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RESEARCH ARTICLE

Comparing Blended and Face-to-Face Collaborative Learning in EFL Argumentative Writing

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ABSTRACT

This study examines the effects of an integrated collaborative approach combining dialogic argumentation and collaborative writing on EFL students' argumentative writing in blended and face-to-face learning environments. A total of 120 EFL undergraduate students were randomly assigned to either a blended or a face-to-face condition and participated in a ten-session intervention involving structured dialogic argumentation followed by collaborative writing tasks. Students' writing was assessed through pre- and post-tests in terms of argumentation quality (claims, counterarguments, and rebuttals) and language use, including syntactic complexity, grammatical accuracy, and fluency. The results showed that EFL students in the blended learning group made significant improvements in both argumentation quality and all aspects of language use. However, no statistically significant differences were found between the two instructional environments in overall argumentation quality or most language measures, except for dependent clauses per clause, where the face-to-face group performed better. These findings suggest that both blended and face-to-face environments can effectively support EFL students' argumentative writing development, although their effects may differ across specific aspects of language use.

Contribution/Originality: This study contributes to the existing literature by examining how blended and face-to-face dialogic argumentation with collaborative writing affect EFL learners' argumentation quality and language use. It documents limited between-group differences, with variation mainly observed in syntactic complexity.

1. Introduction

Argumentative writing plays an important role in developing critical thinking and persuasive communication, both of which are essential in academic and professional contexts (Granado-Peinado et al., 2019; Guo et al., 2022; Zabihi & Bayan, 2020). To produce effective argumentative texts, learners are expected to construct claims, address counterarguments, and provide rebuttals supported by relevant evidence (Stapleton & Wu, 2015). However, previous studies have shown that EFL learners often focus primarily on presenting claims while paying insufficient attention to counterarguments and rebuttals, which may result in one-sided and less-developed arguments (Hemberger et al., 2017; Lam et al., 2018; Najjemba & Cronje, 2020). In addition, limited grammatical accuracy and restricted syntactic variety may further constrain learners' ability to produce effective argumentative essays (Ferretti & Graham, 2019; Jin et al., 2020; Su et al., 2021).

In many EFL contexts, argumentative writing instruction has traditionally been teacher-centered and individually oriented (Lam et al., 2018), which may limit learners' opportunities to engage in extended reasoning and collaborative meaning-making. From a sociocultural perspective, learning is not an isolated cognitive activity but a socially mediated process that develops through interaction with others and participation in meaningful activities (Vygotsky, 1978). In collaborative learning settings, peer interaction can provide mediation and scaffolding within learners' zones of proximal development, enabling them to negotiate meaning, co-construct knowledge, and internalize more advanced forms of reasoning and language use. In the context of argumentative writing, this suggests that collaborative activities may support the development of both argumentation quality and language use.

Among the collaborative approaches that have attracted growing attention in EFL writing research are dialogic argumentation and collaborative writing. These approaches are considered valuable because they create opportunities for learners to interact, evaluate alternative viewpoints, negotiate language choices, and jointly construct written texts (Storch, 2013; Teng & Huang, 2021; Wagner et al., 2017). More recent studies have further suggested that integrating these two approaches may provide complementary support for argumentative writing development by combining idea generation and critical discussion with collaborative text construction and revision (Chen, 2016; Jin et al., 2020; Matos, 2021).

At the same time, blended learning environments, which combine face-to-face interaction with computer-mediated collaboration, have increasingly been viewed as a promising context for implementing such integrated collaborative activities (Jin et al., 2020; Su et al., 2021). In argumentative writing instruction, blended learning may offer practical flexibility while preserving opportunities for peer interaction and joint knowledge construction. Given the growing interest in integrated collaboration and blended learning in EFL contexts, further examination of these strands of research is needed.

1.1. Research Objectives and Questions

This study aims to investigate the effects of a blended collaborative learning context that integrates face-to-face dialogic argumentation and computer-mediated collaborative writing on EFL students' argumentative writing quality, including both argumentation

quality and language use. It further compares the effects of this combined approach across face-to-face and blended learning environments. Specifically, this study addresses the following research questions:

i. Does the combination of dialogic argumentation and collaborative writing in a blended learning environment improve EFL students' argumentative writing quality, including both argumentation quality and language use?
ii. Do the effects of this combined approach on argumentation quality and language use differ between blended and face-to-face collaborative learning environments?

2. Literature Review

2.1. Dialogic Argumentation and Collaborative Writing

Dialogic argumentation refers to a process in which learners engage with differing viewpoints, justify their positions, and respond to alternative ideas through discussion (Kuhn et al., 2016). Dialogic argumentation can support learners' development from social, cognitive, and epistemological perspectives. Research suggests that student-centered argumentative dialogues with diverse arguments and viewpoints can mitigate bias (Matos, 2021), stimulate more inclusive and sophisticated argumentation (Papathomas & Kuhn, 2017), improve the use and support of evidence (Hemberger et al., 2017; Shi et al., 2022), and store argumentative structures in long-term memory for later use while writing (Larrain et al., 2020; Nussbaum & Putney, 2020).

Collaborative writing, defined as the joint production of a single text by two or more students, offers additional advantages, including opportunities for peer feedback and iterative collaboration (Storch, 2013). Previous research has shown that collaborative writing can facilitate language development by providing learners with opportunities for modified input and peer correction (Li & Zhang, 2023; McDonough et al., 2018). Research comparing collaborative and individual writing revealed that co-construction helped students produce writings with a higher proportion of grammatical accuracy (Elabdali, 2021; Kim & Emeliyanova, 2021; Pham, 2021; Teng & Huang, 2021). Moreover, feedback among students in collaborative writing fosters better reflections on their own work than revisions based on teacher corrections (López-Pellisa et al., 2021).

From a sociocultural perspective, both dialogic argumentation and collaborative writing can be understood as socially mediated activities in which learning develops through interaction with others. Through peer collaboration, learners may receive scaffolding, negotiate meaning, and co-construct knowledge within their zones of proximal development (Vygotsky, 1978). However, the two approaches do not contribute in exactly the same way. Dialogic argumentation primarily supports the generation, evaluation, and refinement of ideas, whereas collaborative writing helps learners transform those ideas into structured written texts while improving language use. This distinction suggests that integrating the two approaches may be especially valuable for EFL argumentative writing.

2.2. Integrated Collaboration in Argumentative Writing

Due to the high cognitive nature of argumentative writing, implementing one instructional approach is probably not enough, since EFL students need to promote argumentation and improve language proficiency simultaneously (Lam et al., 2018). Integrating dialogic argumentation and collaborative writing may provide

complementary support for both the argumentative and linguistic dimensions of EFL writing. Dialogic argumentation prepares students to write arguments well-supported by relevant and sufficient evidence, while collaborative writing enables learners to transform ideas into written texts while refining language through joint text construction and revision. These approaches, when combined, have been associated with improvements in essay quality (Chen, 2016; Jin et al., 2020; Matos, 2021).

A growing body of research has begun to examine this integrated approach. Chen (2016), for example, compared several instructional conditions involving dialogic argumentation and collaborative writing and found that the combined approach was associated with stronger knowledge construction and higher-quality argumentation. Similarly, Matos (2021) reported that learners who engaged in both dialogic argumentation and collaborative writing produced higher-quality essays than those who participated in only one of these activities. Jin et al. (2020) also showed that integrating collaborative discussion and writing supported learners' elaboration of argumentative ideas in EFL settings.

Taken together, these studies suggest that integrated collaboration may offer important benefits for argumentative writing instruction. However, most previous research has focused primarily on whether integrated collaboration is beneficial, rather than on how different instructional environments may influence its implementation and outcomes. This limitation highlights the need to examine how integrated collaborative approaches function under different learning conditions in EFL contexts.

2.3. Blended Collaborative Learning in EFL Contexts

In fully EFL face-to-face classrooms, implementing integrated collaborative activities may be constrained by practical factors such as limited class time, large student numbers, and insufficient opportunities for extended interaction and revision (McDonough et al., 2019). Blended learning has therefore been proposed as a flexible alternative that combines the strengths of face-to-face interaction with the affordances of computer-mediated collaboration. In the context of argumentative writing, face-to-face discussion may support immediate negotiation of meaning and spontaneous idea development, while online collaborative writing tools may allow learners to engage in sustained joint text construction, revision, and feedback beyond the constraints of classroom time.

From a sociocultural perspective, blended learning environments may broaden opportunities for mediation by combining synchronous and asynchronous interaction. Immediate face-to-face discussion can support real-time scaffolding, while online collaboration can extend peer interaction and provide learners with more time to reflect, revise, and respond to one another's contributions. In this way, blended environments may support both argumentative development and language use, while also offering practical advantages for classroom implementation.

Recent studies in EFL contexts have started to explore blended instructional designs that combine face-to-face dialogic argumentation with computer-mediated collaborative writing. Jin et al. (2020) and Su et al. (2021), for example, examined blended learning environments in which learners engaged in in-person discussion and online collaborative writing. Their qualitative findings suggested that such environments can promote learner engagement, elaboration of ideas, and collaborative knowledge

construction. These studies provide useful insights into how blended collaboration operates in practice and why it may be pedagogically valuable in EFL writing instruction.

However, important gaps remain. First, although previous studies have explored blended learning environments integrating dialogic argumentation and collaborative writing, much of this research has focused on learners' interaction processes rather than measurable improvements in individual argumentative writing outcomes. As a result, there is a need for further empirical, particularly quantitative, evidence to examine whether such integrated approaches in blended environments can effectively enhance students' argumentation quality and language use. Second, although blended learning has often been viewed as a promising approach, direct comparisons between blended and fully face-to-face collaborative learning environments remain limited. In particular, relatively little is known about whether these two environments differ in their effects on both argumentation quality and language use. Taken together, these gaps highlight the need to examine both the effectiveness of integrated collaboration in blended environments and the extent to which its effects vary across different instructional environments in EFL argumentative writing.

3. Methods

3.1. Context and Participants

The participants in this study were 120 EFL undergraduate students (62 females and 58 males; age 19-22 years) enrolled in an IELTS Training Institution in Hebei Province, China. This sample was drawn from students who joined the institution between January 1, 2024, and May 1, 2024, meeting the following criteria: (1) intermediate English proficiency, and (2) no prior formal training in dialogic argumentation and collaborative writing. Out of 625 eligible students, a random selection process was applied, and invitations were sent out until 120 students agreed to participate. The participants came from a variety of academic disciplines, including engineering, business, arts, social sciences, and natural sciences. Including students from different academic backgrounds was a deliberate choice to enhance the external validity of the study. All participants provided signed consent forms and were informed of their right to withdraw at any time, but no participants chose to withdraw.

Participants were then randomly assigned to one of two groups: (1) a face-to-face learning environment combining dialogic argumentation and collaborative writing, or (2) a blended learning environment combining face-to-face dialogic argumentation with computer-mediated collaborative writing. Each group consisted of 60 students. The two instructional conditions were designed to provide comparable opportunities for dialogic argumentation while differing in the mode of collaborative writing.

The participants' initial writing proficiency, measured by simulated IELTS writing scores, was analyzed using an Independent Samples t-test to confirm that the two groups did not significantly differ before the treatment. The groups were statistically similar in terms of initial writing proficiency, as indicated by the results (p = 0.611).

The researcher, who had 10 years of experience in teaching argumentative writing, was also the teacher of both groups. She provided similar instructions to all students in both groups, thus controlling variability in teaching methods. This helped minimize variability in instructional delivery, ensuring that any observed differences between

groups were primarily attributable to the experimental conditions. To minimize potential researcher bias, standardized instructional procedures and materials were used across both groups.

3.2. Materials and Instruments

3.2.1. Tencent Docs

Tencent Docs, a Web 2.0 collaborative writing platform, was used to support computer-mediated collaborative writing. The platform allows multiple users to edit and comment on shared documents in real time and provides a revision history, enabling tracking of individual contributions.

3.2.2. Writing Topics

In this study, students completed a series of argumentative writing tasks, including an individual written pre-test, seven collaborative practice tasks, and an individual written post-test. All tasks were adapted from IELTS Writing Task 2 prompts and selected through expert review to ensure comparable difficulty and relevance for assessing argumentation and linguistic performance. The pre- and post-tests were completed independently to measure changes in individual writing performance, while the practice tasks were completed collaboratively in class as part of the instructional intervention. This design allowed for an investigation of how collaborative writing and dialogic engagement during the intervention may impact students' individual argumentative writing outcomes.

3.2.3. Assessment Rubric for Argumentative Writing

The rubric used to assess argumentative writing quality was adapted from the Analytic Scoring Rubric for Argumentative Writing (ASRAW) by Stapleton and Wu (2015), which provides a comprehensive framework for evaluating key dimensions of argument structure. Permission to use the rubric was obtained from the publisher. This rubric scoring system relates to three critical components associated with argument writing quality: the Claim, Counter-argument Claim, and Rebuttal. Each component was rated on a 0-5 scale, based on the presence and depth of evidence. A score of 0 indicated that the particular argumentative form did not occur, while a score of 1 denoted presence of the form with no supporting evidence. Scores from 2 to 5 reflected increasing levels of evidential support and development within each argumentative component. The rubric brought together scores from all components, giving us a whole-part assessment of the quality of students' argumentative writing based on the quality of argumentative components and the extent to which they were supported by evidence.

3.2.4. Metrics for Language Use

The following measures were used to assess students' language use in writing in terms of complexity, accuracy, and fluency (CAF). T-unit was used as the basic syntactic unit for analysis. A T-unit is defined as an independent clause together with all subordinate clauses and non-clausal structures linked to or embedded within it (Teng & Huang, 2021).

Complexity was assessed using clauses per T-unit (C/T) and dependent clauses per clause (DC/C). Accuracy was measured by the proportion of error-free clauses to total clauses (EFC/C) and the proportion of error-free T-units to total T-units (EFT/T). Fluency was measured by the average number of words per text (AW/Tx), T-units per text (AT/Tx), and clauses per text (AC/Tx) (Barrot & Gabinete, 2021).

Together, these CAF measures, grounded in T-unit analysis, provided a comprehensive assessment of students' language use in argumentative writing. As shown in Table 1, the specific CAF assessment metrics and their operational definitions are summarized.

Table 1: CAF Assessment Metrics

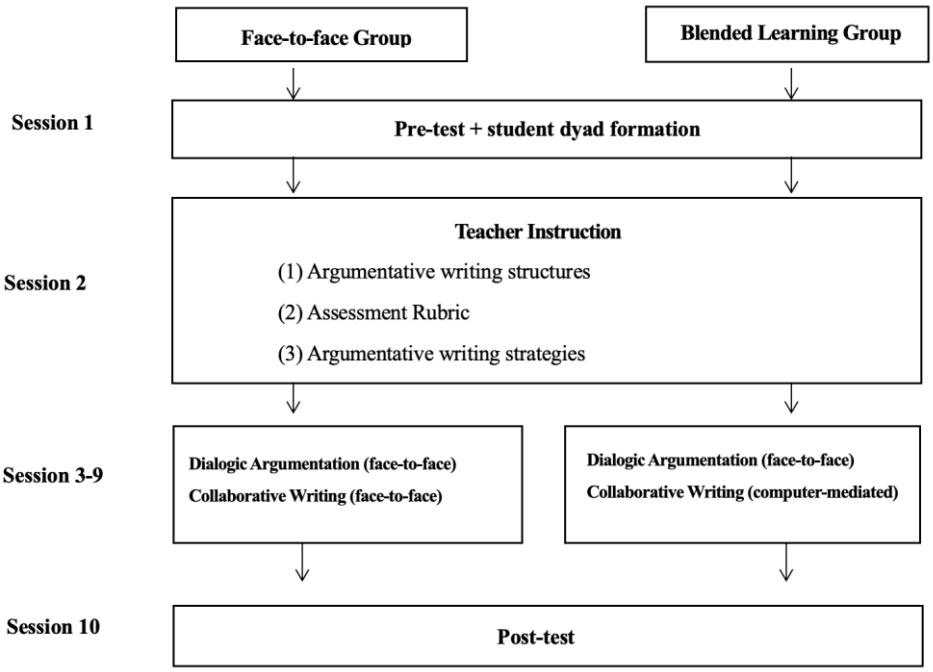
Measures	Descriptions
Complexity	1. The proportion of clauses to T-units (C/T)
	2. The proportion of dependent clauses of all the clauses (DC/C)
Accuracy	1. The proportion of error-free clauses of all clauses (EFC/C)
	2. The proportion of error-free T-units of all T-units (EFT/T)
Fluency	1. The average number of words per text (AW/Tx)
	2. The average number of T-units per text (AT/Tx)
	3. The average number of clauses per text (AC/Tx)

3.3. Research Procedures

The intervention design was informed by a sociocultural perspective, in which peer interaction was treated as a key means of supporting mediation, scaffolding, and collaborative meaning-making. There was a total of 10 sessions, each lasting two hours. The 120 participants were randomly assigned to one of the two instructional conditions: face-to-face or blended learning. The blended group lessons were conducted with face-to-face dialogic argumentation and online collaborative writing on Tencent Docs, while the other group had face-to-face dialogic argumentation and collaborative writing lessons. In the first session, participants wrote an argumentative essay as the pre-test, which was administered to establish participants' baseline argumentative writing performance.

After pre-test, participants were arranged into dyads, ensuring gender diversity and differing academic backgrounds. These pairings were maintained through the course of the study. Additionally, the second session provided explicit instruction on argumentative writing structure, planning and drafting as well as revision strategies to ensure that students had a clear understanding of the writing process. In Sessions 3 to 9, participants completed one writing task per session, consisting of 30 minutes of dialogic argumentation followed by 90 minutes of collaborative writing. The same procedures and topics were used for both groups, and the only variable difference was with respect to the kind of environment in which each group was learning. In the final session, a post-test was administered, during which all participants again completed a handwritten essay individually, replicating the pre-test conditions. This post-test allowed for a direct comparison of writing improvement across the two groups. The overall experimental procedure for the two groups is illustrated in Figure 1.

Figure 1: Experimental Procedure for Two Groups



3.4. Data Collection and Analysis

All participants completed two individual argumentative writing tasks: a pre-test before the intervention and a post-test after the intervention. In total, 240 essays were collected, including 120 pre-test essays and 120 post-test essays. The essays were assessed in terms of both argumentation quality and language use. Argumentation quality was rated using the adapted Analytic Scoring Rubric for Argumentative Writing (ASRAW), which measures claims, counterargument claims, and rebuttals. Language use was analyzed using the selected CAF measures of syntactic complexity, grammatical accuracy, and fluency.

Two experienced raters were involved in the scoring process. The primary rater was the researcher, and the secondary rater was an external teacher with nine years of relevant teaching experience. Before scoring, the raters completed a three-hour training session to ensure a shared understanding of the rating criteria and coding procedures. The primary rater assessed all 240 essays, while the secondary rater independently scored 20% of the essays (n = 48) for inter-rater reliability analysis.

Inter-rater reliability was examined using the intraclass correlation coefficient (ICC) based on a two-way mixed-effects model. The ICC for argumentation quality ratings was 0.78, indicating good agreement. For the language use measures, the ICC values were 0.71 for T-units, 0.76 for clauses, 0.68 for dependent clauses, 0.71 for error-free T-units, and 0.74 for error-free clauses, indicating moderate to substantial agreement.

All quantitative analyses were conducted using SPSS. To address the first research question, paired-samples t-tests were conducted to compare the pre-test and post-test scores of the blended learning group. To address the second research question, analysis of covariance (ANCOVA) was conducted on the post-test scores of the two groups, with pre-test scores entered as the covariate. ANCOVA was used to control for initial

differences and to provide a more accurate comparison of post-intervention outcomes between the two instructional environments. Before the analysis, the assumptions of normality, homogeneity of variance, linearity, and homogeneity of regression slopes were checked and met.

4. Results

This section presents the findings of the study, organized according to the two research questions. The results are reported in two parts: first, the within-group changes in the blended learning group, and second, the between-group comparisons of the blended and face-to-face learning environments.

4.1. The Effects of Blended Learning Environments on Argumentative Writing Quality

To address the first research question, paired-samples t-tests were conducted to compare the pre-test and post-test scores of the blended learning group (n = 60). The results are presented in terms of argumentation quality and language use.

4.1.1. Argumentation Quality

As shown in Table 2, the paired-samples t-test results revealed significant pre-test to post-test improvements in all measures of argumentation quality in the blended learning group. Claims increased from 1.63 (SD = 0.61) to 2.55 (SD = 0.53), counterargument claims from 0.93 (SD = 0.55) to 1.68 (SD = 0.47), and rebuttals from 0.50 (SD = 0.50) to 1.43 (SD = 0.43), with all differences reaching statistical significance (all p < .001). The total argumentation scores also rose markedly from 3.07 (SD = 0.95) in the pre-test to 5.67 (SD = 0.82) in the post-test, p < .001. The corresponding effect sizes were large across all four measures, with Cohen's d ranging from 1.03 to 2.03. Overall, these findings indicate substantial gains in the blended learning group's argumentation quality following the intervention.

Table 2: Paired-Samples t-Test Results for Argumentation Quality

Items	Paired (M±SD)		Mean difference	*t*	*p*	Cohen's *d*
	Posttest	Pretest				
Claims	2.55±0.53	1.63±0.61	0.92	8.780	< .001	1.13
Counterargument claims	1.68±0.47	0.93±0.55	0.75	7.982	< .001	1.03
Rebuttals	1.43±0.43	0.50±0.50	0.93	9.561	< .001	1.23
Total Score	5.67±0.82	3.07±0.95	2.60	15.756	< .001	2.03

4.1.2. Language Use

As shown in Tables 3–5, significant pre-test to post-test improvements were observed across all measures of language use in the blended learning group, including complexity, accuracy, and fluency.

For complexity, both measures showed statistically significant increases, although the effect sizes were small. The mean C/T score increased from 1.58 to 1.74 (p = .017), and the mean DC/C score from 0.32 to 0.42 (p = .011), with Cohen's d ranging from 0.33 to 0.35.

For accuracy, substantial improvements were observed with large effect sizes. The mean EFC/C score increased from 25.78 to 55.31, and the mean EFT/T score from 22.99 to 41.23 (both p < .001), with Cohen's d ranging from 1.21 to 3.62.

Similarly, all fluency measures showed significant increases with large to very large effect sizes. The mean AW/Tx score increased from 181.80 to 230.48, AC/Tx from 17.35 to 27.33, and AT/Tx from 10.37 to 14.15 (all p < .001), with Cohen's d ranging from 0.85 to 3.06.

Overall, these results indicate that the blended learning intervention was associated with significant improvements in learners' syntactic complexity, grammatical accuracy, and writing fluency.

Table 3: Paired-Samples t-Test Results for Language Complexity

Items	Paired (M±SD) Posttest	Pretest	Mean difference	*t*	*p* Cohen's *d*
C/T	1.74±0.13	1.58±0.32	0.16	2.539	.017 0.33
DC/C	0.42±0.05	0.32±0.19	0.10	2.719	.011 0.35

Table 4: Paired-Samples t-Test Results for Language Accuracy

Items	Paired (M±SD) Posttest	Pretest	Mean difference	*t*	*p* Cohen's *d*
EFC/C	55.31±24.02	25.78±5.12	29.53	9.380	< .001 1.21
EFT/T	41.23±4.54	22.99±2.17	18.24	28.074	< .001 3.62

Table 5: Paired-Samples t-Test Results for Language Fluency

Items	Paired (M±SD) Posttest	Pretest	Mean difference	*t*	*p* Cohen's *d*
AW/Tx	230.48±38.59	181.80±46.90	48.68	6.575	< .001 0.85
AC/Tx	27.33±2.34	17.35±2.69	9.98	23.722	< .001 3.06
AT/Tx	14.15±1.29	10.37±1.90	3.78	12.314	< .001 1.59

4.2. The Differential Effects of Blended and Face-to-Face Learning Environments

To address the second research question, ANCOVA was conducted to compare the post-test scores of the blended and face-to-face groups while controlling for pre-test scores. Prior to the analysis, the assumptions of normality, homogeneity of variance, linearity, and homogeneity of regression slopes were tested and met.

4.2.1. Argumentation Quality

As shown in Table 6, ANCOVA revealed no statistically significant difference in post-test argumentation quality between the blended and face-to-face groups after controlling for pre-test scores, $F(1, 116) = 2.363$, $p = .127$, partial $\eta^2 = .020$. This indicates that the two instructional environments did not differ significantly in their effects on overall argumentation quality.

Table 6: ANCOVA Results for Argumentation Quality

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial η^2
Group	3.098	1	3.098	2.363	.127	.020
Pretest Total Score	2.129	1	2.129	1.623	.205	.014
Residual	152.100	116	1.311			

Note. $R^2 = .056$.

4.2.2. Language Use

As shown in Table 7, ANCOVA results revealed only one statistically significant between-group difference among the seven language measures, namely in dependent clauses per clause (DC/C), $F(1, 116) = 10.248$, $p = .002$, partial $\eta^2 = .081$.

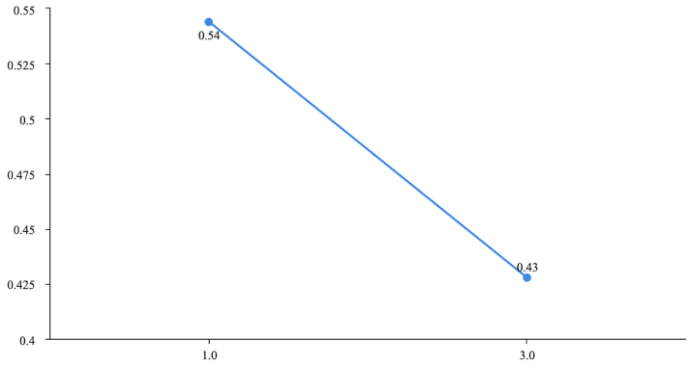
Table 7: ANCOVA Results for Language Use

Items	Type III Sum of Squares	Mean Square	*F*	*p*	Partial η^2
C/T	0.005	0.005	0.165	.685	.001
DC/C	0.028	0.028	10.248	.002	.081
EFC/C	181.725	181.725	0.598	.441	.005
EFT/T	21.219	21.219	0.863	.355	.007
AW/Tx	4.115	4.115	0.002	.960	.000
AC/Tx	1.456	1.456	0.272	.603	.002
AT/Tx	0.015	0.015	0.008	.929	.000

Note. All ANCOVA tests were based on df = (1, 116).

As illustrated in Figure 2, the face-to-face group obtained a higher mean DC/C score (0.54) than the blended learning group (0.43). No statistically significant between-group differences were found for the other language measures, including C/T, EFC/C, EFT/T, AW/Tx, AC/Tx, and AT/Tx. Overall, the results indicate that the two instructional environments differed only in DC/C, with the face-to-face group showing higher syntactic complexity on this measure.

Figure 2: Comparison of Mean Dependent Clauses per Clause (DC/C) Between Groups



5. Discussion

This study investigated the effects of an integrated collaborative approach in a blended learning environment on EFL students' argumentative writing quality, including both argumentation quality and language use, and further compared these effects with those observed in a face-to-face learning environment. The findings showed that students in the blended learning group made significant gains from pre-test to post-test in argumentation quality as well as in measures of complexity, accuracy, and fluency. At the same time, the between-group comparison revealed no statistically significant differences in overall argumentation quality or in most language-use measures, although the face-to-face group demonstrated significantly higher performance in one measure of syntactic complexity, namely dependent clauses per clause (DC/C).

These findings extend previous research on integrated collaborative learning in EFL writing by providing quantitative evidence for changes in students' individual writing performance. Previous studies, such as Jin et al. (2020) and Su et al. (2021), explored combinations of face-to-face dialogic argumentation and online collaborative writing and offered valuable qualitative insights into how such activities support learner engagement, idea elaboration, and collaborative knowledge construction. The present study builds on this line of work by showing that integrated collaborative learning in a blended context was associated with measurable gains in students' individual argumentative writing performance. In this sense, the study broadens the empirical basis for understanding how blended collaborative learning may support EFL writing development.

The study also contributes to the broader literature by directly comparing two instructional environments within an integrated collaborative design. Previous research has often focused on the relative value of individual collaborative activities, such as discussion or joint writing, or on whether integration is beneficial overall (Chen, 2016; Jin et al., 2020; Matos, 2021). By contrast, less attention has been given to how different instructional environments may shape the outcomes of such integrated collaboration. The present findings suggest that the learning environment did not lead to major differences in overall argumentation quality, but it may have shaped certain aspects of language use. This indicates that the delivery format may matter in more specific ways than broad outcome comparisons alone might suggest.

One notable finding is that the face-to-face group achieved a significantly higher DC/C score than the blended group. One possible explanation is that face-to-face interaction may provide more immediate and multimodal opportunities for negotiation during collaborative work. Verbal exchanges supported by intonation, facial expressions, and gestures may create richer conditions for clarification, reformulation, and elaboration. From a sociocultural perspective, such interaction may offer more immediate opportunities for scaffolding, which in turn could support the co-construction of more complex syntactic forms. In contrast, although blended learning offers flexibility and sustained opportunities for writing and revision, the reduced immediacy of interaction during the writing phase may have provided fewer opportunities for spontaneous syntactic elaboration.

At the same time, the absence of statistically significant differences in overall argumentation quality between the two groups is also noteworthy. Rather than suggesting that one environment was clearly superior to the other, this finding may indicate that integrated collaborative learning can support argumentative development across both face-to-face and blended conditions. One possible explanation is that dialogic argumentation itself may be a robust component of the instructional design, helping learners develop claims, counterarguments, and rebuttals regardless of whether the subsequent collaborative writing takes place in a fully face-to-face or blended format. Another possibility is that students' performance in argumentation quality may be shaped more strongly by factors such as task design, topic familiarity, or prior language proficiency than by the delivery mode alone. These possibilities suggest that future research should examine the mediating factors that shape the effects of integrated collaborative learning across different environments.

The findings also have practical implications for EFL instruction. In contexts where teacher-centered instruction and individual writing remain dominant, both face-to-face and blended environments appear capable of supporting integrated collaborative writing instruction. Face-to-face learning may offer advantages for certain aspects of syntactic complexity, whereas blended learning may provide greater practical flexibility by combining in-person discussion with extended opportunities for online collaborative writing and revision. For teachers and curriculum designers, this suggests that the choice of instructional mode should be informed not only by pedagogical goals, but also by contextual constraints such as available classroom time, class size, and access to digital tools.

Overall, the present study suggests that integrated dialogic argumentation and collaborative writing can support EFL students' argumentative writing development across both instructional environments. Although no significant between-group differences were found in overall argumentation quality, the face-to-face environment showed an advantage in one measure of syntactic complexity. Taken together, these findings indicate that both environments have value, but their contributions may not be identical. Teachers may therefore benefit from considering how the affordances of each environment align with their instructional priorities when designing collaborative argumentative writing tasks.

6. Conclusion

This study examined the effects of an integrated collaborative approach in a blended learning environment on EFL students' argumentative writing quality and compared

these effects with those observed in a face-to-face learning environment. The findings showed that students in the blended group made significant gains in both argumentation quality and language use. However, no significant between-group differences were found in overall argumentation quality or in most language-use measures, although the face-to-face group performed better in one measure of syntactic complexity (DC/C).

The study contributes to the literature by providing quantitative evidence that integrated collaborative learning can support improvements in individual writing performance in EFL contexts. It also suggests that the instructional environment may influence specific aspects of language development rather than overall outcomes. These findings are broadly consistent with sociocultural perspectives, which emphasize the role of interaction in supporting learning.

From a practical perspective, both blended and face-to-face environments appear to be viable for implementing integrated collaborative writing instruction. While face-to-face interaction may support certain aspects of syntactic complexity, blended learning offers greater flexibility by extending opportunities for collaboration beyond classroom time. Instructional decisions should therefore consider both pedagogical goals and contextual constraints.

This study is subject to several limitations. It was conducted in a specific higher education EFL context and focused on short-term outcomes. Future research could examine long-term effects and explore the factors that shape writing development across different instructional environments.

Ethics Approval and Consent to Participate

This study was approved by the Universiti Malaya Research Ethics Committee (Reference Number: UM.TNC2/UMREC_3526). All procedures involving human participants were conducted in accordance with established ethical guidelines. Informed consent was obtained from all participants, who were assured of their anonymity and that all data would be kept confidential. Participation was voluntary, and participants were free to withdraw at any time without any consequences.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

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