

Computer Engineering Students' Attitudes Toward Hybrid Literature Circles and Their Perceived Role in English Reading Proficiency

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Abstract

Students' attitudes are often considered an important factor in promoting engagement and skill development in hybrid classrooms. However, evidence regarding technical students' attitudes toward collaborative reading interventions remains limited. This study investigated Computer Engineering students' attitudes toward Hybrid Literature Circles (HLC) and their role in English reading proficiency. This study employing a convergent mixed-methods design purposively recruited 58 first-semester students from an Indonesian private university. Data were collected through a reading proficiency test and an attitude questionnaire with open-ended questions to obtain qualitative data. Descriptive statistics and Mann-Whitney U test were applied to analyze quantitative data and thematic analysis was used for qualitative response interpretation. Findings revealed students' positive attitudes, particularly regarding assigned roles ($M = 5.09$), affection ($M = 5.07$), and literary texts ($M = 5.06$). Nevertheless, these attitudes did not produce statistically significant improvements in reading proficiency ($p > 0.05$). Thematic analysis indicated perceived gains in reading skill development, motivation and active engagement, and overall perceived effectiveness. These results suggest that while HLC may support positive learning experiences and perceived reading benefits, such outcomes do not correspond to measurable differences in English reading proficiency. The study offers practical guidance for EFL educators and researchers in using HLC to promote positive reading experiences in technical classrooms while complementing it with instructional strategies to support reading proficiency development.

Keywords: attitudes, Hybrid Literature Circles (HLC), computer engineering students, reading proficiency

1. Introduction

Students' attitudes toward learning methods play a central role in shaping how learners participate in and engage with educational activities (Li & Xue, 2023; Ograjšek & Grmek, 2024). Positive attitudes not only encourage active involvement in class but also support the development of specific skills, including English reading proficiency (Cancino & Gonzalez, 2023). Within hybrid learning environments, students' perceptions of the learning approach influence the effectiveness of their engagement with both learning content and peers (Badiozaman et al., 2025; Mahender & Sharma, 2025). In this regard, hybrid learning has emerged as a promising strategy because it combines face-to-face and online interactions, providing flexibility while promoting more consistent and active involvement in learning tasks (Gamage et al., 2022; Teoh et al., 2025). However, the effectiveness of hybrid learning may vary, as students may resist or participate less actively when they hold unfavorable attitudes toward the learning approach (Scheel et al., 2022). This issue becomes particularly relevant in EFL learning contexts, where active participation and interaction are often essential for supporting reading development and meaningful engagement with texts (Khonamri et al., 2024). Therefore, understanding students' attitudes toward hybrid learning is important for explaining how collaborative learning experiences may support engagement and English reading proficiency.

Among hybrid instructional strategies, Hybrid Literature Circles (HLC) have emerged as a collaborative reading approach that integrates face-to-face discussion with online interaction to support flexibility and sustained learner participation (Daniels, 2002; Eija et al., 2024; Sulistyanto et al., 2023). HLC are operationalized based on Daniels' (2002) framework, which describes Literature Circles (LC) as small discussion groups led by students reading the same text and taking on structured roles, such as summarizer, questioner, or connector, to promote collaborative comprehension and critical thinking. HLC extend this model by combining face-to-face meetings with online discussions, providing flexibility while retaining the collaborative and interactive elements of LC. Their broader design draws on Constructivist

Learning Theory (Piaget, 1970), highlighting that knowledge is actively constructed through social interaction and shared experiences. In reading contexts, such collaborative interaction may support students in clarifying interpretations, responding to peers' perspectives, and developing deeper text comprehension. Previous studies have consistently showed that students' attitudes toward learning methods are a decisive factor influencing their engagement and academic outcomes (Getenet et al., 2024; Mašić & Bećirović, 2021; Yu et al., 2022). In addition, LC have been widely studied in EFL contexts, showing that collaborative reading and discussion promote comprehension (Chou, 2021; El-Esery, 2023), critical thinking (Espinosa-Cevallos et al., 2022), and motivation (Tayeb, 2022). Although research on traditional (Lifang & Ganapathy, 2023; Ma et al., 2023; Talenta & Himawati, 2023) and virtual LC (Huang, 2023; Kassem, 2022; Rokhayati & Alvionita, 2022) has expanded across both quantitative and qualitative domains, limited evidence directly examines the relationship between students' attitudes toward HLC and English reading proficiency.

In addition, the specific context, such as Computer Engineering students, presents unique challenges as students in technical disciplines often prioritize practical and task-oriented learning, which may limit their engagement in English reading activities (E & Christopher, 2024; Simajuntak et al., 2025). In Indonesia, English courses for non-English students are frequently perceived as secondary to core technical curricula (Pramerta et al., 2023), resulting in limited exposure to reading activities and lower engagement. These challenges indicate a need for instructional approaches that can actively enhance students' participation and engagement. Since engineering students often prioritize task-oriented and skill-based learning over language development (Berdanier, 2022), their engagement in collaborative reading practices may be limited (Sveshnikova et al., 2022). However, previous studies on LC predominantly target humanities or general EFL learners, leaving a notable gap in understanding how engineering students, with their practical learning preferences, perceive and respond to HLC. Therefore, understanding how Computer Engineering students perceive and respond to HLC is essential for designing effective interventions that not only enhance English reading proficiency but also accommodate students' learning preferences and schedules.

Despite growing evidence on students' attitudes toward hybrid learning and the benefits of Literature Circles in EFL reading, several gaps remain. First, little evidence directly examines the relationship between students' attitudes toward HLC and English reading proficiency. Second, previous studies have largely focused on humanities or general EFL learners, leaving Computer Engineering students underexplored despite their distinct practical and task-oriented learning preferences. Third, although a study has investigated blended reading circles (Teng et al., 2024), it does not explain how attitudes toward LC in a hybrid format shape the reading outcomes of technical students, particularly from both quantitative and qualitative perspectives. Addressing these gaps is therefore crucial for developing instructional models that align with engineering students' learning preferences while enhancing their English reading proficiency, offering insights valuable not only for local practice but also for broader EFL hybrid learning research.

Understanding the relationship between students' attitudes toward HLC and English reading proficiency requires a conceptual explanation grounded in complementary theoretical perspectives. As a collaborative reading approach, HLC provide opportunities for students to engage in discussion, exchange interpretations, and construct understanding through interaction, reflecting the collaborative learning principles underlying LC (Daniels, 2002b). This learning process also aligns with Constructivist Learning Theory (Piaget, 1970), which suggests that learning develops through active engagement with ideas, reflection, and interaction that enable learners to reorganize and expand their understanding. Students' attitudes toward hybrid learning are conceptualized based on the Theory of Planned Behavior (Ajzen, 2005), which frames attitudes as evaluative judgments influencing behavioral intentions and participation. Within hybrid collaborative learning settings, positive attitudes may encourage students to engage more actively with both face-to-face and online learning activities. In parallel, English reading proficiency, defined as the ability to comprehend, interpret, and critically evaluate texts (Grabe & Stoller, 2013), can be explained through Schema Theory (Anderson, 1977), which emphasizes how prior knowledge interacts with active cognitive processes during collaborative reading to enhance comprehension. Within HLC, positive attitudes may encourage greater participation in collaborative reading activities, creating opportunities for students to activate prior knowledge, negotiate meaning, and develop deeper text comprehension, which may ultimately contribute to enhanced English reading proficiency among Computer Engineering students. Taken together, these theoretical perspectives provide a coherent conceptual basis for understanding the relationship among the study variables.

Considering the above-mentioned research gaps, this study aims to explore Computer Engineering students' attitudes toward HLC and examine how these attitudes are related to their English reading proficiency. To achieve these objectives, the study is framed by the following research questions: (1) To what extent do Computer Engineering students report their attitudes toward HLC? (2) To what extent are Computer Engineering students' attitudes toward HLC associated with their English reading proficiency? (3) How do Computer Engineering students perceive their attitudes toward HLC in supporting their English reading proficiency? By addressing these research questions, the study is expected to provide insights regarding the role of students' attitudes in hybrid learning contexts, offering guidance for educators in designing effective HLC interventions that enhance reading skills while accommodating the unique learning preferences of engineering students.

Furthermore, this study is expected to make several significant contributions. Theoretically, it expands current knowledge of the relationship between students' attitudes and their learning outcomes in hybrid learning settings (Iqbal et al., 2023; Yu et al., 2022), particularly in the context of engineering education. The study findings provide practice-based implications for educators in designing and implementing HLC that effectively enhance English reading proficiency while accommodating the learning preferences and schedules of technical students. Furthermore, the study may offer insights for broader EFL teaching contexts by suggesting how hybrid collaborative reading strategies could be adapted across disciplines and cultural settings to support engagement, motivation, and language skill development, particularly when instructional materials are aligned with learners' disciplinary contexts. By combining both theoretical and practical perspectives, this research makes a contribution to the broader field of hybrid learning and EFL pedagogy, addressing a previously underexplored population of engineering students.

2. Method

This study applied a convergent mixed-methods design, with quantitative and qualitative data simultaneously collected, separately analyzed, and integrated during interpretation (Creswell & Creswell, 2018). The study involved 58 first-semester Computer Engineering students, specifically those majoring in Informatics, with 46 males (79.3%) and 12 females (20.7%) aged 17–21 and enrolled in a General English course at Universitas Indraprasta PGRI, Jakarta. The participants were purposively selected because the study specifically focused on students who actively participated in HLC, making purposive sampling appropriate for obtaining rich data relevant to the research objectives and enabling a more focused examination of students' attitudes and reading proficiency. Students provided informed consent prior to data collection. Students with poor attendance or incomplete tasks were excluded to ensure consistency in reading proficiency (Memon et al., 2025).

HLC activities consisted of six weekly meetings, including one introductory meeting on HLC procedures. Students worked in groups of five to six members and conducted HLC discussions outside regular class hours via Zoom or Google Meet, as classroom conditions were often less conducive to sustained discussion. Face-to-face and online sessions alternated weekly and were used to report and discuss HLC outcomes with classmates and the lecturer. Students completed weekly rotating roles: Discussion Leader, Summarizer, Connector, Word Master, Passage Master, and Illustrator. Reading materials were selected chapters from *Goosebumps: Stay Out of the Basement* and *Welcome to Dead House* by R. L. Stine, chosen for their accessible language and engaging content for EFL learners. Chapters were assigned sequentially each week to support continuity and comprehension. Teacher support included guidance, feedback, and participation monitoring through attendance records, task completion, lecturer observation, and discussion-related activities.

Quantitative data were obtained from a researcher-developed 25-item multiple-choice reading proficiency test constructed from General English reading materials and aligned with curriculum objectives, and an adapted 29-item questionnaire assessing six aspects of attitudes: assigned role, affection, literary text, benefit, behavior, and self-efficacy (Kaowiwattanakul, 2020; Su et al., 2018). The questionnaire also incorporated three open-ended questions used to acquire qualitative data on students' perceptions and experiences in HLC (Creswell & Clark, 2018). Both instruments were piloted, construct-validated, and tested for reliability prior to administration. For the reading test, item–total correlations ranged from 0.20 to 0.76, while three items with low correlations were retained based on expert judgment to preserve content relevance, and the instrument demonstrated strong reliability (Cronbach's $\alpha = 0.90$). The test was employed to assess individual reading comprehension gains as an intended academic outcome of HLC, while collaborative and interactional dimensions of learning were additionally captured through the attitude questionnaire and open-ended responses. The questionnaire showed satisfactory item–total correlations (0.39–0.85) with a high level of internal consistency (Cronbach's $\alpha = 0.96$). Data collection was carried out via Google Forms, starting with the reading test, followed by the attitude questionnaire.

Quantitative analysis using SPSS 27 began by performing descriptive statistics (means and standard deviations) (Starbuck, 2023) on attitude questionnaire data, with results categorized into low (1.00–2.70), moderate (2.71–4.40), and high (4.41–6.00) (Cirocki & Anam, 2024). Reading proficiency scores were analyzed only as the dependent variable to assess differences across attitude levels. The normality of quantitative variables was assessed using the Kolmogorov–Smirnov test. As most variables were not normally distributed ($p < 0.05$), non-parametric analysis was employed. Although three attitude levels were initially established, only moderate and high groups were represented in the data, with no participants classified into the low category. Therefore, the Mann–Whitney U test was applied to examine differences in reading proficiency between the two groups.

Concurrently, qualitative data from open-ended questions were transcribed, coded, and grouped to identify recurring themes (Braun & Clarke, 2006). The first author conducted the coding process independently by reading the responses to gain familiarity with the data, assigning initial codes inductively based on recurring patterns in participants' responses, and grouping similar codes into broader categories to identify emerging themes. The themes were reviewed and refined through repeated examination of recurring responses until clear and consistent patterns were identified. With two classes, each containing six Literature Circles groups, a coding system was employed for clarity (e.g., 1LC3, S1 indicates the first class, Literature Circles 3, and the first student member). Both quantitative and qualitative findings were then integrated

and analyzed in a joint display (Creswell & Clark, 2018) to provide a comprehensive interpretation of students' attitudes toward HLC and their relation to reading proficiency.

3. Results

3.1 Reported Attitudes toward HLC among Computer Engineering Students

The results indicated that Computer Engineering students generally reported a high level of attitude toward Hybrid Literature Circles (HLC), as demonstrated by a mean score of 5.04. Specifically, 53 students (91.4%) demonstrated a high level of attitude, while only 5 students (8.6%) showed a moderate level of attitude. Notably, no students were found in the low category. Further analysis revealed all students across the measured aspects consistently confirmed high attitude levels, with means ranging from 4.99 to 5.09. The details of these findings are illustrated in Figure 1.

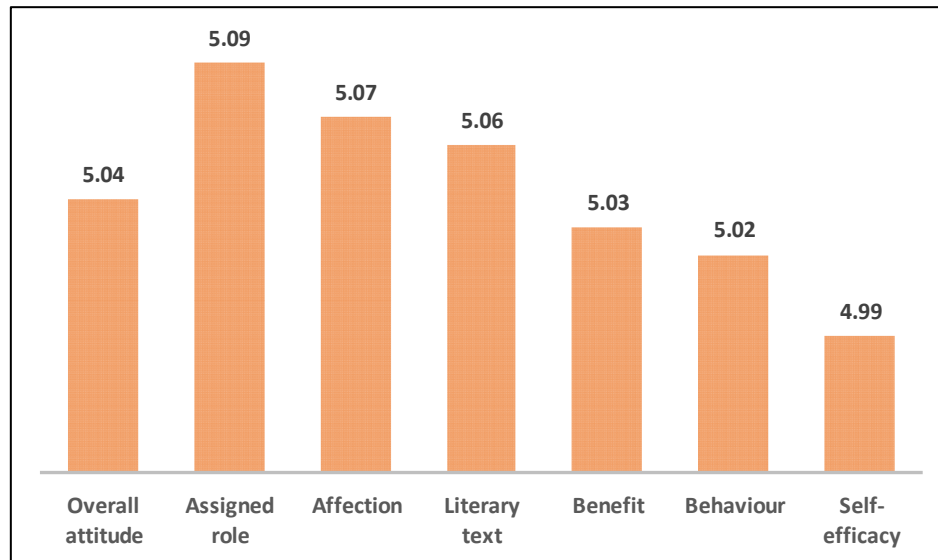


Figure 1. Mean scores of Computer Engineering Students' attitudes toward HLC

More specifically, for the assigned role, 48 students (82.8%) reported the high category, while 10 (17.2%) fell into the medium category. In terms of affection, 52 students (89.7%) were placed in the high category, while only 6 (10.3%) in the medium category. A similar distribution was observed in literary texts, with 52 students (89.7%) classified as high category and 6 (10.3%) as medium category, and in the perceived benefits of hybrid Literature Circles, with 51 students (87.9%) falling into high category and 7 (12.1%) into medium category. Behavioral attitudes reflected the same pattern, with 47 students (81.0%) in the high category and 11 (19.0%) in the medium category. Finally, students' self-efficacy showed a comparable orientation, with 48 participants (82.8%) in the high-level category and 10 (17.2%) in the medium-level category.

3.2 Association of Students' Attitudes toward HLC with Reading Proficiency

Having examined the extent of students' attitudes in the six different areas and thereby addressed the first question, Mann-Whitney U Test was performed to determine whether significant differences exist in Computer Engineering students' reading proficiency according to their reported attitudes toward HLC

Table 1. Students' reading proficiency: differences by attitudes toward HLC

Aspects of attitudes	Median		<i>p</i>	<i>r</i>
	M	H		
Overall attitude	4.24	5.00	0.18	0.17
Assigned Role	4.10	5.00	0.35	0.12
Affection	4.00	5.00	0.17	0.18
Literary Text	4.30	5.00	0.97	0.01
Benefit	4.00	5.00	0.77	0.04
Behavior	4.40	5.00	0.51	0.09
Self-efficacy	4.20	5.00	0.29	0.14

Note: M (moderate group), H (high group), *p* (*p*-value), *r* (effect size). No low-attitude group was identified in the dataset.

Table 1 presents no statistically significant differences in reading proficiency across overall attitudes and their aspects toward HLC: overall attitude ($U = 84.50$, $p = 0.18$, $r = 0.17$), assigned role ($U = 194.50$, $p = 0.35$, $r = 0.12$), affection ($U = 102.00$, $p = 0.17$, $r = 0.18$), literary text ($U = 154.50$, $p = 0.97$, $r = 0.01$), benefit ($U = 166.50$, $p = 0.77$, $r = 0.04$), behavior

($U = 225.50$, $p = 0.51$, $r = 0.09$), and self-efficacy ($U = 189.50$, $p = 0.29$, $r = 0.14$). Across all aspects, the high group consistently showed higher median scores than those of moderate group. However, the effect sizes range from negligible to small, indicating limited practical differences between groups. Taken together, although the descriptive trend suggests higher reading proficiency among students with stronger attitudes toward HLC, the negligible-to-small effect sizes and the absence of statistical significance indicate only a limited and non-substantial association between attitudes toward HLC and reading proficiency.

3.3 Themes of Students' Attitudes Toward HLC and Their Relation to Reading Proficiency

Based on the analysis of the responses to open-ended questions from participants, central themes were cross-examined. This resulted in the identification of three themes, namely: Reading skills development, Motivation and active engagement, and Overall perceived effectiveness. Each of these themes was further detailed in the following explanation.

3.3.1 Theme 1: Reading Skills Development

Students reported that participating in HLC enhanced their English reading skills, including fluency, vocabulary acquisition, and comprehension. Many noted that the texts helped them read more smoothly and confidently, as reflected in statements such as *"Yes, I have become a little more fluent in reading English"* (1LC1, S5), *"In my opinion, the texts provided and used in the LC activities have greatly helped me to become more fluent in reading English"* (2LC3, S3), and *"The texts used in the LC were quite good, and they helped improve my reading as well as expand my knowledge through the new vocabulary I learned from the LC"* (1LC1, S2). Vocabulary development was highlighted as a key factor supporting reading proficiency, with students observing that encountering new and varied words expanded their lexical knowledge, for example, *"Yes, because the texts contained many new vocabulary items"* (1LC2, S1), *"Yes, that's right, I learned many new vocabulary items. For example, I enjoyed being the word master because it made it easier for me to learn English through that role"* (2LC2, S4), and *"The texts used in the LC were very diverse, and they contained some vocabulary that people rarely know"* (2LC6, S5).

In addition, the structured roles within LC, particularly the summarizer, further promoted comprehension, as students explained that summarizing required careful reading and understanding of the texts: *"The role that helped me the most was being the summarizer, because I had to understand the text and be able to reexplain it"* (1LC2, S4), *"As a summarizer, I had to read the text carefully and summarize it"* (2LC6, S5), and *"The texts in the LC helped me improve my English literacy"* (1LC3, S1). Additional reflections emphasized that LC enhanced students' understanding of meaning and context: *"it was enough to improve my reading skills and comprehension in English"* (1LC4, S1). Overall, these findings suggest that HLC offered a comprehensive environment for developing multiple dimensions of reading proficiency by combining exposure to diverse texts, role-based responsibilities, and active engagement in a collaborative setting.

3.3.2 Theme 2: Motivation and Active Engagement

Students reported that the engaging nature of the texts in HLC motivated them to read more actively and consistently. Many participants emphasized that the variety, relevance, and appeal of the texts captured their interest and encouraged sustained attention. For example, one student noted, *"It was very helpful; the texts used in the LC activities were highly varied, and all the stories sparked curiosity to find out what happens next"* (1LC5, S4), another commented, *"My opinion about the texts used in the LC is that they are very interesting"* (1LC5, S2), and a third added, *"The storyline... was enough to keep me from feeling bored while learning"* (1LC3, S2). These responses indicate that the texts themselves served as a motivational factor, making reading more enjoyable and stimulating students' curiosity. In addition, the structured roles in LC, such as summarizer, word master, and discussion leader, further promoted active engagement by requiring students to participate meaningfully in the reading process. Students explained that these roles encouraged them to read attentively, collaborate with peers, and take responsibility for their learning. One participant shared, *"As a summarizer, I had to read the entire text to fully understand it"* (2LC3, S2), another remarked, *"As a word master, it helped me learn new vocabulary"* (2LC1, S1), and a third noted, *"As a discussion leader, I took the initiative to read the text further"* (2LC3, S2). Collectively, these findings suggest that HLC fostered active participation and motivation through engaging texts and role-based tasks, resulting in measurable gains in Computer Engineering students' English reading proficiency.

3.3.3 Theme 3: Overall Perceived Effectiveness

Students generally perceived HLC as an effective method for improving their English reading proficiency. Many participants highlighted that the combination of engaging texts, role-based tasks, and collaborative activities contributed to a meaningful and productive learning experience. For instance, one student stated, *"The texts used in the LC so far have been very helpful in improving my English learning skills"* (1LC4, S6), while another observed, *"The LC materials were very helpful in allowing me to explore my English language abilities"* (1LC5, S1). The holistic benefits of LC were further emphasized, including enhanced reading skills, vocabulary acquisition, and sustained motivation, as reflected in *"Overall,*

the texts in the LC were very useful for improving English reading skills, as they provided direct experience in understanding the texts and their context" (2LC6, S2) and "The LC was engaging and effective because it was interactive and collaborative" (1LC2, S2). These reflections indicate that students viewed LC not only as engaging and interactive but also as a supportive approach for fostering the development of their English reading proficiency.

3.4 Mixed-methods Result Integration

Integrating qualitative and quantitative findings is essential in a convergent mixed-methods model to provide a comparison between the results to see if they confirm or disconfirm each other (Creswell & Creswell, 2018). After being analyzed separately, each dataset was jointly presented to enable comparison. A joint display (Table 2) was developed to show the relationship between quantitative results and themes derived from open-ended answers. This approach provides an accessible representation of findings and supports the overall interpretation by highlighting convergence, divergence, contradiction, and consistency across the two data sources.

Table 2. Joint Display of the Integration of Quantitative and Qualitative Results

Quantitative	Qualitative	Integration
High level attitudes toward Hybrid Literature Circles:		
Overall attitude	"The LC was engaging and effective because it was interactive and collaborative" (1LC2, S2) (theme 3)	Confirm
	"Overall, the texts in the LC were very useful for improving English reading skills, as they provided direct experience in understanding the texts and their context" (2LC6, S2) (theme 3)	Enhance
Assigned role	"The role that helped me the most was being the summarizer, because I had to understand the text and be able to reexplain it" (1LC2, S4) (theme 1)	Confirm
	"As a summarizer, I had to read the entire text to fully understand it" (2LC3, S2) (theme 2)	Enhance
	"As a word master, it helped me learn new vocabulary" (2LC1, S1) (theme 2)	Enhance
	"As a discussion leader, I took the initiative to read the text further" (2LC3, S2) (theme 2)	Confirm
Affection	"The storyline... was enough to keep me from feeling bored while learning" (1LC3, S2) (theme 2);	Confirm
	"My opinion about the texts used in the LC is that they are very interesting" (1LC5, S2) (theme 2)	Enhance
	"It was very helpful; the texts used in the LC activities were highly varied, and all the stories sparked curiosity to find out what happens next" (1LC5, S4) (theme 2)	Confirm
Literary text	"The texts used in the LC were very diverse, and they contained some vocabulary that people rarely know" (2LC6, S5) (theme 1)	Confirm
	"In my opinion, the texts provided and used in the LC activities have greatly helped me to become more fluent in reading English" (2LC3, S3) (theme 1)	Confirm
	"The texts used in the LC so far have been very helpful in improving my English learning skills" (1LC4, S6) (theme 3)	Confirm
	"Yes, I have become a little more fluent in reading English" (1LC1, S5) (theme 1)	Confirm
Benefit	"Yes, because the texts contained many new vocabulary items" (1LC2, S1) (theme 1)	Enhance
	"It was enough to improve my reading skills and comprehension in English" (1LC4, S1) (theme 1)	Confirm
	"The LC materials were very helpful in allowing me to explore my English language abilities" (1LC5, S1) (theme 3)	Enhance
Behavior	"As a discussion leader, I took the initiative to read the text further" (2LC3, S2) (theme 2)	Confirm
Self-efficacy	"The role that helped me the most was being the summarizer, because I had to understand the text and be able to reexplain it" (1LC2, S4) (theme 1)	Confirm
Students' attitudes toward HLC did not substantially associate with reading proficiency	All themes	Contradict

Note. Confirm = qualitative findings support quantitative findings; Enhance = qualitative findings extend or deepen quantitative findings; Contradict = qualitative findings diverge from quantitative findings.

As seen in Table 2, the integrated quantitative and qualitative findings demonstrate a strong convergence across multiple aspects of students' attitudes toward HLC. For the overall attitude, qualitative results confirmed the quantitative findings by showing that students perceived HLC as interactive, collaborative, and useful for improving reading proficiency. The analysis of assigned roles revealed both confirmation and enhancement, as students described how roles such as summarizer, word master, and discussion leader promoted comprehension, vocabulary growth, and proactive reading behaviors. These insights illustrate how role-based engagement not only aligned with quantitative results but also provided deeper explanations of how learning was facilitated. The dimension of affection also confirmed and, in some cases, enhanced quantitative outcomes. Students emphasized that varied and engaging texts reduced boredom and increased curiosity, highlighting the motivational value of HLC. However, this relation to reading proficiency is indirect, serving primarily as emotional support for sustained reading practices. In contrast, the aspect of literary text demonstrated full confirmation, as students consistently reported that the diversity of texts and exposure to unfamiliar vocabulary directly supported their reading fluency and comprehension. Similarly, the benefit dimension showed both confirmation and enhancement, with students explicitly linking HLC participation to improvements in fluency, vocabulary, and comprehension. For behavior and self-efficacy, the evidence confirmed quantitative findings, as students highlighted increased initiative in reading and greater confidence in understanding and explaining texts. These results show how HLC shaped both cognitive and affective aspects of reading development.

Despite these strong convergences, a contradiction emerged: quantitative analysis revealed no statistically significant relationship between attitudes and reading proficiency, whereas qualitative accounts consistently described perceived improvements. This discrepancy suggests that while quantitative measures may capture general patterns, they may overlook nuanced learning gains better revealed through qualitative insights. Taken together, the joint display underscores the importance of a convergent mixed-methods design, as it captures both measurable outcomes and the experiences of students in developing their English reading proficiency.

4. Discussion

The present study examined Computer Engineering students' attitudes toward Hybrid Literature Circles (HLC) and their relationship with English reading proficiency. Findings revealed that the majority of students exhibited highly positive attitudes toward HLC, with 91.4% categorized as high and 8.6% as moderate, reflecting strong engagement and willingness to increase their participation in both online and in-person discussions. However, even if these results are positive, quantitative analysis statistically showed no significant relationship between students' attitudes and their reading performance ($p > 0.05$). This suggests that while students perceive HLC as effective in improving reading skills, actual proficiency gains may be related to other factors. Qualitative data further revealed that students perceived HLC as beneficial for reading fluency, comprehension, and vocabulary acquisition, particularly through structured roles such as summarizer and word master. In other words, while positive attitudes toward HLC encourage active participation and perceived learning benefits, they do not necessarily lead to measurable gains in reading proficiency.

Furthermore, these study findings suggest that positive attitudes of Computer Engineering students toward HLC reflect a strong cognitive and affective readiness to engage in collaborative reading activities, consistent with the Theory of Planned Behavior (Ajzen, 2005) suggesting that favorable attitudes facilitate the intention to perform target behaviors. Although these attitudes did not produce statistically significant improvements in reading proficiency, qualitative evidence revealed that students perceived HLC as effective in developing several reading aspects. This aligns with Constructivist Learning Theory (Piaget, 1970), emphasizing that knowledge is actively constructed through social interaction, and with Schema Theory (Anderson, 1977), which explains how students' prior knowledge interacts with active cognitive processes during collaborative reading to support comprehension. These interpretations indicate that while attitudes alone may not directly translate into measurable reading gains, they still have a crucial role in promoting engagement, motivation, and students' perceptions of learning effectiveness.

Consistent with previous studies, the findings also demonstrated that Literature Circles (LC) and hybrid learning approaches enhance students' engagement, motivation, and collaborative reading skills (Badiozaman et al., 2025; Daniels, 2002a; Ismail et al., 2025; Mahapatra et al., 2024). Similar to prior studies in EFL contexts, students in this study reported that structured collaborative roles and interactive discussions promoted comprehension and active participation (El-Esery, 2023; Turk, 2023). However, the lack of a statistically significant effect of attitudes on reading proficiency contrasts with some earlier studies reporting a direct relationship between positive learning attitudes and language performance (Lu et al., 2023; Mašić & Bećirović, 2021). Several external factors may help explain why these attitudes did not translate into significant improvements in reading proficiency. For instance, the limited intensity of English language use outside the classroom (Wang et al., 2022), variations in the complexity or relevance of reading materials (Ballenghein & Lachaud, 2024; Martínez-Santiago et al., 2021), and differences in instructor support may have influenced outcomes (Leino et al., 2022). The task-oriented learning preferences common among Computer Engineering students could have constrained the transfer of positive attitudes into measurable gains, as their focus may remain on technical competencies rather than

language development (Berdanier, 2022). Additionally, factors such as time constraints, cognitive load, or uneven participation in online versus face-to-face components of HLC might have moderated the effectiveness of collaborative reading activities (Ochs et al., 2024; Wagner et al., 2025; Yuanyuan & Diego, 2025). These alternative explanations underscore the complexity of the relationship among attitudes, engagement, and academic performance, suggesting that hybrid interventions should consider contextual and learner-specific factors to optimize outcomes.

A meaningful mixed-methods finding emerged from the contradiction between the quantitative and qualitative results. While quantitative findings showed no significant relationship between attitudes toward HLC and reading proficiency, qualitative responses suggested perceived improvements in comprehension, vocabulary, fluency, and confidence during collaborative reading activities. This may indicate that motivational and confidence-related gains emerged before measurable proficiency gains became visible in test scores (He, 2024; Zhang et al., 2023). Similar inconsistencies between objective achievement measures and students' subjective perceptions have been reported in prior educational studies, suggesting that learners often recognize increased confidence, engagement, and perceived competence earlier than observable performance improvements (Jaspan et al., 2022; Swanson et al., 2024; Thiel & Hanssen, 2025). In contrast to studies assuming an immediate relationship between positive attitudes and measurable academic achievement, this discrepancy may be explained by the attitudinal and motivational changes that develop more rapidly than language proficiency, particularly in EFL settings where reading improvement often requires sustained exposure, repeated practice, and longer instructional periods (Han, 2021; Milliner, 2021). Theoretically, this finding can be interpreted through the Theory of Planned Behavior (Ajzen, 2005), which posits that positive attitudes may initially strengthen intentions and learning-related behaviors before influencing measurable outcomes, and through Constructivist Learning Theory (Piaget, 1970), which emphasizes that meaningful learning often begins with social interaction and shared experiences, in this case through increased participation, confidence, and collaborative engagement. Pedagogically, these findings suggest that educators should not evaluate the effectiveness of HLC solely through short-term proficiency gains, but also consider motivational, confidence, and engagement indicators as meaningful intermediate outcomes that may eventually support long-term reading development among technical EFL students.

Furthermore, this study makes a contribution to the theoretical understanding of the interplay between attitudes of students and learning outcomes within hybrid learning environments, particularly among technical students. Theoretically, integrating the Theory of Planned Behavior (Ajzen, 2005), Constructivist Learning Theory (Piaget, 1970), and Schema Theory (Anderson, 1977), the findings suggest that positive attitudes may facilitate engagement and active participation, even when immediate measurable improvements in reading proficiency are not evident. More specifically, this study provides evidence that Computer Engineering students tended to report positive attitudes toward HLC, yet these attitudes were not substantially associated with reading proficiency. This suggests that positive attitudes in hybrid collaborative learning may contribute more to engagement and perceived learning than to reading proficiency. The research highlights that HLC supports knowledge construction through social interaction and structured collaborative roles, aligning with constructivist principles, while also showing that prior knowledge and cognitive schemata influence students' ability to interpret and comprehend texts collaboratively (Daniels, 2002a; Grabe & Stoller, 2013). Practically, these insights suggest that EFL educators can design HLC interventions with structured roles, engaging and relevant texts, and flexible hybrid formats to foster attitudes and produce reading benefits. In particular, HLC activities may become more meaningful for Computer Engineering students when reading materials, discussion topics, and collaborative tasks are aligned with computing-related contexts, such as programming, cybersecurity, software development, or emerging technologies, thereby increasing perceived relevance and encouraging stronger participation in collaborative reading activities. By bridging theoretical foundations with instructional strategies, the study provides guidance for implementing hybrid collaborative learning that supports both the attitudinal and cognitive development of technical students in English reading proficiency.

In spite of these contributions, the study has several noteworthy limitations. First, the study was conducted at a single institution and involved a relatively small sample of Computer Engineering students, leading to restriction on the generalizability of the findings to other disciplines or different educational contexts (Clifford & Rainey, 2025). Second, the cross-sectional design prevents causal inference (Pérez-Guerrero et al., 2024), limiting the ability to determine the directionality of the relationship between attitudes and reading outcomes. In addition, the absence of a control or comparison group and the lack of pre-test and post-test reading measures limited the ability to more rigorously examine the effectiveness of HLC and changes in reading proficiency over time. Moreover, the imbalance in attitude group distribution, with most students classified in the high-attitude group and few in the moderate group, may have reduced the statistical strength of group comparisons. Third, while quantitative instruments measured reading proficiency, they may not have fully captured the multidimensional nature of reading skills in hybrid learning environments, particularly the interactive and collaborative aspects emphasized in HLC (Daniels, 2002a; Grabe & Stoller, 2013). Finally, variability in students' prior language proficiency, exposure to English outside the classroom, and engagement in online versus

face-to-face components may have influenced the results (Zhao et al., 2021). Furthermore, the purposive sampling approach may have introduced potential self-selection bias, as students with stronger motivation or greater willingness to participate may have been overrepresented, meaning that the final sample may reflect more active or motivated students. This may have contributed to the relatively high attitude scores reported in the study, as students with greater engagement are more likely to express positive perceptions toward HLC.

To address these limitations, future research should employ longitudinal or experimental designs, include control or comparison groups, and collect pre-test and post-test reading scores to better examine the effectiveness of HLC over time. Future studies may also expand the sample to incorporate multiple institutions, disciplines, and cultural contexts. Involving students with varying levels of participation and motivation may reduce potential self-selection bias and improve sample representativeness. Researchers may also consider analyzing attitudes as a continuous variable rather than categorical groups to strengthen statistical comparisons across attitude levels. More applications of comprehensive mixed-methods approaches, including classroom observations, analysis of online interactions, and in-depth interviews may also better understand how attitudes relate to reading outcomes. Moreover, investigating moderating factors such as prior proficiency, cognitive load, and task-specific motivation, as well as engagement may clarify the complex interplay between attitudes and reading performance, thereby informing more effective hybrid EFL instructional strategies. Collectively, these improvements may help clarify how perceived learning experiences relate to measurable reading outcomes across technical and diverse educational settings.

5. Conclusion

This study examined Computer Engineering students' attitudes toward Hybrid Literature Circles (HLC) and their perceived role in supporting English reading proficiency, focusing on understanding the extent of students' attitudes and their potential relationship with measurable reading outcomes. The findings indicate that students reported positive attitudes toward HLC and perceived it as beneficial for reading development; however, these attitudes were not associated with measurable differences in English reading proficiency. This distinction highlights the gap between positive attitudinal responses and measurable reading outcomes in technical education contexts where language learning often takes a secondary role to discipline-specific tasks. The study contributes to the literature by clarifying how HLC may support engagement and perceived reading benefits, even when measurable proficiency differences remain limited.

Beyond these findings, the research emphasizes the broader significance of HLC as a hybrid collaborative learning strategy that supports positive attitudes and perceived learning effectiveness among technical students. Grounded in the Theory of Planned Behavior, Constructivist Learning Theory, and Schema Theory, the study contributes to the academic discourse by showing how attitudes and collaborative practices interact in hybrid learning contexts. Beyond theoretical implications, the findings provide practical insights for EFL educators and researchers in designing HLC interventions that integrate discipline-specific content with structured reading activities, including assigning clearly defined HLC roles, selecting texts relevant to engineering-related topics, monitoring student participation, and linking reading activities to students' disciplinary interests to enhance positive attitudes and perceived learning benefits. Looking forward, implementing adaptive HLC models that integrate technical content with language learning may further reinforce these benefits, although their relationship with reading proficiency gains requires further investigation.

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Author contributions

FE conceived the study, collected and analyzed the data, interpreted the findings, and drafted the manuscript. SS provided conceptual guidance, methodological input, and academic supervision throughout the research process. SA contributed to the research design, methodological refinement, and academic supervision. All authors approved the final version for publication.

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