TRANSFORMING STUDENT CLASSROOM PREPARATION WITH GPTUTOR: INSIGHTS ON CRAFTING FLIPPED LEARNING MATERIALS

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Abstract

The flipped classroom model in higher education empowers instructors to transform class time into a dynamic environment that fosters meaningful student interaction and knowledge retention. Within this model, the use of case studies is particularly impactful, immersing students in real-world problems and cultivating higher-order thinking skills through engaging discussions. The rise of open-access platforms in educational technology presents exciting opportunities for instructors to innovate pedagogical models and achieve learning outcomes with greater effectiveness and creativity.

This study examines the use of GPTutor, a generative AI-powered chatbot, to enhance the flipped classroom experience. GPTutor offers a self-directed, personalized learning journey, enabling students to ask subject-related questions anytime, anywhere as if they had a personal tutor by their side. Qualitative feedback from business students in Hong Kong shows enthusiasm for using the platform, including for exam revision. Building on this positive reception, the study further investigates which learning materials can be integrated into this approach and how. By exploring students' perceptions of leveraging this technology to deepen their understanding of the subject matter, the study provides insights into creating pre-class and post-class resources that support flipped learning approaches. This study opens up further discussion for educators eager to integrate GPTutor into their teaching strategies, ultimately enhancing student engagement and enriching learning outcomes.

Keywords: Active learning, Chatbots, Flipped learning, GPTutor, Student-centered learning.

1 INTRODUCTION

In the rapidly evolving landscape of higher education, technological advancements are reshaping traditional teaching methods and offering students novel learning opportunities. Among these innovations, the flipped classroom model [1] has gained prominence for its ability to enhance higher-order thinking skills through interactive discussions, such as case study methods. The expansion of open-access platforms in educational technology presents instructors with exciting opportunities to innovate and develop pedagogical models that effectively achieve learning outcomes. However, there is no one-size-fits-all platform; therefore, it is essential to evaluate the effectiveness of these applications by gathering user feedback and continually making improvements.

This study examines the implementation of GPTutor as a tool for students' class preparation. The rationale for adopting GPTutor lies in its function as a personalized, self-directed learning platform. GPTutor enables students to ask subject-related questions anytime and anywhere, simulating the presence of a personal tutor. Unlike other AI chatbots, GPTutor offers controlled access to course-specific content. At the university featured in this study, instructors can upload course materials to an asset library and create tailored learning modules. A key feature of GPTutor is its ability to generate summaries. When students pose questions, GPTutor retrieves relevant learning materials, allowing generative AI models to provide accurate answers and starter questions, thereby promoting student engagement and exploration of learning materials. Additionally, the feature of suggested follow-up questions can encourage deeper exploration, fostering a comprehensive understanding. This enables students to engage in self-directed learning and explore course content at their own pace.

In the study context, a central topic is the comparison of traditional and technology-based training methods. To provide a non-didactic learning experience, students were given the opportunity to explore GPTutor as a technology-based training tool, simulating its application in corporate training programs. This experiential approach allows students to experience the platform's capabilities firsthand. Mid-semester, after covering foundational topics such as training needs analysis and training program design, students were tasked with independently exploring this topic. Students received a briefing and access to a dummy course to familiarize themselves with GPTutor's features. Over a two-week period, students engaged in self-directed learning, with progress monitored and bonus marks awarded for successful completion.

From a flipped learning perspective, GPTutor can streamline the preparation process for instructors as PowerPoint presentations and relevant readings can be easily uploaded. The learning outcomes of this trial activity include: (a) understanding the functionality of GPTutor and its effectiveness in facilitating self-directed learning, and (b) applying the learning experience to design blended learning approaches in the future.

2   METHODOLOGY

In the first semester of 2024, a self-administered survey was conducted among management students in Hong Kong enrolled in a human resources development course. The aim was to gather initial feedback on their experiences using GPTutor as a flipped learning tool, incorporating learning materials such as PowerPoint slides and readings. A total of 46 postgraduate students participated, sharing their likes and concerns about GPTutor. Given the positive feedback received from the majority of students, another trial activity was conducted with undergraduate students. The qualitative data from open-ended responses underwent initial coding to identify recurring patterns and insights. During data analysis, key themes and categories were developed to capture the core aspects of student feedback. This thematic analysis highlighted their concerns and positive aspects of GPTutor collectively, providing an understanding of the students' experiences and perceptions.

3   RESULTS

Fourteen areas were identified based on students' positive feedback and concerns for improvements (see Table 1). With regard to the positive comments, students appreciated the summary feature and suggested that all PowerPoint slides be uploaded to facilitate exam revision. Moreover, some students expressed a desire for all courses to include a GPTutor asset library, emphasizing the perceived value of having comprehensive resources readily available. Instructors might consider expanding the application to better meet these expectations, thereby maximizing its learning impact on students.

Table 1. Students' Comments.

Category	Positive Aspects	Concerns for Improvements
Human interaction	Interactive, wide range of topics, personalized engagement	Not like real people, lacks emotion, mechanical, no interaction
User interface	Easy to use, clear answers	Interface issues, data loss on homepage return, not adaptable
Idea generation	Helps brainstorm, gives immediate response	No inspiration gained
Summarization	Summarizes articles/videos, instant Q&A	Sometimes too general, not in-depth, misses key information
Consistency	Consistent answers, allows return anytime	Answers vary, not always reliable
Generalization	Human-like text, broad topic coverage	Too general, not specific enough
Planning	Helps organize thinking, structured suggestions	Limits critical thinking, over-reliance my reduce self-thinking
Time efficiency	Saves time by summarizing important concepts	Generating time is slow
Convenience	Quick, precise, helps find main points	Speed is slow, long response time
Speed	Fast response, quick summarization	Speed is slow, not that fast
Usefulness	Very innovative	Lacks visual or interactive features, cannot highlight text, lacks visual aids
Learning autonomy	Personalized learning pace and style	Cannot upload own materials freely
Trust and privacy	---	Concerns about data misuse, privacy, plagiarism, AI bias
Database and accuracy	---	Outdated information, limited database

While majority of the positive feedback came from postgraduate students, undergraduate students expressed a more balanced mix of positive and negative comments. The analysis of concerns and negative comments also revealed that students have specific expectations when using GPTutor, often comparing it to their experiences with ChatGPT or similar tools. This underscores the importance of clearly communicating the specific functions and limitations of GPTutor to students.

The above variation suggests different expectations and experiences across educational levels. The concerns raised by students will also be thoroughly reviewed in collaboration with the subsequent provider. Further qualitative interviews could be conducted and focus on student-centric enhancements, helping tailor the tool to better meet the diverse needs of both undergraduate and postgraduate students.

Table 2 provides an overview of the themes and dimensions identified in the study.

Table 2. Themes and categories.

Theme	Dimension
User Experience and Interface	Ease of Use Clear Answers Interactive Personalized Learning Pace Personalized Educational Experience Adaptable Interface
Functionality and Performance	Summarization Instant Question and Answer Quick and Precise Responses Helps Find Main Points Fast Response Saves Time Consistent Answers Innovative Helps Brainstorm Ideas
Cognitive Support and Learning	Organizes Thinking Structured Suggestions Personalized Feedback Supports Planning Helps Brainstorm Encourages Individual Learning
Trust and Privacy	Trustworthiness Privacy Concerns Plagiarism AI Bias and Fairness Reliable system

In light of the identified themes, a set of 27 preliminary statement items categorized under four dimensions was developed. Table 3 lists these statement items, serving as an initial framework for subsequent empirical investigations.

Table 3. Preliminary Statement Items.

Dimensions	Preliminary Statement Items
User Experience and Interface	I find the system (GPTutor) easy to use. I find the answers generated by the system is clear. I find the system interactive. I find the system supports my personalized learning pace. I find the system provides a highly personalized educational experience. I find the system interface adaptable.
Functionality and Performance	I find the system effectively summarizes articles. I find the system provides instant answers. I find the system provides quick responses. I find the system provides precise responses. I find the system helps me find main points. I find the system responds quickly. I find the system saves me time. I find the system provides consistent answers. I find the system innovative. I find the system helps me brainstorm ideas.
Cognitive Support and Learning	I find the system helps organize my thinking. I find the system provides structured suggestions. I find the system provides personalized feedback. I find the system supports my planning. I find the system helps me brainstorm. I find the system encourages individual learning.
Trust and Privacy	I trust the system. I have privacy concerns about the system. I am concerned about plagiarism with the system. I am concerned about AI bias with the system. I find the system reliable.

4   CONCLUSIONS

This study offers insights into crafting flipped learning materials by examining students' experiences with class preparation in a flipped learning environment. Through an experiential learning approach, students engage and immerse themselves in the role of a learner using GPTutor. This not only enhances their understanding of the platform but also allows them to acquire valuable subject knowledge applicable to designing tech-based training programs for corporate employees. This hands-on learning approach effectively equips students with the skills necessary for developing corporate training solutions, bridging the gap between academic learning and practical application in professional settings.

Furthermore, the study highlighted the importance of readiness to learn, as some students need to improve their skills in crafting effective prompts. This finding emphasizes that instructional designers should not assume students inherently know how to formulate prompts. Refining prompts and asking questions are integral to cognitive learning, fostering critical thinking and higher-order thinking skills. Additionally, motivation plays a key role in student engagement. Offering incentives such as bonus marks or other forms of recognition can enhance motivation and encourage active participation, driving students to engage more deeply with the material.

Implementing a flipped classroom model with GPTutor maximizes class time for deeper discussions, enhancing knowledge retention and application. GPTutor allows students to engage with material anytime, catering to individual learning needs. While preparing learning materials can be time-consuming, GPTutor helps reduce preparation time by uploading existing data. Regularly updating the database ensures it remains a valuable asset library. Overall, this learning modality has been well-received and holds promise for continued improvement. By addressing both logistical and pedagogical aspects, educators can create an efficient learning environment that benefits students and instructors.

4.1 Limitations

One of the primary limitations of this study is the relatively small sample size, which consisted of a limited number of students. Moreover, to enhance the richness and depth of the data, future research could incorporate in-depth interviews as a follow-up to the initial survey. Conducting these interviews would allow for a more comprehensive exploration of the themes and comments identified in the open-ended responses, providing a deeper understanding of the students' perspectives.

ACKNOWLEDGEMENTS

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