

LLM-based GPT Chatbot on Reading Engagement of the Flipped Classroom

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Abstract

A significant challenge to the effectiveness and efficiency of the flipped classroom, particularly in higher education, is the lack of preparation in the pre-class activities, especially concerning pre-assigned reading. Researchers contend that existing studies have not delved deeply enough into the fundamental reasons for this low engagement, nor have they connected it with learners' motivation and engagement levels. This research aims to employ a qualitative research approach to investigate the challenges learners face when reading materials assigned by tutors before the flipped classroom sessions and its impact on learners' motivation and engagement. This investigation seeks to offer a fresh perspective on the potential of LLM-based GPT Chatbot in enhancing learner engagement. To achieve this goal, an online survey, testing with the GPT-Chatbot, and follow-up semi-structured interviews were employed. A total of 11 students and 4 module leaders participated in the semi-structured interviews. The research identified four types of challenges and four constructs related to engagement. These findings suggest that most students and tutors hold a positive attitude toward the application of GPT-Chatbot in addressing the issue of low reading engagement in the flipped classroom. Based on these results, implications for researchers, course designers, and education practitioners are presented and discussed.

Keywords: flipped classroom, challenges, reading motivation, reading engagement, LLM, ChatGPT

Introduction

As the new generation of students has grown increasingly accustomed to using the Internet as a primary source of information (Lage et al., 2000), the traditional lecture-style dissemination of course information may not resonate well with students, leading to a need for more engaging and student-centered approaches, such as the flipped classroom model. The flipped classroom model involves teachers providing learning resources such as reading materials, recorded lectures, or other interactive learning tasks (Jensen et al., 2018) before class, thus freeing up in-class time for active group learning activities, such as project-based learning and collaborative problem-solving.

Despite the benefits, there are significant challenges in the implementation of the flipped classroom, particularly concerning pre-assigned

reading for international students registering for an interdisciplinary programme. They encounter difficulties in engaging with the required readings effectively. This low engagement hampers the overall efficiency and effectiveness of the flipped mode.

The launch of the AI-powered chatbot, ChatGPT, by OpenAI prompts us to consider whether leveraging this chatbot intervention could serve as a novel solution to enhance engagement with pre-assigned readings in the flipped classroom. As follows, this article will first review the existing literature and present three research questions. Following the introduction of the research methods, the findings, discussions, and impacts will be explained in sequence.

Literature Review

The flipped classroom, also known as inverted classrooms, means "events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa." (Lage et al., 2000). As Bishop and Verleger (2013) proposed, the flipped classroom is an educational technique consisting of two parts: interactive group learning activities inside the classroom and direct computer-based individual instruction outside the classroom, including providing e-version reading materials.

For interdisciplinary MA programmes, this model holds promise. Students in interdisciplinary programs come from varied academic backgrounds, which means they may have different value bases and ways of thinking (Kinnair et al., 2014), making it crucial for pre-class materials to be rich and varied (Newswander & Borrego, 2009). Therefore, considering the features of multi-disciplinary education and the importance of academic reading in higher education (Brewerton, 2014; Edwards-Waller, 2009), the flipped model is very suitable for students from these programmes.

However, this model presents a set of unique challenges for students, especially during the pre-class stage when students usually study alone. First, Individuals from diverse socioeconomic backgrounds might possess different degrees of technological familiarity, which can impact their level of comfort when it comes to engaging with a flipped classroom (Kassam et al., 2013). Furthermore, they hold a conventional view of learning (Snyder et al., 2014) and do not understand why they need to do this (J. W. Baker, 2016), and take all the responsibility (Laurillard, 2012) for the learning outcomes themselves, and why they have to take the added workload of pre-class activities. The flipped model can also lead to cognitive overload, as students are required to absorb a large amount of information in a short period (Sweller, 1988). This is particularly true for international students who may have difficulties in understanding the reading material because of the vocabulary (Laufer, 1992), grammar (Kuhn & Stahl, 2003), and background knowledge (R. C. Anderson &

Pearson, 1984; Rumelhart & Ortony, 1977). Things get worse when they work alone since they cannot ask for help immediately. These challenges have great impacts on learners' motivation and engagement.

In the reading domain, reading motivation could be defined as "the individual's personal goals, values, and beliefs with regard to the topics, processes, and outcomes of reading" (Wigfield & Guthrie, 2000), and this is affected by the following four elements. First, the informed autonomy to choose what they consider of the greatest value is very important. It is worth noting that a goal will only serve as a better motivator if it is autonomously set by the individual (Ryan & Deci, 2000), and learners should know why they are doing something and how to do it most effectively in order to be motivated (Deci et al., 1999). Furthermore, learners must also have confidence that they can successfully complete the tasks assigned by the teacher. This is what Masland and Gizdarska (Masland & Gizdarska, 2018) refer to as "competency." Thirdly, if the need to feel connected to others—"a sense of belongingness and connectedness to the persons, group, or culture disseminating a goal") (Deci et al., 1999)—is satisfied, individuals are more likely to be motivated.

Engagement usually substantially overlaps with the concept of motivation (Connell & Wellborn, 1991), especially at the emotional level. To better study the concept of engagement, Unrau and Quirk (2014) suggested affective, behavioral, and cognitive engagement as the sub-dimensions of reading engagement. Except for these three constructs, Ivey and Johnston (2013), Wilhelm (1995), and Redmond et al. (2018), by adding social and collaborative constructs, developed a new online learning engagement framework, which includes five constructs: cognitive engagement, emotional engagement, behavioral engagement, social engagement, and collaborative engagement, and suggests some indicators as shown in the following table.

Table 1. Online Learning Engagement Framework (Redmond et al., 2018)

Reading Engagement Constructs	<i>Suggested indicators</i>
<i>Cognitive Construct</i>	Thinking critically
	Activating metacognition
	Integrating ideas
	Justifying decisions
	Developing deep discipline understanding
	Distributing expertise
<i>Emotional Construct</i>	Managing expectations
	Articulating assumptions

Reading Engagement Constructs	<i>Suggested indicators</i>
	Recognizing motivations
	Committing to learning
<i>Behavior Construct</i>	Developing academic skills
	Identifying opportunities and challenges
	Developing multidisciplinary skills
	Developing agency
	Upholding online learning norms
	Supporting and encouraging peers
<i>Social Construct</i>	Building community
	Creating a sense of belonging
	Developing relationships
	Establishing trust
<i>Collaborative Construct</i>	Learning with peers
	Relating to faculty members
	Connecting to institutional opportunities
	Developing professional networks

The launch of interacting ChatGPT 3.5 has sparked conversations about its potential impacts across industries. However, its influence on education—particularly on student motivation and engagement—remains under-researched. Considering its effectiveness in summary (Soni & Wade, 2023), translation (Chen et al., 2020; Jiao et al., 2023; Zhang et al., 2020), comprehending language and its context (Lecler et al., 2023; Wang et al., 2023), and producing responses that are coherent and pertinent (Li et al., 2019), this study will examine how this technology could help to overcome challenges, boost reading motivation, and increase engagement. The research questions are as follows:

- (1) What problems do learners encounter in pre-class engagement with a flipped classroom in interdisciplinary postgraduate programmes?
- (2) For international students enrolling in interdisciplinary programmes in higher education, how do they perceive the use of the GPT Chatbot in pre-assigned reading in a flipped classroom?
- (3) How do teachers perceive the utilization of GPT Chatbot in supporting students' engagement with the assigned reading?

Research Methods

Data Collection

This study uses a combined method: a survey questionnaire, a document analysis of the records of students' interaction with GPT Chatbot, and a follow-up interview to delve into students' experience and perception of how GPT Chatbot could impact their reading engagement in the pre-class activities of a flipped classroom. Eleven students from an interdisciplinary programme which adopts the flipped model were interviewed and the whole interview lasted about 1 hour. Interviews were also conducted with 4 tutors who designed flipped classrooms and experienced some of the learners' low engagement in pre-assigned reading. The employment of triangulation (Clark et al., 2021) helps to enhance the likelihood that the results and explanations will be deemed trustworthy (Lincoln & Guba, 1985).

Data Analysis

After collecting the data, thematic analysis was adopted to analyze it and a summary and interpretation of the interviews were sent via email to all 15 participants, including both students and tutors, for them to review and offer feedback. This member check ensures the findings genuinely capture the perspectives, experiences, and viewpoints of the participants, thus bolstering the research's credibility (Lincoln & Guba, 1985).

Ethical Issues

Diener and Crandall (1978) identified four ethical principles: no harm to participants, informed consent, respect for privacy, and no deception. To minimize discomfort, participants' engagement in flipped classrooms was explored with empathy, ensuring anonymity and the right to withdraw. Consent forms were collected before the research and the information sheet outlined procedures, ensuring informed participation. Pseudonyms were used to protect privacy, and permission was reconfirmed before recording interviews. No deception occurred, as study objectives and methods were transparently communicated. An updated ethics form, reflecting methodological changes, was reviewed and approved.

Findings and Discussion

The findings of this study led to several conclusions and raised some important questions regarding what challenges international students from interdisciplinary programmes met in the pre-assigned reading of the flipped

classroom and how students and tutors perceived the potential of LLM-based AI Chatbot in helping to maintain and increase their reading engagement when facing these difficulties.

Various Challenges

In this research, learners' challenges were divided into four main categories: cognitive overload, difficulties in understanding the reading material, lack of immediate support, and unfamiliarity with the pedagogy. While these categories are examined separately, most participants mentioned multiple challenges, suggesting that these challenges are interconnected and not mutually exclusive.

Cognitive Overload

Cognitive overload was the most mentioned challenge among all the participants. Among eleven participants, nine had concerns about this, and one mentioned but believed she could overcome it by devoting more time and energy. One even complained the reading list gives her a syndrome like PTSD. When interviewed about the challenge, only one didn't show any concern in this term.

For some, the reason mainly lies in the language barrier. First, because there were many new words, they needed to stop to refer to the dictionaries once for a while, so their reading speed greatly slowed down (Kuhn & Stahl, 2003), which means compared to native English speakers, they needed to spend more time on reading the materials.

Furthermore, because in this interdisciplinary programme, all modules were conducted in the flipped classroom, seven student participants had the experience of having two modules at least in one term, which means their workload doubled. When there were periodic exams or formative evaluations (Tutor Troy), the need to manage multiple tasks concurrently intensified the cognitive burden.

Difficulties in Understanding the Reading Materials

Difficulty in understanding the materials is another common challenge these students met. These are mainly caused by the vocabulary, English grammar, and background knowledge.

Ten among eleven participants pointed out that there are many terminologies they were not familiar with. For some participants, even after looking up the dictionaries, they were not sure what this terminology meant. Even some words they had been very familiar with in this domain are endowed

with new meanings which could not be easily checked in the dictionaries. The lack of vocabulary caused some troubles in their reading speed and comprehension (Fry, 1981; McQuillan & Krashen, 2007).

Furthermore, English grammar also poses difficulties for many international students in their English reading, especially when they encounter complex English sentences, which was complained about by 3 participants. The difficulty in quickly grasping the meaning of such sentences hindered both reading speed and comprehension because of different ways to structure the sentences (Kuhn & Stahl, 2003).

Besides, background knowledge also has an influence on learners' reading comprehension. Because student participants in this study all came from single-discipline backgrounds, and the required reading list for this interdisciplinary program included literature from two or more specialized fields, any literature that fell outside their own specific discipline lacked their pre-existing schema (Rumelhart & Ortony, 1977). So, when encountering very difficult-to-understand topics, it was not possible to use slots from the existing schema to automatically fill the gap and aid in comprehension (R. C. Anderson & Pearson, 1984). Therefore, sometimes the concept in the research paper was difficult for them to understand.

Lack of Immediate Support

The lack of immediate support was not explicitly put forward as a challenge they met in pre-assigned reading. However, when being interviewed if they had a question about the reading material, whether they preferred to ask ChatGPT or the tutor, 9 of them answered "ChatGPT" and a common reason was immediate feedback. Tutor Troy also mentioned that to cultivate self-regulated learning skills, he intentionally reduced the tutor's presence when designing the module but unexpectedly, learners' engagement also waned as the tutor's presence became less and less. One reason was the lack of immediate support (Bhagat et al., 2016).

Unfamiliarity with the New Pedagogy

This is the only challenge students encountered but tutors failed to notice. Most international students participating in the survey come from Asia where the flipped classroom is not a common practice. Among eleven student participants, only 3 had experience of being educated in the flipped model. Because they were not familiar with it, they didn't understand why they should do it this way (J. W. Baker, 2016). When they received an article, they didn't know why they should read it and what kind of information they were expected to get from it (especially the critical reading). Hence, they could only maintain the lowest level of engagement.

Technological barriers (Jensen et al., 2015), as a common challenge for the application of the flipped classroom in the reviewed literature, especially for the pre-class activities which rely on various media (Clark & Salomon, 1986) to provide self-learning materials, were not represented in this study. The reason is that every participant has access to at least one laptop and the internet is available on the campus or in their living places. Furthermore, the laptop borrowing services in the library are free for all registered students and there are technical staff to assist students if they have any problems. Therefore, this also reduces the possibility that technology becomes a challenge.

Potential of LLM-Based GPT Chatbot

All these challenges can significantly impact learners' motivation in 3 ways (Ryan & Deci, 2000). When students do not comprehend the pedagogical approach, they often lack a clear goal, consequently diminishing the perceived value of that goal, and making it difficult to achieve informed autonomy. Additionally, encountering difficulties and facing cognitive workloads can erode their self-efficacy, leading to doubts about their competency. The absence of immediate support is directly linked to a lack of a sense of relatedness. In the interview, seven student participants and three tutors hold very positive perspectives on the potential of GPT Chatbot in addressing the challenges, activating their motivation, and thus increasing their behavioral, cognitive, emotional, and social engagement.

Behavioral Engagement

The summaries created by GPT Chatbot help learners save time while simplifying vocabulary and sentence structures, thus reducing cognitive load for readers. The functionality of GPT Chatbot translation helps second-language learners overcome language barriers and lowers reading difficulty. In addition, if students encounter issues, they can receive immediate feedback from GPT Chatbot. These features make English reading less challenging, so these participants express that with GPT Chatbot, they have a greater likelihood of completing pre-assigned reading before the flipped classroom (Sherry, Yellow, and Selina).

Furthermore, during the questioning and answering dialogues, they maintain a more active engagement in the reading process, which is a very important element of meaningful engagement (Tutor Troy).

Therefore, GPT Chatbot could promote behavioral engagement (Fredricks et al., 2004), displaying positive actions, which can be visibly demonstrated through adhering to educational norms, utilizing reading techniques, demonstrating agency, and enhancing focus.

Cognitive Engagement

Cognitive engagement is a form of deep engagement, with the “willingness to exert the mental effort needed to comprehend [texts] and accomplish difficult [reading] tasks” (Guthrie et al., 2012, p.602), requiring being thoughtful and purposeful during the reading. This was not fully realized by students when they filled out the questionnaire: 10 out of 11 student participants rated 4/5 in the self-evaluation of their reading engagement while in the interview we found the high evaluation of reading engagement only meant that they read the materials, which is also a concern of the tutors (Malisa and Eason, referred as “superficial engagement”). However, after doing the test, these participants show different extent of not “superficial engagement in the reading material.

Firstly, GPT Chatbot leads to a deeper understanding. The guided questions generated by it offer students a direction for their thinking, which encourages them to engage in deeper contemplation of the article's content rather than passively reading (Brown et al., 2016). These questions may also introduce points that students haven't considered, guiding them to generate fresh insights and activate metacognition (Henri, 1992). This process, through further questioning and answering, leads to a higher cognitive level according to Bloom's taxonomy of cognitive development (L. W. Anderson & Krathwohl, 2001).

Furthermore, GPT Chatbot also aids students in critical reading (Cervetti et al., 2001) of these articles. Some students, after it generates the text, review the original text and refer to additional resources, such as Google Scholar or Wikipedia. Through the process of comparing, they gradually develop different understandings.

Finally, during the process of questioning and answering, student participants Selina and Annie gradually become aware of certain metacognitive skills, which encompass tasks like strategizing how to tackle a specific learning assignment, continuously assessing comprehension, and appraising one's advancement in completing the task (Livingston, 2003).

Emotional Engagement

GPT Chatbot could promote emotional engagement, which means emotions and feelings that lead a student to be engaged in an activity and usually substantially overlaps with the concept of motivation (Connell & Wellborn, 1991). The emotion during reading could involve both positive and negative emotions. Positive emotions could be important incentives for learners to stay engaged in the reading, while the negative would do the opposite. The potential of GPT Chatbot is mainly to reduce the negative while promoting the positive.

As challenges mentioned earlier, many participants felt overwhelmed by a substantial amount of reading tasks; and encountering unfamiliar terminology, complex English sentences, and difficult-to-understand concepts generated a sense of apprehension, even PTSD for some. However, with the simplification provided by the GPT Chatbot summary tool, language assistance from the translation feature, and real-time clarifications through the questioning and answering function, their anxiety levels tend to diminish.

Furthermore, shy students could have a safe space to articulate their ideas (Tutor Malisa and Troy) with GPT Chatbot, which relieves their concerns about being judged. By reducing these concerns, students would be more willing to interact with the reading materials.

Moreover, on many occasions, participants were uncertain about their ideas. When GPT Chatbot confirmed their (Aria and Teresa) answers and allowed them to justify their choices, their confidence was enforced.

Finally, because the process of questioning and answering with GPT Chatbot often introduced thought-provoking viewpoints, some students pointed out that this greatly sparked their curiosity and deep interest in the article.

Social Engagement

First, the GPT Chatbot could facilitate conversations about the reading. The responses, regardless of their accuracy, could be used to stimulate students' discussion of the text, thereby invigorating the entire learning community (Yellow). This is also what Tutor Eason suggested ChatGPT could be used for. In addition, Tutor Troy believed ChatGPT could facilitate conversations in the forum where students discuss the reading before the synchronous class by asking students questions when the forum falls into silence.

Furthermore, guided questions generated by the GPT Chatbot can also serve as an opportunity to initiate a dialogue with peers and tutors. Some students have noted that they may not be particularly interested in the questions themselves, but they enjoy using these questions to initiate discussions with their peers, and sometimes they even seek guidance from their tutors.

In this sense, GPT chatbot facilitate students' social investment in collegiate experience (Knight, 2013) and engaging in social conversations (Coates, 2006), which is the essence of social engagement.

Limitations of LLM-based GPT Chatbot

Despite its potential to increase reading engagement, both student and tutor participants had concerns about the limitations of this tool, which can be categorized into two main areas: technological design and pedagogical

aspects.

Technological Design

The accuracy of generated questions or answers, lying in the technological design, is the main concern. Except for Yellow, all students questioned its accuracy, citing past experiences where ChatGPT provided inaccurate information during their everyday use. Since GPT Chatbot responses rely on databases and prompts provided by users (OpenAI, 2022), the accuracy of these two sources directly impacts its responses. Achieving 100% accuracy for LLM-based GPT chatbots appears challenging. Furthermore, student Selina and Tutor Watson mentioned that the translations were sometimes inaccurate. The reasons for this might be that the translations may not capture the full nuance and subtleties of the original text, and concepts, idiomatic expressions, or technical terms might not have direct equivalents in the target language, potentially leading to misunderstandings (M. Baker, 2018).

Doubts were also raised about whether it could generate high-quality summaries. Among the 11 student participants, two had complete mistrust in AI's ability to do so and did not attempt it. Three students compared their own summaries to those generated by ChatPDF and found that the summaries were incomplete, missing one or more crucial parts of the article, and included some minor, insignificant details. Tutor Watson also tested ChatGPT's summary feature and found that it produced two completely different summaries for the same article using the same prompts, indicating that at least one of them did not meet the requirements. This could potentially mislead students. This aspect contradicts much of the existing literature which proved the competency of GPT Chatbot in summarization (Chopra et al., 2016; Lewis et al., 2019; Nallapati et al., 2016; Rush et al., 2015; See et al., 2017; Soni & Wade, 2023), and the reasons might be that many concepts could not be understood without surrounding context (Haque et al., 2020).

Bias is another concern. Student participants (Jane, Sarah, and Maria) all encountered issues where GPT exhibited preferences for certain languages, cultures, and viewpoints. Tutor Watson also mentioned that when he asked about the drawbacks of personalized learning, he received mostly uninformative information because personalized learning is widely praised online. As many researchers (Haque et al., 2020; Holmes et al., 2022) have pointed out, bias is an inherent attribute of AI.

Pedagogical Aspects

While there are a lot of research studies related to limitations caused by technological design, research on deficiencies in pedagogical applications is still limited. Below are some conclusions drawn from the findings.

The first pedagogical limitation is that AI lacks a specific goal, and it cannot provide the text we need without humans assigning it a goal. As indicated in the findings of the interview, one of the challenges is that students often lack a clear goal when reading. Although GPT Chatbot-generated guided questions can provide them with a direction, they often do not align with the learning outcomes expected by the teacher. Maria pointed out that the guided questions provided by ChatGPT were very generic and did not reflect the purpose her teacher had for reading the article. Tutor Troy expressed similar concerns.

Secondly, over-reliance on this tool can lead to a lack of training for one's own brain. For instance, depending on ChatPDF to create summaries, students lose the ability to synthesize information with their own brains (Maria). Relying on translation deprives students of the opportunity to learn the language (Tutor Watson). Relying on its answers, instead of engaging in self-reflection, also hinders the development of metacognition skills (Tutor Troy).

Additionally, while discussing with AI may seem to enhance focus and deepen understanding, AI lacks the ability to think critically and understand, so it does not actively challenge or question our viewpoints. Therefore, its contribution to critical thinking is limited (Sherry). Furthermore, its answers tend to be superficial and fail to achieve in-depth understanding (Tutor Watson).

Finally, the effective use of this tool requires students to already possess a relatively high level of engagement (Tutor Malisa and Eason). Otherwise, the tool's use will remain superficial, resulting in limited benefits. Selina noted that she would not use it if her teacher did not require her to, as she had no initial desire to read.

Implications

This qualitative research reveals that in terms of learning design, no matter what pedagogy and technology we employ, it is crucial to consider it within the framework of learners' motivations and engagement. In the following section, we explore both the pedagogical and technological implications of this study, hoping to provide new perspectives for education designers, practitioners, and researchers.

Pedagogical Implications

First, at the very early stage, the purpose of learning design should be communicated to students, especially when employing a relatively new pedagogy among students from different cultural and social backgrounds. At the very beginning, tutors should make it explicit what learning outcomes they expect to achieve and how this pedagogy could help students achieve them.

Second, designing scaffolding activities could help achieve the designed learning outcomes, thus helping students to engage in the reading more deeply. In addition to what is expected to achieve, how to achieve should also be informed. To be specific, some active learning activities could be assigned to help scaffold the reading materials, such as key vocabulary words or concepts list, guided questions, discussion forum, or/and debate, etc.

Third, the establishment of a supportive learning community is paramount in sustaining reading motivation and engagement. Such a community can provide learners with a sense of belonging and a supportive learning environment. In this community, students can collaborate, share insights, and encourage each other, further fueling their enthusiasm for reading. If time and energy permit, tutors' presence should also be guaranteed, because compared to peer support, students trust tutors more. When students feel that they are part of a supportive learning community, they are more likely to stay motivated and committed to their reading goals, ultimately leading to a more successful learning experience in the flipped classroom.

Finally, innovative assessment could be adopted to facilitate collaborative learning, which is very helpful for removing the challenges students have in pre-assigned reading (Rojas-Drummond et al., 2014). All the participants surveyed indicated that the final assessments are conducted on an individual basis, mainly in the form of essay writing, so reading along is enough to get an excellent grade. Therefore, when students face growing social pressures stemming from their personal and professional responsibilities, the absence of collaborative learning in the final assessment makes them not value it enough (Leach & Zepke, 2011; Sheard et al., 2010). That's partially why no matter how the tutors (Tutor Watson and Troy) stressed the importance of collaborative learning in pre-class readings, the students still prefer to work individually. If collaborative activities could be effectively represented in the assessment, this could be beneficial for maintaining extrinsic motivation and engagement in the pre-class activities, reading included.

Technological Implications

First, a guideline should be provided to students to make students fully understand what capabilities and limitations this AI tool has. Therefore, students could understand how to make use of this tool to assist their study, and at the same time keep a critical attitude to its limitations.

Second, the university could design and conduct related workshops where students have the chance to experience the tool under the guidance of AIED experts. At the same time, training and workshops should also be conducted among tutors. As mentioned by Tutor Eason and Malisa, quite a few

tutors are not familiar with LLM-based GPT Chatbot. The tool should be intrinsically embedded across all the modules and related support should be provided by specific departments in the university.

Third, the university or tutors should provide related training in how to create the right prompts for the GPT Chatbot to “understand” their request and thus could respond to it in the most accurate way within its capability.

Conclusion

This study examined the potential of LLM-based AI chatbots in supporting international students in interdisciplinary programs with pre-assigned readings in flipped classrooms, aiming to enhance motivation and engagement. Participants, including students and tutors, generally held positive attitudes, provided the tool was used critically. Key challenges identified in pre-class engagement included insufficient understanding of the pedagogy, heavy workloads, difficulties with reading comprehension, and lack of support. While some students distrusted the tool, most found it beneficial for deepening engagement with materials. Tutors highlighted its potential to enhance reading engagement but noted the risks of superficial understanding and misconceptions.

This study contributes to understanding challenges in interdisciplinary flipped classrooms and how they affect motivation and engagement. It also highlights the potential of AI tools like GPT chatbots in addressing these challenges. Future research could explore the application of such tools in diverse pedagogical contexts and examine how communication between students and tutors influences motivation and engagement.

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