

# A Case Study of Utilising Generative AI Tools In Collaborative Learning: Benefits, Challenges, And Strategies

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**Abstract** – Collaborative learning in education is a dynamic approach that encourages active student engagement and knowledge sharing. Generative AI tools have significant potential in facilitating and enhancing collaborative learning experiences among students. Its ability to understand natural language and contextual nuances makes it an excellent choice for nurturing collaboration and active learning in higher education. However, Generative AI tools present challenges, such as potential costs and efforts for educators to evaluate the relevance and accuracy of generated information. There is a lack of research on the impact of Generative AI tools on collaborative learning in Malaysia, which could have a significant impact on the country's cultural and educational context. Therefore, this study conducted qualitative research with a purposive sampling technique that involved two lecturers and two students in an educational institution in Perak. Based on the data, Technology-Enhanced Personalized Learning consists of (i) enhanced learning experience and student engagement, and (ii) empowering learning and academic performance, which emerged as the main themes of benefits of utilizing Generative AI tools in education. For the aspect of challenges, the study found that Ethical and Practical Considerations in AI-driven Tools, consisting of (i) Biases and Accuracy, and (ii) User Experience and System Efficiency, mattered. The study found responsible and Empowered AI-assisted learning in Education, which consists of (i) Empowering Educators as Guides and Facilitators, and (ii) Fostering Ethical and Informed Digital Citizenship, as the strategies for integrating Generative AI tools in education. In conclusion, the findings of this study provide insights and recommendations for educators based on potential benefits, challenges, and strategies identified. Further studies are needed to comprehensively assess the strategies for implementing Chat-GPT in collaborative learning environments in Malaysia.

**Keywords** – Collaborative Learning; Higher Education; Generative Ai Tools; Artificial Intelligence

## I. INTRODUCTION

In higher education, collaborative learning is a dynamic approach that encourages active student engagement and knowledge sharing in a group setting (Irene-Angelia, 2022). As technology plays an increasingly important role in educational environments, its significance in facilitating and enhancing collaborative learning experiences is becoming more obvious. Generative AI tools are transformative tools with tremendous potential in this context. Generative AI tools, such as Chat-GPT, are sophisticated natural language processing models demonstrating remarkable comprehension and generation of responses resembling humans (Thorp, 2023).

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Its capacity to comprehend natural language, and contextual nuances, and generate coherent and pertinent content makes it an excellent choice for nurturing collaboration and active learning in higher education.

Generative AI tools are large language models (LLMs) per-trained on vast text data using the Reinforcement Learning from Human Feedback technique (Thorp, 2023) that has garnered worldwide attention, interest, surprise, acclaim, and concern. For example, Chat-GPT is causing a revolution in higher education. On the one hand, it presents new opportunities, such as encouraging instructors to use Generative AI tools to create innovative assessments and activities for educational purposes. Despite the importance of Generative AI tools, they present challenges, such as potential costs and efforts for educators to evaluate the relevance and accuracy of generated information, and threats to student essays as evaluation assignments since the generated text is produced in seconds and may not trigger plagiarism detectors (Rudolph et al., 2023). This subject is extremely important since it has the potential to have a big impact on academic integrity, teaching, and learning in the higher education sector (Susnjak, 2022; Ventayen, 2023).

Despite a few exceptions (Ali, 2023; Shoufan, 2023; Yan, 2023), there is a lack of study on the impact of Generative AI tools on learning (Hashem Mahmoud, 2020). Specifically, there is a gap in researching collaborative learning in the context of Malaysia. This research gap is concerning because Malaysia's cultural and educational context could have a significant impact on how Generative AI tools impact collaborative learning. Additionally, researching the impact of collaborative learning in Malaysia may offer insightful information and suggestions to the experts and educators. As a result, a study in this field is required to better understand the potential advantages and difficulties of implementing Generative AI tools in collaborative learning contexts in Malaysia.

## II. PROBLEM STATEMENT

The integration of Generative AI tools in collaborative learning within higher education presents a multifaceted landscape characterized by both significant benefits and notable challenges. On one hand, these tools have the potential to enhance collaborative learning experiences by providing personalized feedback, facilitating real-time communication, and fostering innovative pedagogical approaches that can adapt to diverse learning needs (AlAli & Wardat, 2024; Kadaruddin, 2023). For example, Generative AI can support students in developing critical thinking and problem-solving skills through interactive learning environments that encourage engagement and collaboration (Baidoo-Anu & Ansah, 2023; Razmerita, 2024). Furthermore, the ability of these tools to analyze vast amounts of data quickly allows for tailored educational

content that meets the specific requirements of learners, thereby promoting inclusivity and equity in educational settings (Hezam & Alkhateeb, 2024; Grassini, 2023).

Conversely, the deployment of Generative AI in collaborative learning is not without its challenges. Issues such as the lack of trust in AI systems, concerns over data privacy, and the potential for exacerbating educational inequalities must be critically examined (George & Wooden, 2023; Jin et al., 2023). Research indicates that students may prefer human interaction for motivational support, highlighting the importance of building trust in AI systems to ensure their effective utilization (Jin et al., 2023). Additionally, individual differences in students' self-regulated learning skills can significantly impact the effectiveness of AI tools, suggesting that not all learners may benefit equally from these technologies (Yan et al., 2024; Kim et al., 2022). Therefore, understanding the limitations and challenges associated with AI integration is crucial for developing effective strategies to mitigate these risks while maximizing the benefits.

To navigate this complex landscape, it is essential to identify and implement strategies that facilitate the effective use of Generative AI tools in collaborative learning contexts. This includes fostering collaboration among educators, technologists, and policymakers to align AI applications with pedagogical objectives and ethical standards (AlAli & Wardat, 2024; George & Wooden, 2023). Moreover, training educators to effectively integrate AI tools into their teaching practices and developing robust frameworks for assessing the impact of these technologies on learning outcomes are vital steps toward successful implementation (Nguyen et al., 2022; Calatayud et al., 2021). By addressing these aspects, educational institutions can harness the transformative potential of Generative AI to create more dynamic, inclusive, and effective collaborative learning environments.

### III. LITERATURE REVIEW

#### *Collaborative Learning (CL)*

Collaboration has become fashionable in the twenty-first century (OECD, 2009). Since the emphasis has shifted from individual efforts to group work, from independence to community (Leonard & Leonard, 2001), there is an increased need for society to think and work together on topics of crucial significance. Collaborative Learning (CL) has significantly altered the typical lecture-centered or teacher-centered environment in classrooms. The traditional learning methods (lecture/listening/notetaking) may not fully vanish in collaborative classrooms. Still, it coexists with other processes that are built on student active engagement and participation with the learning material (Scheuer et al., 2014). Teachers who employ CL techniques tend to view themselves less as expert transmitters of knowledge to students and more as expert designers of intellectual experiences for students (Marjan & Mozghan, 2012).

Collaborative learning is a field widely acknowledged within the learning sciences but extends beyond disciplinary boundaries, embracing contributions from sociology, computer science, and cognitive psychology (Dillenbourg et al., 1996; Hmelo-Silver, 2006). The nature of collaborative

learning is rooted in its exploration of the learning dynamics that arise when individuals collaborate to achieve shared objectives. According to Johnson & Johnson (1986), active group engagement, constructive interdependence, and a strong feeling of personal accountability are essential components of effective collaborative learning. Collaborative learning delves into methods of supporting individuals in generating and exchanging shared knowledge, ultimately seeking to enhance the learning process and its outcomes. Additionally, it is an approach to teaching and learning in which groups of students collaborate to solve a problem, complete a task, or develop a product. In the CL environment, learners are challenged socially and emotionally as they are required to articulate and defend their ideas while listening to multiple perspectives.

Learners could converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and be actively involved in a CL environment (Srinivas, 2011). A wide range of educational activities, including collaborative problem-solving, argumentation, and project-based activities, as well as game-based or online learning, are included in collaborative learning. These approaches can be combined to fit various learning situations and objectives, but they are not always mutually incompatible. To teach argumentation, for example, it is common practice to mix collaborative scripts with the co-construction and usage of shared representations (Scheuer, McLaren, Weinberger, & Niebuhr, 2014). Other approaches, such as Massive Open Online Courses (MOOCs) and online learning communities, are part of this CL approach with the integration of digital technology.

#### *Generative AI Tools in Higher Education*

Chatbots are software applications that conduct real-time conversations with users (Clarizio et al., 2018). They serve as teaching agents, peer agents, teaching agents, and motivational agents in education (Kuhail et al., 2022). Chatbots can integrate multiple information sources, respond immediately to students' queries, and motivate them (Okonkwo & Ade-Ibijo, 2021). They have been implemented in computer science education, language learning, and mathematics education (Winkler et al., 2020; Jeon, 2021; Rodrigo et al., 2012). However, there are criticisms such as a lack of user-centered design, fictitious conversations, and ethical concerns (Kuhail et al., 2022; Murtarelli et al., 2021). Generative AI tools are sophisticated chatbots with human-like text processing capabilities. Some are hesitant about its application, while others are optimistic. For example, Kasneci et al. (2023) discovered risks and obstacles associated with the use of LLMs, such as ethical and practical concerns. Tlili et al. (2023) pointed out concerns regarding the accuracy, integrity, and user privacy of Chat-GPT, whereas Qadir (2022) identified potential biases and ethical issues. Plagiarism and cheating are issues as well (Guo et al., 2023).

According to Rudolph et al. (2023), Chat-GPT has issues with context comprehension, emotion, inventiveness, false information, answer quality variability, and the risk of jailbreaking. Despite these reservations, a rising body of research indicates that LLMs will be used more frequently

in work settings and classrooms in the future (Looi & Wong, 2023; McMurtrie, 2022; Thorp, 2023; Tlili et al., 2023). According to earlier research, LLMs may be beneficial for delivering automated evaluations and adaptive feedback (Moore et al., 2022; Sailer et al., 2023; Zhu et al., 2020); arousing curiosity (Abdelghani et al., 2022); boosting engagement (Tai & Chen, 2020); and supporting programming tasks and code explanations in computing education (Sarsa et al., 2022). In the studies on language learning, medical education, and engineering education, Generative AI tools have shown potential efficacy (Ali et al., 2023; Yan, 2023; Kung et al., 2023; Sallam, 2023). However, there is not much study on Generative AI tools' effects on learning because it is a relatively new technology (Thorp, 2023). Only two peer-reviewed papers and eight unreviewed preprints were discovered when Rudolph et al. (2023) did a literature assessment on Chat-GPT and higher education in January 2023. To comprehend the Generative AI tools' effects on learning, additional study is required.

#### IV. METHOD

This study's design is a qualitative research method that makes use of case studies, and interviewing techniques to gather data. Every meaning that is discovered through this qualitative research is comprehensive, multifaceted, and dynamic (Merriam, 2001). Therefore, this study's design was selected as it enables researchers to gather more in-depth information concerning the integration of Generative AI tools in collaborative learning in higher education. In this study, two lecturers and two teacher students from the Institute of Teacher Education were selected through a purposive sampling technique (Patton, 2002). Besides, participants who were selected were based on their experience and knowledge of the ChatGPT and collaborative learning in higher education. A structured interview method was employed with an interview protocol. In addition to taking handwritten notes, interviews were conducted face-to-face and recorded with their consent. All study participants' identities were kept private and confidential. The information was obtained and safely stored in the Google Cloud. Informants' responses were transcribed.

#### V. FINDINGS

##### *Participants' Demographic Profiles*

This study involved a total of two lecturers and two student teachers who were selected by using the purposive sampling technique (Patton, 2002) to obtain information about the utilization of Generative AI tools in collaborative learning in higher education through structured interviews. Profiles of participants involved in this study are shown as explained in Table 1.

**TABLE 1: PARTICIPANTS PROFILE**

Lecturer	Teaching Experience	Gender	Subject
Lecturer A	25 Years	Male	English
Lecturer B	20 Years	Female	English

  

Student	Semester	Gender	Subject
Student A	Semester 6	Female	English
Student B	Semester 6	Female	English

Based on Table 1, all participants in this study have experience in using Generative AI tools for collaborative learning in higher education settings. Therefore, it can be concluded that the participants were lecturers and students who have experience in using Generative AI tools, as well as being physically and mentally prepared to share their information in this study.

##### *Potential Benefits of Utilizing Generative AI Tools For Collaborative Learning*

To answer the first research question, to identify the potential benefits of utilizing Generative AI tools for collaborative learning in higher education, the researcher has obtained two main themes based on the interview data. The emerging theme for this research question is Technology-Enhanced Personalized Learning, which consists of (a) enhanced learning experience and student engagement, and (b) empowering learning and academic performance. Details for the themes are shown in Table 2.

**TABLE 2: LIST OF CATEGORIES, EMERGING THEMES, THEMES, AND SUB-THEMES OF POTENTIAL BENEFITS OF UTILIZING GENERATIVE AI TOOLS FOR COLLABORATIVE LEARNING**

Category	Emerging Themes	Themes	Sub-themes
Potential benefits of utilizing Generative AI tools for collaborative learning	Technology-Enhanced Personalized Learning	Enhanced learning experience and student engagement	<ul style="list-style-type: none"> <li>Ease of Use and Accessibility</li> <li>Idea Generation and Support</li> </ul>
		Empowering learning and academic performance	<ul style="list-style-type: none"> <li>Timesaving and Efficiency</li> <li>Accuracy and Relevance</li> <li>Simplification of Complex Topics</li> </ul>

Based on Table 2, there are various views presented by participants related to the potential benefits of utilizing Generative AI tools for collaborative learning in higher education. To get a clearer and more thorough picture and understanding of the themes obtained, the researcher elaborated on each theme individually based on interview findings.

*Challenges and Limitations Associated with Using Generative AI Tools in Collaborative Learning*

Based on the interview data, the emerging theme for challenges and limitations is Ethical and Practical Considerations in AI-driven tools, which consist of (a) Biases and Accuracy, and (b) User Experience and System Efficiency. Details for the themes are shown in Table 3.

**TABLE 3: LIST OF CATEGORIES, EMERGING THEMES, THEMES, AND SUB-THEMES OF CHALLENGES AND LIMITATIONS OF UTILIZING GENERATIVE AI TOOLS IN COLLABORATIVE LEARNING**

Category	Emerging Themes	Themes	Sub-themes
Challenges and Limitations of utilizing Generative AI tools in collaborative learning	Ethical and Practical Considerations in AI-Driven Tools	Biases and Accuracy	<ul style="list-style-type: none"> <li>Language Used and Biased Information</li> </ul>
		User Experience and System Efficiency	<ul style="list-style-type: none"> <li>Loss of Sense of Direction</li> <li>Ethical Concerns Regarding Academic Integrity</li> <li>Language Limitations</li> <li>System Performance and Lag Issues</li> </ul>

Based on Table 3, there are various views presented by participants related to the challenges and limitations of utilizing Generative AI tools for collaborative learning in higher education. To get a clearer and more thorough picture and understanding of the themes obtained, the researcher elaborated on each theme individually based on interview findings.

*Strategies for Utilizing Generative AI Tools in Collaborative Learning Practices*

Based on the interview data, the emerging theme for the strategies is Responsible and Empowered AI-assisted learning in Education, which consists of (a) Empowering Educators as Guides and Facilitators, and (b) Fostering Ethical and Informed Digital Citizenship. Details for the themes are shown in Table 4.

**TABLE 4: LIST OF CATEGORIES, EMERGING THEMES, THEMES, AND SUB-THEMES OF STRATEGIES FOR UTILIZING GENERATIVE AI TOOLS IN COLLABORATIVE LEARNING**

Category	Emerging Themes	Themes	Sub-themes
Strategies	Responsible and Empowered AI-Assisted Learning in Education	Empowering Educators as Guides and Facilitators	<ul style="list-style-type: none"> <li>Specific Keywords and Instructions for Effective Use</li> <li>Filtering and Evaluating Information</li> <li>Promoting</li> </ul>

Responsible Use and Preventing Plagiarism	
Fostering Ethical and Informed Digital Citizenship	<ul style="list-style-type: none"> <li>Media Literacy for Proper Use of AI-Generated Content</li> <li>Developing Ideas Using Generative AI Tools Framework</li> <li>Introducing Generative AI tools usage with Clear Guidelines</li> </ul>

Based on Table 4, the importance of promoting the responsible use of Generative AI tools in higher education was emphasized to prevent plagiarism. Participants suggested teaching digital literacy to students to use content appropriately, and filter and evaluate material to avoid biased information. However, participants also raised concerns about the challenges, limitations, and ethical issues of using Generative AI tools in higher education. They suggested introducing the usage of Generative AI tools with clear guidelines to help students develop ethical digital citizenship. Lecturer participants suggested discussing rules and frameworks to develop ideas using distinctive sentences. This approach would help students use the Generative AI tools as supportive tools.

**VI. DISCUSSION**

The findings of this study highlight the multifaceted benefits and challenges associated with the integration of Generative AI tools in collaborative learning environments within higher education. The identified themes of enhanced learning experiences and student engagement, as well as empowering learning and academic performance, underscore the potential of Generative AI tools to transform educational practices. This aligns with existing literature that emphasizes the role of AI in personalizing learning experiences, thereby fostering greater student engagement and improving academic outcomes (Karimi & Khawaja, 2023; Novianandy et al., 2024).

The study also reveals significant challenges, particularly concerning ethical and practical considerations in AI-driven tools. The concerns regarding biases and accuracy, as well as user experience and system efficiency, resonate with findings from other studies that caution against the uncritical adoption of AI technologies in education. Zhou et al. (2024) emphasize the importance of addressing the biases inherent in AI systems to ensure equitable educational outcomes. Furthermore, the need for educators to evaluate the relevance and accuracy of AI-generated information is echoed in the work of Akgün and Greenhow (2021), which stresses the necessity of critical engagement with AI tools to mitigate potential misinformation.

The integration of Generative AI tools in collaborative learning is one of the important change initiatives in higher education (Thorpe, 2023). This AI-driven technology has the power to completely transform how students interact with

the learning material, collaborate with course mates, and improve their critical thinking abilities (Hu, 2023). However, to make sure this change initiative is implemented successfully, thorough planning and clear guidelines must be followed. For educators to play a pivotal part in initiating and facilitating the integration of Generative AI tools in collaborative learning, leaders should support them with the necessary resources (Buil et al., 2019). Educators should receive training and materials on how to successfully incorporate Generative AI tools into their teaching practices to ensure that they are up to date on the latest technological developments (Bass & Riggio, 2006).

Furthermore, it is critical to establish clear guidelines and instructions for using Generative AI tools (Thorp, 2023). Educators should explain expectations for appropriate use to students in higher education. Students should be exposed to the potential biases in content produced by AI, the value of fact-checking, and the responsible use of AI tools. By providing students with this information, they could develop a critical mindset and understand the limitations of AI-generated content. Additionally, educators should encourage open discussions and promote ethical considerations when using Generative AI tools to foster responsible AI usage among students. This approach is supported by the findings of Essel et al. (2022), who argue that the role of educators is pivotal in guiding students through the complexities of AI technologies and ensuring that they are used responsibly. Additionally, the emphasis on ethical considerations aligns with the work of Akgün and Greenhow (2021), who highlight the importance of addressing ethical challenges in AI applications within educational settings.

## VII. LIMITATIONS AND SUGGESTIONS

This study has several limitations that should be addressed in future research. First, there were only four participants in this study: two lecturers and two students from a higher education institution with a purposive sampling technique. This small sample size limited the generalisability of the findings. Future research should survey a larger sample of participants from diverse cultural backgrounds and students participating in a broader setting over a longer time to generalize the findings. Second, qualitative data were the primary source of data for this study. To explore more, future studies should use different methodological approaches to gain a more comprehensive understanding (Creswell & Creswell, 2018). For future research, the findings of this study identified several strategies or best practices for the utilization of Generative AI tools in collaborative learning. Third, the study's findings suggest that there is a need for further research to assess the strategies for implementing Generative AI tools in collaborative learning in different places. This is particularly relevant given the cultural and educational context of the country, which may influence the acceptance and effectiveness of AI technologies in education.

## VIII. CONCLUSION

In conclusion, while the integration of Generative AI tools in collaborative learning presents significant opportunities for enhancing educational practices, it also

necessitates careful consideration of ethical implications and the need for robust strategies to empower educators and students alike. The findings of this study contribute to the growing body of literature on AI in education, providing valuable insights into the benefits, challenges, and strategies for effective implementation. Future research should continue to explore these dimensions, particularly in diverse cultural contexts, to fully harness the potential of Generative AI in higher education.

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