



Impact of Computer-Assisted Peer Negotiations on EFL Learners' Collaborative Writing and Their Attitudes Toward it

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Received: March 03, 2024

Accepted: May 05, 2024

Abstract

The current attempt aimed to explore how computer-assisted peer negotiations impact collaborative writing among a group of 50 intermediate Iranian EFL learners. Random assignment was used to divide the participants into experimental and control groups. The experimental group received a treatment that involved incorporating visual stimuli and engaging in socializing activities during the collaborative writing tasks. The writing assessments were conducted using Big Blue Button, Google Forms, and Google Docs. Although there was no statistically significant difference between the experimental and control groups, the study findings demonstrated that computer-assisted peer negotiations positively affected the writing skills of the experimental group. Both groups showed progress throughout the course. The participants in the experimental group provided favorable feedback on online collaborative writing, emphasizing the usefulness and practicality of technology and collaboration. The implication of this study suggests that computer-assisted peer negotiation can be implemented by EFL teachers and learners to enhance writing performance and skills.

Keywords: Collaborative writing, computer-assisted learning, computer-mediated communication, EFL learners, online collaboration, peer negotiation

INTRODUCTION

In the past decades, computer-mediated communication media has expanded both in functional and structural ways. Being able to manage social interactions, making oneself understood, and understanding others' behaviors are so essential that together they shape one's competence. Like any other field, language learning demands certain interactional competencies that would help the learners manage their social interactions to their advantage in online learning environments (Abe, 2020). Computer-mediated tools in the field of foreign language teaching have given researchers and EFL teachers engaging venues to conduct writing

instruction and promote online collaborative writing (Hsu, 2020). The development and affordability of Web 2.0 applications, such as Google Docs, has resulted in a notable increase in the usage of web-based writing in language learning contexts for educational purposes. (Elola & Oskoz, 2017) Within EFL contexts, computer-assisted collaborative writing has gained increasing attention due to its potential to provide learners with unprecedented opportunities for participation and collaboration (Li, 2018). When several authors work together to create a single text, it's known as collaborative writing, and it helps language learners complete writing assignments and hone their writing abilities. It is a widely used strategy that promotes teamwork in L2 writing classes, where students

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work together to brainstorm, compromise, and make plans before starting to write texts on their own. (Storch, 2019).

Moreover, recently there has been a significant change in the way writing is taught, moving away from a focus on the final written product to a greater emphasis on the writing process itself. This approach, known as the process-oriented approach, encompasses several stages, starting with pre-writing activities, followed by planning, drafting, revising, and editing, all leading to the creation of the final draft of the written work (Carless & Boud, 2018). Instead of solely concentrating on the result, the process-oriented approach recognizes the value of guiding students through the multiple steps involved in writing. It emphasizes that writing is not a linear process but rather one that involves several iterative stages (Lee et al., 2016).

Adopting a process-oriented approach in writing instruction empowers students to actively participate in their own learning. It provides them opportunities to refine their ideas, critically assess their work, and receive feedback from peers and instructors. By nurturing a deeper understanding of the writing process, this approach helps students become more reflective, independent, and skilled writers (Rahimi & Fathi, 2022).

In a similar vein, computer-assisted collaborative writing offers enhancements over traditional paper-based writing. These platforms allow for the inclusion of various multimedia elements such as audio, videos, images, and hyperlinks, providing greater opportunities for students to showcase their work and support their further learning improvements (Fathi et al., 2023). By utilizing these online applications, students can effectively manage their writing process, access resources, and feedback, and collaborate with peers outside of traditional classroom settings. These digital platforms not only offer flexibility and convenience but also enhance students' engagement and provide a dynamic and interactive space for their writing development (Fathi et al., 2021; Tavassoli & Rahmatollahi, 2023).

Previous studies have highlighted various affordances of collaborative writing, including its focus on language forms and discourse,

boosting awareness, developing learners' confidence and motivation to write, enhancing individual writing development, fostering writing self-regulation, efficacy, and creativity (Fathi et al., 2021; Dobao, 2012; Jiang & Eslami, 2022; Li, 2018; McDonough & De Vleeschauwer, 2019; Moonma, 2021; Qiu & Lee, 2020; Rahimi & Fathi, 2022; Storch, 2013). However, questions remain concerning whether online peer negotiations can enhance collaborative writing. Traditional teaching approaches are still commonly utilized in writing courses in many EFL university contexts, with little incorporation of internet resources for group writing exercises, formative writing evaluations, and other process-oriented approaches. As a result, incorporating a computer-assisted peer negotiation and collaborative course can be beneficial for EFL students in effectively accomplishing their collaborative writing activities. This platform regularly uploads language learning tasks and related materials, and tracks students' activities, assignments, and progress, thereby providing a comprehensive and convenient learning experience (Rahimi & Fathi, 2022; Lam et al., 2018).

The objective of the present study, therefore, was to explore the effect of computer-assisted peer negotiations on the collaborative writing performance of intermediate EFL students. Additionally, the study investigated EFL learners' attitudes and perceptions toward online collaborative writing. These investigations will provide valuable insights into the impact of computer-assisted peer negotiation on EFL students' collaborative writing performance. The findings of the study can also help inform efficient pedagogical approaches and helpful strategies for developing EFL students' writing abilities, including improving writing content, organization, and language use.

LITERATURE REVIEW

Theoretical Framework

The theoretical foundation of this study is rooted in Vygotsky's (1978) social-constructivist theory of learning. According to this theory, learning occurs within a social context where individuals, as members of a community, actively participate in collaborative activities to

collectively share and construct knowledge. This collaborative process allows learners to engage in joint tasks, relying on social interactions and the support of others to enhance their understanding and learning outcomes (Lantolf, 2000). Students play a pivotal role in mediating each other's learning performance as peers when they work together on a task. This process, whether done implicitly or explicitly, helps peers progress through their zone of proximal development (ZPD), where learning and development intertwine. In Vygotsky's perspective, the ZPD represents the gap or distance between a student's current level of development, ascertained by solving problems on their own, and their potential development, which can be attained by working with more capable peers or solving problems under the supervision of an adult (Neumann & McDonough, 2015; Vygotsky, 1978). In other words, students can support each other's learning by working together, thereby enhancing their overall development within their ZPD.

Indeed, through social collaboration and interaction, students have the opportunity to co-construct their second language (L2) knowledge. One specific example is L2 writing, where students engage in collaborative activities with their peers to collectively improve their cognitive development and reach their full potential (Neumann & McDonough, 2015). Donato (2004) and Kim (2008) explain that in these collaborative language learning activities, students bring their individual language abilities to the group, sharing their knowledge to complete tasks together. Through these social interactions, students collaboratively construct their L2 skills, progressing within their zone of proximal development and effectively self-regulating their cognitive processes.

Computer-Assisted Peer Negotiation

In the field of ESL/EFL writing research, peer feedback has received significant attention. Early studies suggested that peer feedback did not effectively support student revision, often resulting in superficial comments, and was considered less valuable compared to feedback from teachers (Pham, 2022). However, more recent research has shown that when students

receive proper training, peer feedback can have several positive impacts on their writing. These include increasing writers' awareness of their audience, improving the quality of student interaction, facilitating meaningful revision, and enhancing overall writing quality (Sánchez- Naranjo, 2019).

Studies have indicated that using computer-assisted peer feedback offers several advantages over traditional face-to-face peer feedback in writing contexts. These benefits include increased student motivation, promoting equal participation among students, and the generation of more revisions and improved writing quality (Pham, 2022). Research conducted by various scholars has highlighted the efficiency of computer-assisted peer feedback in enhancing students' writing performance and fostering engagement, collaboration, and social learning (Awada & Diab, 2023; Hsieh, 2020; Pritchard & Morrow, 2017; Purchase & Hamer, 2018). Studies have found that computer-assisted peer feedback provides a platform for students to actively contribute and participate, especially in overcoming inhibitions or poor social skills that may hinder their involvement in face-to-face peer feedback sessions (Awada & Diab, 2023). Computer-assisted peer feedback has also been shown to reduce anxiety and create a more comfortable atmosphere for students to provide substantial comments (Breuch, 2004).

Online Collaborative Writing

Research has demonstrated that engaging in collaborative work with peers can be advantageous in the process of acquiring a second language, as it facilitates the construction of shared knowledge (Storch, 2013). While collaborative writing has been found to enhance language learning, its efficacy in comparison to individual writing remains a subject of debate. Although some studies have indicated that collaborative writing results in higher ratings for written paragraphs, others have not found any significant difference in accuracy when compared to individual writing. Collaborative tasks can promote learner autonomy and engagement, reduce anxiety, and encourage interaction among students. However, it is unclear whether these benefits extend to collaborative writing in

computer-mediated communication settings. Collaborative writing involves the distribution of the writing task among two or more writers, including peer editing and planning. Although it can be a rewarding experience when executed effectively, leading collaborative writing can present challenges and require further attention in research (Lingard & Watling, 2021). Collaborative writing is advantageous for second language (L2) learners as it facilitates the development of both macro-level and micro-level language skills. L2 learners progressively enhance the complexity and accuracy of their written texts by acquiring fundamental writing skills. Additionally, at an advanced level of communication, learners acquire the competence to integrate a hierarchy of interconnected ideas using cohesive devices, functional-semantic elements, and diverse stylistic techniques. Collaborative writing nurtures students' focused attention on multiple aspects of language skills development, encompassing both the broader or macro-level and the narrower or micro-level of target-language discourse (Pourdana, 2022).

There has been a growing trend in using computer-assisted collaborative writing in L2 classrooms due to the advancements in technology that support both individual and group writing (Li, 2018). The development of web 2.0 technologies and social software has shifted the focus of writing tasks from being self-directed to more collaborative in nature. Collaborative writing is beneficial for text production (McDonough & De Vleeschauwer, 2019) and has been linked to cognitive advantages and development (Hsu, 2020). Online collaborative writing has attracted significant interest from language educators and researchers in L2 writing, as it holds the potential to enhance students' writing skills (Yanguas, 2020).

Tools such as Google Docs/Forms and Wiki are widely used in educational settings for online collaborative writing (Lee & Hassell, 2021; Pourdana & Tavassoli, 2022). Google Docs, in particular, offers a highly interactive environment where writers can contribute and edit their texts synchronously or asynchronously in real time. This level of convenience was not readily available in traditional writing

classrooms (Kitjaroonchai & Suppasetseree, 2021). Moreover, research has shown that computer-assisted communication positively impacts the design of collaborative writing tasks, the collaborative process itself, learners' motivation for writing and learning, as well as the quality of their writing (Jiang & Eslami, 2022; Wang, 2015; Zioga & Bikos, 2020). Li and Zhu (2013), for instance, reported that the use of wikis in collaborative writing provided learners with greater flexibility. Neumann and McDonough (2015), also found that when students wrote paragraphs in a collaborative planning and writing condition, their work received higher ratings compared to writing in isolation. Similarly, Wang (2015) reported that wiki-mediated collaborative writing led to improved learning results regarding grammatical accuracy, structure, and writing content. Likewise, Vorobel and Kim (2017) reported that their participants found collaborative writing beneficial for developing communication skills and producing a higher-quality final product in terms of grammar, vocabulary, content, and organization.

In a study conducted by McDonough et al. (2018), it was reported that in a face-to-face setting, collaborative writing resulted in higher ratings compared to independent writing. But when it came to accuracy, there was no discernible difference between autonomous and collaborative writing. In another study conducted by McDonough and De Vleeschauwer (2019) the influence of both independent and group prewriting planning on EFL learners were compared. The findings showed that collaborative planning led to improved accuracy while individual planning resulted in improved analytic rating of texts.

The existing body of literature provides evidence for the benefits of collaborative writing, including enhanced learner autonomy, reduced anxiety, and increased motivation, engagement, and interaction among students. However, scant research has specifically examined the effect of computer-assisted peer negotiation on EFL learners' collaborative writing and their attitudes toward it. By addressing the following research questions, this study attempts to bridge the current gap.

Q1. Does computer-assisted peer negotiation have any significant effect on Iranian EFL learners' collaborative writing ability?

Q2. What is the Iranian EFL learners' attitude toward online collaborative writing?

METHOD

Research Design

In this study, a quasi-experimental design was employed due to the absence of true randomization. This type of design was deemed suitable as it allowed the researcher to exert greater control over the tasks and involved assigning treatments in a partially randomized manner, while interventions were already present in the classes (Best & Kahn, 2006). In this research, only the experimental groups received the treatment, which was provided by situations in which negotiations between peers such as having discussions, chatting, and brainstorming took place, while the control group received no such treatments.

Participants

The participants of this study were 50 Iranian EFL learners who were selected through the convenience sampling method (Best & Kahn, 2006) that is, they were selected due to their availability and willingness to take part in this study. In order to choose participants with the same level of proficiency, out of the initial 72 samples taking part in the Oxford Placement Test (OPT), 50 participants were placed in intermediate level and randomly assigned into control and experimental groups each including 25 participants. In this sample, 90% of the participants were female and 10% were male between the ages of 18 and 30 years.

Materials and Instruments

Oxford Placement Test

The Oxford Placement Test (OPT), which evaluates students' vocabulary, grammar, and reading comprehension skills, was used in this study to homogenize the participants. This made it easier for the researchers to determine the individuals' proficiency levels and classify them as elementary, pre-intermediate, intermediate, or advanced. The research's specific sample of interest was formed by participants whose scores were

classified as intermediate, meaning they were within one standard deviation above or below the mean.

Writing Tests

As for the pre-test, the students were asked to write an argumentative essay collaboratively, which was chosen from Cambridge Practice Test 14 (2019), and for the post-test, they were also required to write another argumentative essay in collaboration with their peers which was selected from Cambridge Practice Test 15 (2020). In order to assess the writings, IELTS Writing Band Descriptors Task 2 was employed and two examiners assessed the essays in the pretest and posttest. In addition, these band descriptors were also used to correct 7 writings that learners wrote during the course.

Google Docs

In this study, each learner was encouraged to use their tablets, laptops, or smartphones. As for the applications, to compose texts, they used Google Docs which offers advanced functionalities that are comparable to other emerging cloud-based word processing tools. These features include synchronized editing, automatic saving, and real-time updates. Additionally, Google Docs supports both synchronous and asynchronous collaboration modes, enabling individuals or groups to contribute insights into the writing process seamlessly and effectively (Seyyedrezaie et al., 2016). Research findings have demonstrated significant improvements in students' writing skills following the implementation of Google Docs in collaborative writing activities (Alwahoub et al., 2020).

Big Blue Button

All the treatment sessions of this study were held on Big Blue Button, which is a globally recognized virtual teaching platform that provides an opportunity for holding conferences, webinars, and classes. It also stands out for its unique origin as it was developed within an educational setting rather than a corporate environment. This distinction highlights its exclusive focus on meeting the specific requirements of teachers. Notably, Big Blue Button is available in 65 languages, and teachers from

various regions have actively contributed to its design. Moreover, the platform is continuously expanding and evolving through collaboration with a global network of developers and companies that offer commercial support. These ongoing efforts ensure that Big Blue Button remains responsive to the ever-changing needs of teachers worldwide (Salehi et al., 2023).

Learners' Attitude Toward Online Collaborative Learning Questionnaire

In order to explore the participants' attitudes toward online collaborative writing a questionnaire developed and validated by Chatterjee and Correia (2020) was administered to the participants of this study (Appendix A). This questionnaire includes 11 items on a 5-point Likert scale regarding attitude toward online collaborative learning. The reliability of the questionnaire was examined by running Cronbach's Alpha reliability. The reliability index for the eleven items of the learners' attitudes toward online collaborative learning questionnaire was 0.924.

Procedure

In this study, participants who took the Oxford Placement Test were randomly assigned to 10 micro-groups on Telegram, with 5 participants in each group. Half of the groups were control groups, while the other half were experimental groups. The goal of the study was for the participants to write argumentative essays using collaborative writing in an online setting. The essay prompts were selected from Cambridge Practice Tests for IELTS.

Data was collected over ten sessions, with three sessions per week for about three weeks. Each session lasted approximately 75 minutes. At the start of each session, the teacher discussed the band descriptors and guided the participants on the correct approach to writing. Feedback was given on their writing. Before starting the writing process, participants learned how to analyze IELTS prompts. Both the control and experimental groups were taught how to analyze different aspects of prompts. The experimental groups received additional materials to pre-read and watch before the session, aiming to generate more ideas and discuss them

during peer negotiation in class. Due to the nature of the treatment which requires peer negotiation these materials were used as food for discussion and peer negotiation.

During each session, the treatment involved discussing the main themes of each prompt. Articles were shared in the Telegram groups and in-class discussions were held, where students summarized the articles and shared their own views. The control groups brainstormed and worked together to write their essays, while the experimental groups had the opportunity to discuss topics through peer negotiation in addition to brainstorming.

The Big Blue Button platform was used for webcams and microphones for commenting, and the public chat was used to share views. Google Docs was used for writing and storing the essays. The class time was dedicated to IELTS Task 2 Writing content, and the writing collaboration took place within the class time. The writing process consisted of planning, drafting, editing, and final draft stages.

For the pretest and posttest, both groups collaboratively wrote an essay selected from Cambridge Practice Tests for IELTS 12. They also completed a questionnaire to measure their attitudes toward computer-assisted collaborative writing. The IELTS Writing Band Descriptors were used to assess and provide feedback on the essays, using a scoring rubric with four dimensions: task response, coherence and cohesion, lexical resources, and grammatical range and accuracy.

RESULTS

Normality of the Data

The normality of the data was examined by running one-sample Kolmogorov-Smirnov tests (KS-Test) (Pallant, 2020) and the results are reported in Table 1. According to Pallant (2020), a value is considered significant if it is smaller than the critical .05 level ($\alpha=.05$; $p<\alpha$). In such a case the data set does not bear normal distribution. Otherwise, the data set is claimed to be normal. Accordingly, both proficiency tests of the control and experimental groups are normally distributed since both their significant values are higher than the standard value (p of CG=.87, p of EG=.90; $\alpha=.05$; $p>\alpha$).

Table 1

One-sample Kolmogorov-Smirnov Test of the Oxford Placement Test of the Control Group (CG) and Experimental Group (EG)

		Proficiency test of CG	Proficiency test of EG
N		25	25
Normal Parameters	Mean	69.36	70.32
	SD	5.49	4.95
Asymp. Sig. (2-tailed)		.87	.90

Next, the normality of the pre-instruction and the post-instruction scores of the two groups on the questionnaire was checked. According to the outcomes represented in Table 2, all four data sets obtained from the pre-instruction and post-instruction administration of the attitude questionnaire are normal according to their significant values which are .94 for the

control group's pre-instruction, .58 for their post-instruction, .56 for the experimental group's pre-instruction, and .98 for their post-instruction all of which are bigger than the critical .05 level of significance ($\alpha=.05$; $p>\alpha$). Therefore, parametric analyses were the most suitable whenever the total scores of the questionnaire were to be checked.

Table 2

One-sample Kolmogorov-Smirnov Test of the Pre-instruction and Post-instruction Scores of the Two Groups on the Questionnaire

		CG, Pre-instruction	CG, Post-instruction	EG, Pre-instruction	EG, Post-instruction
N		25	25	25	25
Normal Parameters	Mean	37.40	37.96	37.96	38.20
	SD	4.51	5.35	5.20	4.54
Asymp. Sig. (2-tailed)		.94	.58	.56	.98

However, since the participants of the two groups performed in groups of five, there were only five sets of scores for each of the two groups' writing tasks, and therefore, non-parametric formulae had to be selected where the focus of the analysis was the writing scores.

Reliability of the Tests

Next, the reliability of the tests that were used in the process of this research was checked. The reliability index of the Oxford Placement Test of the current inquiry was calculated using Kuder-Richardson formula 21 (KR21) the results of which show the strong reliability index of both control and experimental groups' proficiency tests as they are .88 and .84 respectively, both of which above .7.

Checking the Cronbach's alpha reliability index of the attitude questionnaire for the pre-instruction of the control group (i.e., .70), post-instruction of the control group (i.e., .72), pre-instruction of the experimental group (i.e., .71), and post-instruction of the experimental

group (i.e., .70), the conclusion is that all these data sets are highly reliable due to their values that are all above .7.

In addition, the inter-rater reliability of the pretest and posttest scores of the two groups were checked using Spearman rho, the results of which indicated that the ρ value reported for the correlation of the first and second raters' scores to the pretest of the control group is .77 and to the posttest of the control group is .88. That is to say, the two sets of scores in both the pretest and posttest are highly correlated and a sign of a good reliability index. Moreover, the ρ value reported for the correlation of the first and the second raters' scores to the pretest of the experimental group is .42 which is a sign of the modest correlation and the correlation between the first and the second raters' scores to the posttest of the experimental group is .38, which is again a sign of the modest correlation and therefore, the moderate reliability index of the scores for the experimental group.

Homogeneity of the Groups

Since at the beginning of the study, the participants were chosen using an Oxford Placement Test whose scores proved to be normally distributed, an independent samples t-test was used to check the homogeneity of the two groups. The descriptive statistics of the two groups' scores on their proficiency tests are illustrated in Table 3. Comparing the mean scores presented, which are 69.36 for the control group and 70.32 for the experimental group, the conclusion is that the experimental group had a slightly better performance. The significance of such an outperformance then was checked

through an independent-samples t-test (Table 4), the results of which indicated that the significant value of the t-test for Equality of Means is .51 which is higher than the critical value ($p=.51$; $\alpha=.05$; $p>\alpha$). It means, there was not a considerable difference between the mean scores of the two groups on the proficiency test. Therefore, the conclusion is that the participants of the control and experimental groups had almost the same English knowledge at the start of the investigation, and so, whatever probable improvement could be counted on as the result of the treatment they received in their instructional sessions.

Table 3
Descriptive Statistics of the Proficiency Test of the Two Groups

Control Group (N=25)	Mean	69.36
	SD	5.49
Experimental Group (N=25)	Mean	70.32
	SD	4.95

Table 4
Independent-Samples T-Test of the Proficiency Test of the Two Groups

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Proficiency Test	Equal variances assumed	.33	.56	-.64	48	.51

Investigation of the First Research Question

To respond to the study's initial research question, the data was analyzed through non-parametric formulae since each of the five mini-groups, made up of five participants, wrote one collaborative writing together, and therefore, the researchers received only five writings for the pretest and the posttest of each CG and EG. To start with, the descriptive statistics of the pretest and posttest scores of the two groups are

reported in Table 5. Next, two Wilcoxon Signed Rank Tests (Table 6) were run to track the amount of effect the treatment sessions had on the participants' performance from the pretest to the posttest. Then, two Mann-Whitney tests (Table 7) were run to see whether the two groups had the same performance in either the pretest or the posttest based on whose results it is possible to compare the amount of the two groups' improvement.

Table 5
Descriptive Statistics of the Pretest and Posttest Scores of the Two Groups

	Pretest of CG	Posttest of CG	Pretest of EG	Posttest of EG
N	25	25	25	25
Mean	5.32	5.77	4.95	5.72
Median	5.12	5.50	4.87	6.00
Std. Deviation	.54	.83	.18	.54
Range	1.38	2.00	.50	1.38
Minimum	4.88	5.00	4.75	4.88
Maximum	6.25	7.00	5.25	6.25

Referring to the mean scores of the two groups' performance on their pretest shown in Table 5 (i.e., 5.32 and 4.95 for the CG and EG), it can be said that although not very different, the participants of the control group outperformed the experimental group. Comparing the two groups' mean scores on their posttest, which are very close to each other (i.e., 5.77 and 5.72 for the CG and EG), and checking the amount of the change the two groups had from pretest to posttest, the conclusion is that learners of the experimental group had more improvement from pretest to posttest.

Table 6
Wilcoxon Signed-Rank Test of the Pretest and Posttest of the Two Groups

	CG	EG
Total N	25	25
Test Statistic	13.00	10.00
Standard Error	3.70	2.73
Standardized Test Statistic	1.48	1.82
Asymptotic Sig. (2-sided test)	.13	.06

According to the results presented in Table 6, the development observed in the performance of the participants of the control group from the pretest to the posttest was not noteworthy for the significant value is .13 which is higher than the critical .05 level ($p=.13$; $\alpha=.05$; $p>\alpha$). That is, there was not a considerable improvement in the participants' performance from pretest to posttest. As it is illustrated in Table 6, although the participants of the experimental group had more progress, their progress was not significant either since the significant value showing the amount of improvement in their performance from pretest to posttest is .06 which is higher than the critical level ($p=.06$; $\alpha=.05$; $p>\alpha$). That is, the experimental groups' participants did not perform significantly better in the posttest. However, since the significant value related to the participants of the experimental group's performance from pretest to posttest was very close to the critical value of .05, it can be concluded that computer-assisted peer negotiation had a good positive effect on the experimental group's performance, although it did not reach the critical level.

Next, the amount of the difference between the performance of the participants of the two groups, i.e., control and experimental, before and after the instructional sessions was checked to see which group had more progress. To do so, two Mann-Whitney Tests (Table 7) were run on the two groups' pretest and posttest scores.

Table 7
Mann-Whitney Test of the Pretest and Posttest of the CG and EG

	Pretest	Posttest
Total N	50	50
Mann-Whitney U	5.50	12.00
Wilcoxon W	20.50	27.00
Test Statistic	5.50	12.00
Standard Error	4.71	4.74
Standardized Test Statistic	-1.48	-.10
Asymptotic Sig. (2-sided test)	.13	.91

As shown in Table 7, the significant value comparing the pretest scores of the two groups is .13 and bigger than the critical level ($p=.13$; $\alpha=.05$; $p>\alpha$). Therefore, the two groups' performance was not considerably different from each other in the pretest. The outcomes of the Mann-Whitney Test also compare the posttest scores of the two groups (i.e., .91). Since the value is higher than the critical level ($p=.91$; $\alpha=.05$; $p>\alpha$), it can be concluded that neither group outperformed the other one significantly. To wrap up, the conclusion is that although the control and experimental groups initiated with almost the same level of English knowledge at the start of the study, the experimental group had a better performance at the end of the research and on their posttests, however, the amount of this improvement was not significantly higher. The conclusion then, led the researchers to present a negative answer to the first research question.

Investigation of the Second Research Question

To answer the second research question, concerning the learners' attitude towards online collaborative writing, the researchers first present a full explanation of the participants' attitudes towards the online collaborative writing instruction through descriptive statistics (Table 8).

Table 8

Descriptive Statistics of the Learners of the EG's Pre- and Post-instruction's Attitude Towards the Online Collaborative Writing

	Pretest		Posttest	
	Mean	SD	Mean	SD
Being interactive with peers using online collaborative learning tools increases my motivation for learning.	3.64	.75	3.88	.83
I enjoy experiencing online collaborative learning using online collaborative tools with my peers.	3.72	.89	3.84	.80
Online collaborative activity increases our creativity.	3.60	.86	3.72	.98
I believe that collaborative work can be effective when using with online collaborative tools.	4.04	.88	3.72	.67
Online collaborative activities improve social skills.	3.88	.88	3.72	.84
I enjoy solving issues regarding collaborative work using online collaborative tools with my peers.	3.84	.80	3.72	.93
More ideas come up when working collaboratively using online collaborative tools.	3.72	1.24	4.08	.86
Online collaborative tools are very entertaining to me.	3.44	1.08	3.56	.91
I think I have had/will have more successful results as I work collaboratively with my peers using online collaborative tools.	3.48	1.08	3.68	.94
Trying to teach something to my peers using online collaborative tools makes me tired.	2.24	.97	2.36	.90
Online collaborative tools are not suitable for me.	2.36	1.15	1.92	.95

To wrap up, to check if there is a considerable change in the experimental groups' participants' attitudes regarding the computer-assisted peer negotiations while most of them announced the usefulness of the technology and also collaborative

work both before and after the instructional sessions, a paired-sample t-test was run on the pre- and post-instruction total scores on the questionnaire. First, Table 9 presents the descriptive statistics of the total scores on the questionnaire.

Table 9

Descriptive Statistics of the Responses Provided by the Participants of the Experimental Groups to the Attitude Questionnaire

		Pre-instruction	Post-instruction
Experimental Group	N	25	25
	Mean	37.96	38.20
	SD	5.35	4.54

Table 9 reports the information about the participants of the experimental groups' responses to the attitude questionnaire. The mean score of the experimental groups' answers to the 11 items of the questionnaire has changed from 37.96 to 38.20 from pretest to posttest

which shows that the change was not that much noteworthy. However, to ensure whether the change has been significant or not, a paired-samples t-test (Hinton et al., 2014) was run. Table 10 is presented to report the results of this analysis.

Table 10

Paired-samples T-test on the Responses Provided by the Experimental Groups' Participants to the Attitude Questionnaire

		Paired Differences		T	df	Sig. (2-tailed)
		Mean	Std. Deviation			
Pair 1	Pre- and Post-instruction of Attitude	-.240	5.854	-.205	24	.839

Table 10 compares the change observed in the attitude of the experimental groups' participants from the pre-instruction to the post-instruction administration of the questionnaire. As it can be seen, the significant value is .83, which is bigger than the critical level ($p=.63$; $\alpha=.05$; $p>\alpha$). Therefore, there is not a significant difference between the participant's responses to the attitude questionnaire from the pre-instruction to the post-instruction administration of the instrument. It means the instructions given to the learners did not cause a considerable difference in their attitudes.

DISCUSSION

The findings of this study are centered on two key discoveries: (1) the influence of computer-assisted peer negotiations on learners' collaborative writing and (2) the learners' attitude towards online collaborative learning. In response to the first inquiry, Wilcoxon signed-rank tests were conducted, revealing no statistically substantial disparity between the control and experimental groups. However, the researchers observed a positive effect on the writing skills of the experimental group as a result of computer-assisted peer negotiations. These findings are in agreement with those of the study conducted by Pritchard and Morrow (2017) comparing the effectiveness of face-to-face (f2f) and online peer response processes. They found that incorporating online peer response groups can be a starting point for literacy instructors hesitant to teach online courses, as the rules and processes for both environments are similar, but training is necessary. Similarly, Hsieh (2020) discovered that the use of online resources encourages different types of interactions among learners with different collaboration preferences. Likewise, (Pham, 2022) investigated how peer review and revision were affected by two types of feedback: oral face-to-face interaction (OF2F) and written asynchronous computer-mediated communication (WACMC). He discovered that a greater uptake rate of written comments and more revision-oriented comments resulted from the WACMC-OF2F sequence and WACMC feedback. In a similar vein, Awada and Diab (2023) examined the effectiveness of online peer review (OLPR) and face-to-face peer

review (F2FPR) in improving argumentative writing skills. The OLPR group outperformed the F2FPR group, providing more systematic feedback.

Furthermore, in the present study, the progress of learners throughout the course was assessed using the Mann-Whitney test, which revealed that both groups demonstrated improvement from the first to the last assignment. These findings corroborate several studies. For instance, Li and Zhu (2013) found that learners who utilized wikis in their collaborative writing process experienced increased flexibility in their writing. Neumann and McDonough (2015) discovered that when ESL students engaged in collaborative planning and writing, their work received higher ratings compared to writing individually. Wang (2015) uncovered that writing structure, content, and grammatical accuracy all improved when wikis were used for collaborative writing. Similarly, Vorobel and Kim (2017) reported that their participants found collaborative writing to be advantageous for developing communication skills and generated a final product with superior grammar, vocabulary, content, and organization. Jiang and Eslami (2022) also found that in Computer-Mediated Collaborative Writing (CMCW), the type of task, dyadic arrangement, and fluency and overall writing performance were highly influenced by language proficiency, but not complexity or accuracy. Likewise, Ebadijalal and Moradkhani (2023) pinpointed that collaborative prewriting (CPW) led to better writing performance compared to individual writing (IW) among Iranian EFL learners in the context of computer-mediated communication.

Considering EFL learners' attitudes toward collaborative writing, the outcomes of the present study showed that most of the learners confirmed the usefulness and practicality of technology and collaborative work. This finding was in line with Littlewood (2010) and (Trinder, 2013) who found favorable views on pair and group activities in their participants. In addition, there was a similar conclusion from Yeh and Chen (2019) who found that their participants had a positive outlook toward collaborative writing. Similarly, Pham (2021) reported that the participants of her

study emphasized the usefulness of collaborative activities and their motivating aspects. She concluded that collaborative writing can lead to better motivation, something which is also confirmed by this research as most learners had positive attitudes toward collaborative learning.

In summary, the mentioned studies highlight the benefits of collaborative writing using wikis and Google Docs as tools for learners. These benefits include increased flexibility, high motivation, enhanced writing quality, improved learning outcomes in various aspects of writing, and the development of crucial communication skills. These findings suggest that incorporating online collaborative writing activities can be a valuable pedagogical approach to writing instruction.

CONCLUSION

In the present study, the effects of computer-assisted peer negotiation on collaborative writing among EFL learners were examined, alongside an exploration of their attitudes toward online collaborative writing. While no discernible difference was seen between the experimental and control groups, the study's findings indicated that the use of computer-assisted peer negotiations positively influenced the writing skills of the experimental group. Both groups demonstrated progress throughout the course. This improvement can potentially be attributed to the integration of online collaborative writing activities within EFL instruction, which offers learners the opportunity to engage in purposeful, interactive, and task-oriented language learning experiences. Furthermore, participants in the experimental group expressed positive feedback regarding online collaborative writing, highlighting the utility and practicality of technology and collaboration in the language learning process.

The outcomes of this study have several implications for EFL students, teachers, and materials developers. For students, online collaborative writing and computer-assisted peer negotiation offer opportunities to practice and improve their writing skills within an interactive environment. They benefit from receiving feedback and suggestions from peers and teachers,

which enhances their language proficiency. Moreover, collaborative writing motivates students and fosters engagement as they work together, share ideas, and learn from one another. For teachers, online platforms enable the provision of individualized feedback during the writing process, facilitating immediate guidance and support. They can monitor students' progress, assess their language development, and tailor instruction accordingly. With online collaborative writing, teachers can also customize tasks and resources to cater to diverse learning styles and abilities. Materials developers play a crucial role in incorporating technology-enhanced activities and writing prompts into materials. They can design tasks that target effective communication and collaboration skills, such as group projects and peer editing exercises. In addition, they can utilize diverse resources such as multimedia and authentic materials to enrich the writing experience and expand students' writing skills.

This study has certain limitations that should be acknowledged. First, it only focused on the impact of computer-assisted peer negotiation on EFL students' writing quality within the context of argumentative writing. Other EFL contexts and genres of writing were not explored. Moreover, the study had a relatively small sample size of only 50 EFL students, which may limit the generalizability of the findings to a wider population. Furthermore, the study took place over a relatively short time span of ten 75-minute sessions, which might not have allowed for a comprehensive exploration of all the intricacies and nuances of the effects of computer-assisted peer negotiation on EFL students' online collaborative writing performance. Future research could consider examining these factors over an extended period of time to provide a more in-depth and thorough analysis. Additionally, it is worth noting that the study exclusively utilized the Big Blue Button learning platform. Future studies could explore the effects of other platforms such as Adobe Connect, Zoom, or Skype, to assess whether different platforms yield varying outcomes in terms of EFL students' online collaborative writing performance.

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