, active learning, this pilot study adopted the chatbot feature of GPTutor.

Methodology

This study employed a quantitative research design to evaluate student engagement within a flipped classroom model. Data collection took place during the 2024–2025 academic year at a business school in the Hong Kong Special Administrative Region. The study targeted a sample of 146 students, comprising both undergraduate and postgraduate cohorts.

The instructional design required students to participate in a pre-class flipped learning activity utilizing GPTutor as their learning partner. Students were provided a two-week window prior to the in-class session to review assigned lecture topics at their own pace and complete a multiple-choice assessment. The primary objective of this intervention was to establish a foundational understanding of the course material, targeting lower-order cognitive skills. By mastering these fundamentals independently, students could then engage in a more interactive and high-order in-class discussions. Following the completion of the AI-supported pre-class tasks and the subsequent flipped classroom session, participants were invited to complete a survey.

Measurement Items

The survey instrument was designed to assess three key dimensions: students' perceived motivation toward using GPTutor, their level of perceived enjoyment during the activity, and their overall satisfaction with the flipped classroom activities. All items were measured in a five-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").

Perceived Motivation was assessed using a three-item scale adapted from Intrinsic Motivation Inventory (Bosch, 2024). The items included "I felt motivated to learn about GPTutor", "I felt motivated by the incentives to use GPTutor in this flipped learning activity", and "I felt motivated to learn new technologies such as GPTutor".

Perceived Enjoyment during the flipped learning activity was adapted from the "Positive Enjoyment Scale" (Fuentesal-Garcia et al., 2019). Three relevant items were included, namely "The activity was pleasurable to me", "Replacing lecture by this activity was fun", and "The activity made me feel good".

Overall Satisfaction with the flipped learning activity was measured by three statements namely "In general, replacing the lecture by this flipped learning activity is good", "In general, using flipped learning activity during mid-term period is good", and "In general, I am satisfied with this flipped learning activity".

Results

101 valid responses (68%) were obtained and used for subsequent analysis. Statistical analysis was performed using SPSS version 29.0. The reliability of the measurement instrument was first confirmed through Cronbach's alpha. Cronbach's alpha is a coefficient of internal

consistency that indicates how closely related a set of items are as a group; values range from 0 to 1, with higher values reflecting greater reliability of the scale. Subsequently, regression analysis was utilized to determine the predictive power of the independent variables.

Internal Consistency Analysis

As shown in Table 1, the internal consistency analysis revealed that all measurement scales exhibited acceptable to good reliability, with Cronbach's alpha coefficients exceeding the recommended thresholds of 0.70. Specifically, "Overall Satisfaction with Flipped Learning" yielded a high Cronbach's alpha value ($\alpha = .842$), suggesting that the items consistently capture the intended latent construct. "Perceived Motivation towards GPTutor" and "Perceived Enjoyment" also exhibited robust reliability ($\alpha = .804$ and .785, respectively), thereby validating their use in subsequent statistical analyses.

Table 1
Internal Consistency

Construct	Cronbach's α
Perceived Motivation towards using GPTutor	0.804
Perceived Enjoyment	0.785
Overall Satisfaction with Flipped Learning	0.842

Flipped Learning Activity

A series of linear regression analyses was conducted to evaluate the proposed flipped learning model using post-lesson data. First, perceived motivation toward GPTutor (Table 2) was found to be a significant predictor of perceived enjoyment during the flipped learning activity, $R^2 = .459$, $F(1, 99) = 83.98$, $p < .001$. The regression coefficient was positive and substantial ($B = 0.710$, $\beta = 0.677$, $p < .001$), indicating that students with higher motivation to use GPTutor reported greater enjoyment of the GPTutor platform.

Table 2
Regression Analysis Predicting Perceived Enjoyment

Predictor	B	SE	β	t	p
Perceived Motivation (GPTutor)	0.710	0.077	0.677	9.16	.000

Note. Model fit: $R = .677$, $R^2 = .459$, Adjusted $R^2 = .454$, $F(1, 99) = 83.98$, $p < .001$.

As presented in Table 3 below, enjoyment of the activity strongly predicted overall satisfaction with the flipped learning arrangement, $R^2 = .407$, $F(1, 99) = 68.00$, $p < .001$. Perceived enjoyment exerted a significant positive effect ($B = 0.715$, $\beta = 0.638$, $p < .001$), suggesting that the affective experience during the activity is a key determinant of students' satisfaction with the flipped approach overall.

Table 3

Regression Predicting Overall Satisfaction With Flipped Learning

Predictor	B	SE	β	t	p
Perceived Enjoyment	0.715	0.087	0.638	8.25	.000

Note. Model fit: $R = .638$, $R^2 = .407$, Adjusted $R^2 = .401$, $F(1, 99) = 68.00$, $p < .001$.

Discussion

The regression analysis examined the relationships among the three variables. The findings revealed that student motivation toward GPTutor was a significant predictor of perceived enjoyment, which subsequently contributed to high overall satisfaction with the flipped learning activity.

Based on the findings, to enhance overall student satisfaction within the flipped learning framework is essential. Drawing on the Adult Learning Theory, learners must understand the "why" behind a new task. In this study context, the rationale for using GPTutor should be well-explained. Organizing a structured pre-task orientation to showcase the tool's functionality and its value to their learning outcomes can bridge the expectation gap. Furthermore, extrinsic motivators, such as bonus marks, for the successful completion of the multiple-choice questions, may further encourage their participation and engagement level.

Lastly, instructors should leverage the usage analytics in the GPTutor platform and the results from pre-class multiple-choice questions to pivot their in-class instruction. By identifying common misconceptions before the session begins, instructors can address specific knowledge gaps in a timely manner. This shift fosters greater student engagement and optimizes classroom time for higher-order learning activities.

Conclusion

Findings from this pilot study indicate that GPTutor's chatbot feature can serve as an effective platform for pre-class flipped learning. Specifically, the chatbot provides a low-stakes environment where hesitant or shy students can ask questions without the fear of embarrassment. By complementing traditional lectures, this approach not only enhances the student learning experience but also fosters self-directed learning motivation. Consequently, these results offer promising implications for wider adoption in future educational settings. Furthermore, in the emerging era of AI in education, GPTutor's other features, such as flashcards, review questions, and role-play simulations, warrant further exploration across various disciplines as viable learning tools for adaptive, self-paced learning.

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the sample size was relatively small and limited to a single business school in the Hong Kong. Second, due to the pilot and cross-sectional nature, data were collected at a single point in time, suggesting instructors should exercise caution in interpreting the findings. To build upon these findings, future studies should validate these results using larger and more diverse samples across different faculties and partnering universities.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that GenAI (via PolyU), an AI-assisted writing software was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that no other AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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