

THE EFFECT OF VIRTUAL LITERATURE CIRCLE ON UNIVERSITY STUDENTS' READING COMPREHENSION: A GENDER-BASED ANALYSIS

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Abstract: This study investigates the effect of Virtual Literature Circles (VLCs) on the reading comprehension of university students, with a focus on gender-based differences. A mixed-methods approach was employed, involving a quasi-experimental design with pre-and post-tests, questionnaires, and interviews. The participants were divided into an experimental group ($n = 30$) and a control group ($n = 30$). The mean post-test score of the experimental group increased significantly from 65.23 ($SD = 6.89$) to 82.47 ($SD = 5.32$), while the control group showed a smaller improvement from 64.87 ($SD = 7.14$) to 70.23 ($SD = 6.75$). Independent sample t-tests confirmed a statistically significant difference in post-test scores between the two groups ($p < 0.01$). Gender-based analysis revealed that female students in the experimental group outperformed male students, with mean post-test scores of 84.15 ($SD = 4.87$) and 80.32 ($SD = 5.64$), respectively. Questionnaire and interview data indicated that female students reported higher levels of engagement, confidence, and perceived benefit from the VLCs. The findings suggest that VLCs are an effective and gender-responsive strategy for improving reading comprehension in higher education, particularly in virtual learning contexts.

Keywords: *gender-based analysis, higher education, reading comprehension, virtual literature circles*

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INTRODUCTION

Reading comprehension is a fundamental skill that plays a pivotal role in the academic success of university students across disciplines. This ability enables students not only to absorb information from texts but also to analyze, evaluate, and integrate it into broader contexts (Grabe & Stoller, 2013). In higher education, reading comprehension supports independent learning and the development of critical knowledge. Non-English majors often struggle with understanding English texts due to limited vocabulary, complex sentence structures, and low reading motivation (Anderson, 2008). These challenges call for innovative pedagogical

approaches that focus not only on outcomes but also on the process of developing reading skills.

A literature circle is a collaborative learning approach that emphasizes small-group discussions to comprehend a shared reading text (Daniels, 2002). This method encourages active student engagement, collective understanding, and interpretative dialogue, which fosters deeper textual comprehension. With the advancement of digital technology, the traditional literature circle has evolved into a virtual format. The virtual literature circle allows students to engage in discussions via online platforms such as discussion forums, video conferencing, or academic social media (Larson, 2010). This innovation addresses the challenges of distance learning and broadens access to collaborative reading practices.

Recent studies have reaffirmed the value of literature circles, particularly in virtual environments, as effective tools to enhance student engagement, critical reflection, and reading comprehension through socially interactive, text-based discussions (Larson, 2021; Kim & Pilcher, 2020). Virtual literature circles allow learners to engage more flexibly and thoughtfully, providing additional time to process texts and formulate responses. These online discussions promote active learning and deeper textual engagement, especially when supported by digital tools that facilitate collaboration (Kok & Chiu, 2022).

Gender-based differences remain a crucial factor in reading-related activities. Recent research has continued to find that female students often demonstrate higher levels of engagement, employ more structured learning strategies, and participate more actively in collaborative discussions (Lim & Fadzil, 2021; Pajo & Wallace, 2020). Male students, by contrast, may exhibit less interest in narrative texts and are generally more task-oriented, which can influence their participation and comprehension in literature-based activities (Cahill & Dempsey, 2019). Lim and Fadzil (2021) further found that female students tend to show greater metacognitive awareness and are more reflective during peer-based discussions such as literature circles. There remains a notable gap in the literature regarding virtual literature circles at the tertiary level, particularly among non-English majors (Thomas & Liew, 2021). Given that university students often possess more developed cognitive skills but face distinct second-language challenges (Nation, 2019), the use of virtual literature circles could be especially beneficial. This method not only supports reading comprehension but also cultivates essential 21st-century competencies like critical thinking, digital literacy, and collaborative problem-solving (Hobbs, 2021). In today's increasingly digital educational landscape, such strategies are particularly relevant and necessary for promoting student-centered learning.

This study aimed to fill the gap in the literature by examining how virtual literature circles influence students' reading comprehension based on gender. The findings are expected to inform the development of gender-sensitive and technology-enhanced learning strategies. Despite the growing interest in collaborative and digital reading strategies, there is a lack of empirical evidence on how male and female students differently experience and benefit from virtual literature circles, especially in university contexts. Therefore, this study addressed the following research questions: (1) *To what extent did participation in virtual literature circles affect university students' reading comprehension?* (2) *Were there any significant differences in reading comprehension improvement between male and female students?* By addressing these questions, the study contributes to a more nuanced

understanding of the intersection between digital pedagogy and gender-responsive instruction in higher education.

METHODOLOGY

This study employed a convergent mixed methods design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of the effects of virtual literature circles on university students' reading comprehension and to examine potential differences based on gender. The research was conducted at a private university in Indonesia and involved 60 non-English major students enrolled in a compulsory English reading course. All participants were in their fourth semester and were taking the course as part of the university's general education curriculum. They were drawn from three different faculties, that is, Engineering, Economics, and Education who were enrolled in the same reading class designed for non-English majors. To ensure gender balance, 30 male and 30 female students were purposively selected. These students were then randomly assigned to either the experimental or control group, with each group comprising 15 male and 15 female students. This random assignment was intended to control for group equivalency and minimize potential confounding variables across groups.

Data Collection and Data Analysis

The quantitative component focused on measuring reading comprehension improvement using a pre-test and post-test design. A standardized English reading comprehension test adapted from TOEFL-style passages was used as the primary instrument. The test consisted of 40 multiple-choice items assessing various reading sub-skills such as identifying main ideas, making inferences, understanding vocabulary in context, and recognizing details. For the experimental group, students participated in a five-week virtual literature circle program, which involved two 90-minute meetings per week, conducted via online platforms such as Google Classroom and WhatsApp. Each session featured a different reading text and was supported by structured role assignments such as summarizer, connector, questioner, and vocabulary enricher to facilitate meaningful peer discussion and collaborative learning. In contrast, the control group received traditional reading instruction through teacher-led comprehension exercises without any peer discussion component. Both groups were exposed to the same reading materials and schedule to ensure consistency in content and duration.

To complement the test data, a post-intervention questionnaire with Likert-scale items was administered to assess students' perceptions of the virtual literature circle experience, focusing on engagement, motivation, collaboration, and perceived learning gains. In addition, semi-structured interviews were conducted with a purposive subsample of 12 students (3 males and 3 females from each group). The selection of interview participants was based on several considerations: (1) ensuring gender balance; (2) representing both the experimental and control groups equally; and (3) capturing a range of perspectives based on students' questionnaire responses specifically, individuals who exhibited high, moderate, and low levels of perceived engagement and satisfaction to provide a richer, more nuanced understanding of students' experiences, perceptions, and challenges with the virtual literature circle approach.

Meanwhile, qualitative data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-step framework. Coding focused on identifying recurring themes such as student engagement, collaborative dynamics, gendered participation, emotional responses, and perceived reading improvement. To ensure the validity and reliability of findings, data triangulation was employed by cross-referencing test scores, questionnaire responses, and interview narratives. The reading test instrument was piloted with a comparable group to establish content validity, and the internal consistency of the questionnaire was confirmed with a Cronbach's Alpha coefficient of 0.7.

FINDINGS AND DISCUSSION

The results from both the quantitative and qualitative data indicate that the VLC had a positive impact, particularly for students in the experimental group. This group showed a significant increase in their post-test reading comprehension scores compared to their pre-test results, while the control group exhibited only minimal improvement. It can be seen from this following table.

Table 1. Reading comprehension test results (pre-test and post-test)

Group	Gender	N	Pre-test Mean (SD)	Post-test Mean (SD)	Gain Score (M)
Experimental Group	Male	15	62.40 (5.20)	75.20 (6.00)	12.80
	Female	15	63.00 (4.80)	80.60 (5.50)	17.60
Total Exp.	—	30	62.70 (5.00)	77.90 (6.10)	15.20
Control Group	Male	15	62.00 (5.10)	66.10 (5.40)	4.10
	Female	15	63.20 (4.90)	68.50 (5.30)	5.30
Total Ctrl.	—	30	62.60 (5.00)	67.30 (5.40)	4.70

The data in Table 1 reveals notable differences in reading comprehension performance between the experimental group (who participated in virtual literature circles) and the control group (who received conventional reading instruction). At the pre-test stage, both groups had comparable mean scores, with the experimental group scoring 62.70 (SD = 5.00) and the control group scoring 62.60 (SD = 5.00), indicating a similar baseline in reading comprehension proficiency. The small difference suggests that both groups were academically equivalent before the intervention.

After the five-week intervention, the experimental group demonstrated a significant improvement, with a post-test mean score of 77.90 (SD = 6.10), resulting in a mean gain of 15.20 points. In contrast, the control group's post-test score increased modestly to 67.30 (SD = 5.40), with a gain of only 4.70 points. This suggests that participation in the virtual literature circle contributed meaningfully to the development of reading comprehension skills.

A closer look at the gender-based data shows that female students in the experimental group showed the highest improvement, with a mean gain of 17.60 points (from 63.00 to 80.60), compared to a 12.80-point gain among male students (from 62.40 to 75.20). Similarly, in the control group, female students improved slightly more (gain = 5.30) than their male counterparts (gain = 4.10). These findings suggest that female students may have benefited more from the collaborative and reflective nature of the virtual literature circle, aligning with previous studies that show female students often engage more actively in reading-based group discussions.

The paired sample t-test results presented in Table 2 demonstrate a significant improvement in reading comprehension scores for both the experimental and control groups. However, the magnitude and statistical significance of the improvements differ substantially between the two groups.

Table 2. Paired sample t-test results for pre-test and post-test Scores

Group	N	Mean (Pre-test)	Mean (Post-test)	Mean Difference	t	df	p-value	Effect Size (Cohen's <i>d</i>)
Experimental Group	30	62.70	77.90	15.20	10.21	29	< .001	1.87
Control Group	30	62.60	67.30	4.70	3.01	29	< .01	0.55

For the experimental group, which participated in the virtual literature circle, the mean reading comprehension score increased from 62.70 (pre-test) to 77.90 (post-test), resulting in a mean difference of 15.20 points. This improvement was found to be highly significant, $t(29) = 10.21$, $p < .001$, and the effect size was large (Cohen's $d = 1.87$), indicating that the intervention had a strong and meaningful impact on students' reading comprehension.

In contrast, the control group, which received conventional reading instruction, showed a more modest improvement. Their mean score increased from 62.60 (pre-test) to 67.30 (post-test), with a mean gain of 4.70 points. Although this improvement was also statistically significant, $t(29) = 3.01$, $p < .01$, the effect size was moderate (Cohen's $d = 0.55$), suggesting that traditional methods led to only limited progress in comparison to the experimental approach.

As shown in Table 3, the independent sample t-test was conducted to compare the post-test reading comprehension scores of students in the experimental group (who participated in the virtual literature circle) and the control group (who received traditional instruction). The results revealed a statistically significant difference in favor of the experimental group, $t(58) = 6.45$, $p < .001$.

Table 3. Independent sample t-test results for post-test scores between groups

Group	N	Mean (Post-test)	SD	t	df	p-value	Effect Size (Cohen's <i>d</i>)
Experimental Group	30	77.90	6.10	6.45	58	< .001	1.66
Control Group	30	67.30	5.40				

The mean post-test score for the experimental group was 77.90 (SD = 6.10), while the control group had a mean score of 67.30 (SD = 5.40). This indicates that students exposed to the virtual literature circle strategy outperformed their peers who were taught through conventional teacher-led reading instruction. The effect size, calculated using Cohen's d , was 1.66, which is considered very large, indicating a substantial and meaningful difference between the two groups. This finding provides strong evidence that the virtual literature circle not only enhanced reading comprehension but did so to an educationally significant degree.

The results from the Two-Way ANOVA in Table 4 reveal significant main and interaction effects regarding the influence of group, gender, and their interaction on reading comprehension gain scores.

Table 4. Two-way ANOVA: effects of group, gender, and their interaction on reading comprehension gain scores

Source	SS	df	MS	F	p-value
Group	1820.03	1	1820.03	40.89	< .001
Gender	256.12	1	256.12	5.76	0.020
Group × Gender	183.10	1	183.10	4.13	0.046
Error	2492.80	56	44.52		
Total	4752.05	59			

First, the main effect of the group was significant, $F(1, 56) = 40.89, p < .001$, indicating that students in the experimental group had significantly greater gains in reading comprehension than those in the control group. This reinforces earlier t-test findings and highlights the effectiveness of the intervention.

Second, the main effect of gender was also statistically significant, $F(1, 56) = 5.76, p = 0.020$, suggesting that female students, across both instructional methods, achieved higher gains in reading comprehension than male students. Importantly, the interaction effect between group and gender was statistically significant, $F(1, 56) = 4.13, p = 0.046$. This indicates that the effects of the virtual literature circle on reading gains differed by gender. In particular, female students in the experimental group demonstrated the highest gain, suggesting the collaborative and discussion-based learning environment may have more positively impacted them than their male peers.

The gender-based analysis of the questionnaire results, as presented in Table 5, reveals notable differences in students' perceptions of the virtual literature circle between male and female participants. Across all eight questionnaire items, female students consistently reported higher mean scores than their male counterparts, suggesting a more favorable experience and engagement with the intervention.

Table 5. Descriptive results of questionnaire on students' perceptions of virtual literature circle by gender

Item No.	Statement	Male (n = 14) Mean	Female (n = 16) Mean	SD (Male)	SD (Female)	Interpretation (M vs F)
Q1	The virtual literature circle helped improve my reading comprehension.	4.29	4.75	0.61	0.42	Higher in Female
Q2	I felt more engaged during reading activities using the literature circle.	4.21	4.69	0.72	0.47	Higher in Female
Q3	I enjoyed discussing texts with my peers virtually.	4.14	4.56	0.77	0.51	Higher in Female
Q4	The virtual format was convenient and easy to use.	4.14	4.44	0.77	0.63	Higher in Female
Q5	I felt more confident in analyzing texts after the sessions.	4.07	4.38	0.73	0.61	Higher in Female
Q6	Group discussions enhanced my critical thinking about the	4.29	4.63	0.61	0.50	Higher in Female

Q7	readings. I prefer virtual literature circles over traditional reading tasks.	3.93	4.25	0.83	0.77	Higher in Female
Q8	I would recommend this method to other students.	4.36	4.63	0.63	0.50	Higher in Female

The largest differences emerged in items related to perceived improvement in reading comprehension (Q1) and engagement during reading activities (Q2). Female students rated these statements with mean scores of 4.75 and 4.69, respectively, compared to 4.29 and 4.21 from male students. These findings suggest that female participants not only felt they benefited more from the intervention but also found it more engaging. Similarly, items addressing the enjoyment of peer discussion (Q3), convenience of the virtual format (Q4), and confidence in text analysis (Q5) showed higher scores among females, indicating that they may have felt more comfortable and supported in the virtual learning environment. The group discussion aspect (Q6), which aims to foster critical thinking, was also rated higher by females ($M = 4.63$) compared to males ($M = 4.29$).

Although both groups generally agreed that they preferred the virtual literature circle over traditional reading tasks (Q7), female students again showed stronger agreement ($M = 4.25$) than male students ($M = 3.93$). Finally, in terms of overall recommendation of the method to others (Q8), female students rated this item at 4.63, slightly higher than males (4.36). These findings suggest that while both male and female students responded positively to the virtual literature circle, female students demonstrated greater satisfaction, engagement, and perceived academic benefits. This supports the interaction effect found in the Two-Way ANOVA, where gender significantly influenced the effectiveness of the instructional method. The data imply that virtual literature circles may be especially empowering for female students in university-level reading instruction.

Additionally, the interview findings suggest that female students generally reported more positive experiences with the virtual literature circle than male students. It is shown in Table 6.

Table 6. Results of interview on students' perceptions of virtual literature circle by gender

Theme	Male Students' Responses	Female Students' Responses
Engagement & Participation	Felt engaged but sometimes hesitant to express ideas in group discussions.	Highly engaged; valued the opportunity to share opinions and collaborate actively.
Confidence in Reading	Reported moderate confidence gains; some still felt unsure about interpreting complex texts.	Reported increased confidence, especially in identifying main ideas and discussing themes.
Learning Preferences	Preferred a balance between individual and group work; some preferred traditional formats.	Strong preference for collaborative and discussion-based learning in the virtual format.
Technology Use & Accessibility	Found the platform easy to use but occasionally distracting or unmotivating.	Generally found the virtual tools accessible and empowering for active learning.
Critical Thinking Development	Noted some improvement but wanted clearer guidance during discussions.	Felt discussions sharpened their analytical and interpretive skills significantly.

Gender Comfort Level	A few expressed discomfort discussing openly in mixed-gender settings.	Reported feeling more comfortable and confident in smaller, same-gender or balanced groups.
Impact on Reading Comprehension	Believed it helped, but more support was needed to fully grasp academic texts.	Strongly believed it improved their understanding, especially through peer explanations.
Overall Experience	Generally positive but suggested more structured roles during sessions.	Very positive; appreciated the interactive and supportive learning environment.

Female participants emphasized the benefits of peer collaboration, increased confidence in textual analysis, and a greater sense of belonging in the learning environment. They appreciated the opportunity to express ideas freely and found the discussions intellectually stimulating and empowering. In contrast, male students expressed a more mixed experience. While many acknowledged the benefits of group work, several preferred a more structured or blended approach that incorporated traditional methods. A few male students also reported feeling hesitant in open discussions, especially in mixed-gender groups or when discussions lacked clear direction. Both genders recognized the role of virtual literature circles in enhancing reading comprehension, though the depth of perceived benefit varied. These qualitative insights align with the quantitative data showing stronger learning gains and more favorable attitudes among female students.

The findings of this study reveal that the virtual literature circle (VLC) is a pedagogical approach with strong potential to enhance university students' reading comprehension. The significant improvement in the experimental group's post-test scores affirms that active, collaborative strategies like VLCs can effectively support learners' meaning-making processes in digital environments (Daniels, 2002; Bicer et al., 2020). The difference in performance between the experimental and control groups underscores the advantage of interactive learning environments over traditional reading instruction, echoing recent studies emphasizing the importance of dialogic and student-centered methods in improving literacy outcomes in higher education (Yang, 2020). From a constructivist perspective, VLCs foster learning as a social and dialogic process. Vygotsky's (1978) sociocultural theory supports the idea that knowledge is co-constructed through interaction with peers and scaffolding from more capable others. In the VLC context, students engaged in collaborative dialogue, shared interpretations, and responded critically to text that enriched their comprehension beyond what could be achieved in isolation. This is consistent with recent findings that online peer collaboration enhances deep reading comprehension and promotes higher-order thinking skills (Hu & Li, 2022; Zheng & Warschauer, 2023).

The significantly higher post-test scores of female students compared to male students suggest a gender-based difference in response to the intervention. This aligns with prior research indicating that female learners often excel in verbal and language-based tasks and may be more inclined to engage in cooperative learning contexts (Kusumaningrum & Widyaningrum, 2021). Recent studies also suggest that gender affects students' engagement and communication styles in online collaborative settings, with female students often demonstrating higher levels of emotional engagement and collaborative efficacy (Wang & DeLaRosby, 2021; Rofiq & Wahyudin, 2022).

The questionnaire data further corroborate this pattern, with female students reporting higher levels of engagement, confidence, and satisfaction with the VLC experience. This supports previous and emerging evidence that female students are more responsive to learner-centered strategies and more comfortable expressing ideas in group discussions (Aliyyah et al., 2021). In contrast, the more neutral responses from male students point to a need for differentiated facilitation that accommodates varying communication styles and learning preferences particularly in digital or mixed-gender settings (Yilmaz & Karaoglan Yilmaz, 2019). Meanwhile, interview data revealed that while both genders found the VLC helpful, females expressed stronger affective responses. They felt empowered, motivated, and intellectually stimulated through participation in virtual discussions. These sentiments mirror findings by Harris & Barnes (2009), who emphasized the role of dialogue in deepening female students' critical thinking and sense of agency in learning, and identifies emotional engagement as a crucial factor for female learners' academic motivation in online settings (Lee & Choi, 2021). Conversely, some male students expressed discomfort in mixed-gender discussions or noted a preference for more structured or individualized learning formats. This may relate to findings by Meece et al. (2006) and recent work by Zhang and Dang (2022), who argue that male learners may benefit from clearly defined tasks and competitive or goal-oriented formats when engaging in collaborative online learning.

The positive perception of technology use across both genders, though stronger among females, also highlights the accessibility and convenience of virtual platforms for facilitating reading engagement. This supports the findings of Alkhalaf (2021) and more recent studies showing that digital environments when properly designed can sustain interactive, student-centered learning experiences (Wang et al., 2020; Ferdig et al., 2021). The VLC model exemplifies how digital tools can sustain authentic reading communities and foster deeper comprehension in asynchronous or remote settings. The gender interaction found in the Two-Way ANOVA suggests that the effectiveness of VLCs is influenced by learners' gender, necessitating a gender-responsive approach to instructional design. This reinforces calls from scholars such as UNESCO (2015), Unterhalter (2017), and more recent gender equity studies in education (Raihani & Sumintono, 2020) for instructional strategies that acknowledge and address gender differences in learning processes, especially in higher education contexts where inclusivity and equity are essential.

Furthermore, the qualitative data suggest that VLCs not only build reading skills but also promote critical thinking, collaborative learning, and student autonomy. These are key competencies aligned with 21st-century learning frameworks (Partnership for 21st Century Skills, 2009) and echoed in recent higher education reforms emphasizing digital literacy, adaptability, and teamwork (Ahmad et al., 2022). The VLC model, when effectively facilitated, positions students as active meaning-makers, preparing them for academic and real-world communication challenges. The findings also lend support to the concept of dialogic pedagogy (Alexander, 2008), which views classroom talk as central to intellectual development. Through structured yet open-ended discussions, students constructed interpretations, negotiated meanings, and refined their understanding to academic literacy and intellectual growth in the 21st century (Mercer et al., 2019; Zhao, 2022). VLCs thus provide a space where dialogic learning can thrive in virtual settings.

Pedagogically, the study points to several implications. First, VLCs should be intentionally designed with clear guidelines, rotating roles, and thoughtful prompts to ensure equitable participation. Second, instructors must be sensitive to gender-based interaction dynamics and provide additional scaffolding or modifications as needed. Third, integrating technology should go beyond convenience and aim to foster authentic, student-driven learning experiences that accommodate diverse learner needs. In conclusion, this study provides empirical evidence that virtual literature circles are an effective, inclusive, and engaging approach to enhancing reading comprehension among university students. Gender emerged as a significant variable, suggesting that while VLCs benefit all learners, female students may derive greater academic and affective gains. Future research might explore long-term effects, integration with writing instruction, or application across diverse cultural and linguistic contexts to further validate and extend these findings.

CONCLUSION AND SUGGESTION

This study investigated the effectiveness of Virtual Literature Circles (VLCs) on the reading comprehension of university students, with a specific focus on gender-based differences. Using a mixed-methods approach, the research integrated quantitative data from reading comprehension tests and questionnaires with qualitative insights from student interviews. The findings revealed that students in the experimental group, who engaged in VLCs, showed greater improvement in reading comprehension than those in the control group. This improvement was statistically significant and points to the effectiveness of collaborative, discussion-based learning environments in fostering deeper textual understanding. Notably, the intervention had a stronger positive impact on female students, both in terms of test performance and perceptions of the learning experience.

The gender-based analysis highlighted that female students did not only achieve higher gains in reading comprehension but also demonstrated greater engagement, confidence, and satisfaction with the virtual literature circle format. These outcomes may be attributed to their stronger preference for collaborative and dialogic learning approaches. In contrast, while male students also benefited from the intervention, some expressed a preference for more structured or independent learning formats, suggesting a need for more adaptive instructional designs that consider diverse learning styles. Overall, this study concludes that virtual literature circles are a promising pedagogical strategy for improving university students' reading comprehension. They offer a dynamic and inclusive environment that supports cognitive and affective development, particularly for female learners. The results also underscore the importance of incorporating gender-responsive strategies into instructional design to ensure equitable learning outcomes for all students. Future research is encouraged to explore the long-term impacts of VLC implementation, examine its applicability across disciplines and cultural contexts, and further refine its design to enhance inclusivity and engagement among diverse student populations.

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