



The Role of Online Collaborative Writing in Enhancing Teaching English as a Foreign Language Doctoral Candidates' Abstract Writing: A Self-Determination Theory Perspective

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Abstract

Online collaborative writing is an effective method in higher education, fostering interaction and shared responsibility in academic writing. Despite the growing demand for research publications, doctoral students majoring in Teaching English as a Foreign Language (TEFL) often struggle with writing research article abstracts due to challenges in organizing their content, developing their structure, and choosing the correct language. Grounded in Self-Determination Theory, which highlights fostering autonomy, competence, and relatedness and incorporating genre-based principles, the present study developed an online collaborative academic writing course designed to enhance abstract writing performance. This 10-session online intervention was run for 40 TEFL doctoral candidates using Adobe Connect for synchronous teaching and Google Docs for asynchronous tasks. Using a quantitative experimental design, the study employed t-tests to evaluate the effectiveness of the instructional course. The results revealed a statistically significant improvement in participants' abstract writing performance following the intervention. These findings demonstrate the value of integrating technology-mediated writing instruction into teacher education and highlight the importance of fostering collaborative learning through digital platforms. Overall, the study provides practical insights for teacher trainers, professors, and researchers seeking to improve academic writing instruction in TEFL contexts.

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Introduction

Writing plays a central role in educational achievement, professional advancement, and everyday communication, particularly for foreign language learners, as it serves as an indicator of language proficiency (Teng et al., 2021). Strong writing ability allows learners to articulate scientific ideas clearly in academic settings, contributing to meaningful insights and scholarly publications (Ismail et al., 2018). Collaborative writing (CW) represents a key pedagogical approach in second language (L2) writing, emphasizing learner interaction and shared responsibility for text production (Storch, 2019). Engagement in collaborative writing tasks in higher education promotes language development and deeper understanding, as participants jointly construct written texts (Al Hilali & McKinley, 2021). With technological advancements, CW has expanded into online collaborative writing (OCW), which is increasingly prevalent in tertiary education (Anggraini et al., 2020). OCW allows students to work together through digital platforms, offering greater flexibility and reducing the limitations imposed by conventional classroom schedules (Fan & Xu, 2020). From a theoretical perspective, OCW provides opportunities for satisfying students' basic psychological needs as proposed by Self-Determination Theory (Deci & Ryan, 2000). By allowing students autonomy in their writing choices, fostering peer collaboration to satisfy relatedness, and offering structured guidance to enhance competence, OCW is expected to increase both motivation and performance in academic writing tasks.

Academic writing represents a key domain that can substantially benefit from online collaborative writing, as it is closely associated with academic achievement and encompasses abilities such as information gathering, paraphrasing, and revising (David & Anderson, 2022). The demand for well-developed academic writing skills has intensified among doctoral students in response to the increasing emphasis on publishing research articles in high-quality journals (Atai et al., 2018). Moreover, the ability to write effective research article abstracts is particularly critical, as abstracts function as concise summaries that convince editors of the significance of the reported research (Obeng-Ofori, 2020). Creating an abstract requires a systematic and organized method. Without this approach, readers may struggle to understand the content, which can decrease their interest. Poorly written abstracts can lead to negative consequences, such as reduced visibility or readership. To avoid these problems, writers need to have the necessary skills to create effective abstracts that communicate the main points of the study from the beginning (Sukan & Mohammadzadeh, 2022). Doctoral students' struggles with abstract writing can hinder satisfaction of their psychological needs for competence and autonomy, potentially decreasing engagement. Integrating OCW into abstract writing instruction may help address these challenges by creating an environment that supports intrinsic motivation and fosters skill development, consistent with Self-Determination Theory.

Furthermore, technology-supported collaborative writing offers flexibility, enjoyment, and ease through the use of modern tools like Google Docs (Zhang & Zou, 2021), which provide improved interactivity and writing quality compared to traditional paper-based methods (Li, 2018; Storch, 2019). Although by incorporating genre-based analysis, numerous studies have examined research RA abstracts in terms of their moves or tenses, to date, no study has designed an online course based on integrating a genre-based approach and collaborative

writing principles for teaching how to write RA abstracts for doctoral students majoring in TEFL. Therefore, the present study aimed to address this gap by designing such a course and measuring its effect on the performance of TEFL doctoral students in writing RA abstracts.

Accordingly, this study aimed to answer this research question:

- Does an online collaborative academic writing course improve TEFL doctoral students' abstract writing performance compared to traditional instruction?

Literature Review

Academic Writing and Research Articles

Developing a research article (RA) is fundamental to academic achievement, as it enables scholars to present original ideas and research findings (Klein, 2008). Publication in prestigious journals requires high-quality manuscripts that make a meaningful contribution to existing knowledge, thereby reflecting the academic competence of postgraduate students (Anderson et al., 2006). This process entails identifying suitable sources, developing coherent arguments, and employing accurate and appropriate language. For non-native speakers of English, research writing often poses difficulties due to limited proficiency, lack of confidence, and heightened anxiety (Zotzmann & Sheldrake, 2021). Academic writing also demands conformity to disciplinary conventions and the effective synthesis of multiple sources, a process that is especially significant for doctoral students in strengthening their critical thinking skills and scholarly identity (Paré, 2017). Ultimately, proficient academic writing promotes collaboration and knowledge exchange within the academic community (Glasiter et al., 2023).

Research Articles and Abstracts

Abstracts play a crucial role in research articles by shaping readers' first impressions and influencing the perceived value of a study. Male (2018) describes them as a distinct genre with specific rhetorical structures, and writing an effective abstract is often more demanding than writing the full article, due to the need for a concise, organized presentation (Sukan & Mohammadzadeh, 2022). Kossasih (2018) identifies four key functions of abstracts: providing accessible information, guiding reader engagement, offering a structured outline, and summarizing main ideas. To achieve these goals, writers use various rhetorical strategies, with Hyland (2004) proposing a five-move model: introduction, purpose, method, product, and conclusion. Research on rhetorical moves in applied linguistics abstracts shows diverse patterns: Pho (2008) identified three core components, Tseng (2011) found a four-move structure with tense differences, and studies using Hyland's framework (Suntara & Usaha, 2013; Hakim et al., 2020; Wijaya & Ardi, 2022) reported systematic variations across contexts. Despite extensive descriptive research, studies on teaching these moves and their linguistic features remain limited (Can et al., 2016).

Challenges in Writing Research Article Abstracts

Postgraduate students, especially doctoral candidates, often struggle with writing abstracts for their academic work (Sukan & Mohammadzadeh, 2022). Understanding that abstracts are a distinct genre with specific conventions is critical for effective communication; without this awareness, writers may produce poorly written abstracts that confuse readers regarding the

research's significance. Key challenges include adhering to the rhetorical structure of abstracts, which can affect reader comprehension (Sukan & Mohammadzadeh, 2022). New writers may find it difficult to master these structures, leading to poorly organized abstracts. Non-native English speakers also face language proficiency challenges, as the nuances of academic English can differ significantly from their native languages (Hyland, 2016), resulting in abstracts that may be too simplistic or overly complex. Additionally, authors must convey complex ideas succinctly within a 150 to 250-word limit, which can be daunting for those unaccustomed to concise writing.

Online Collaborative Writing

Online collaborative writing (OCW) has become increasingly prevalent in higher education as a mode of computer-supported collaborative learning (Anggraini et al., 2020). Within OCW contexts, learners jointly complete writing tasks in online environments under the supervision of instructors (Fan & Xu, 2020), which has been shown to improve writing proficiency (Teow, 2014), increase learner participation (Liao et al., 2018), and strengthen writing-related confidence (Yong, 2006). Students commonly divide tasks and later combine their individual contributions into a shared final text (Storch, 2018). Although asynchronous modes of instruction may limit social interaction (Akcaoglu & Lee, 2018; Lai et al., 2016), the use of synchronous communication tools can promote higher levels of engagement (Liu & Lan, 2016). Practices such as online peer feedback and virtual exchanges have been found to enhance communicative competence (O'Dowd et al., 2020; Tan et al., 2022), while Web 2.0 applications—such as Google Docs, wikis, and blogs—facilitate collaboration and remain accessible to learners with limited technical expertise (Rahimi & Fathi, 2022).

Despite the widespread adoption of Google Docs, there remains room to improve interactivity and learner satisfaction (Dinh & Nguyen, 2020). Overall, OCW supports real-time collaboration and access to diverse writing resources, thereby contributing to the development of students' writing skills (Hsu, 2020). These benefits can be explained through Self-Determination Theory, which posits that fulfilling students' needs for autonomy, competence, and relatedness enhances intrinsic motivation and engagement (Deci & Ryan, 2000). OCW supports autonomy by allowing choice in tasks, competence through feedback and scaffolding, and relatedness via peer collaboration, suggesting these psychological mechanisms underlie improvements in writing and participation.

Online collaborative writing in L2 classrooms, especially with Web 2.0 technologies, has been shown to improve writing quality and motivation (Li, 2018; Ebadi & Rahimi, 2017). Studies demonstrate that wikis and Google Docs enhance flexibility, content quality, grammatical accuracy, and collaborative skills (Wang, 2015; Aydın & Yıldız, 2014). Equitable collaboration patterns foster positive attitudes and learning outcomes (Lai et al., 2016), while group leadership and interactive tools further support motivation and performance (Selcuk et al., 2021; Teng, 2021).

In Iran, academic writing is often neglected due to traditional, teacher-centered instruction, leaving students struggling with complex assignments (Amiri & Puteh, 2017; Alavi & Rajabzadeh, 2021). Existing courses are lecture-based, limited in scope, and rarely address rhetorical moves, argumentation, or genre awareness, leading to vague expressions,

disorganized content, and plagiarism (Gholami et al., 2020). These challenges underscore the need for a systematic, genre-based approach. Accordingly, this study designed an online collaborative writing course aimed at teaching abstract writing, improving students' competence in its content, structure, and language.

Method

Participants

This study adopted a quasi-experimental design to evaluate the possible effect of an online collaborative academic writing course on research article abstract writing performance among Iranian TEFL doctoral students. 40 participants (8 males, 32 females; age range 25–50) pursuing doctoral studies at State and Azad Universities in Iran were recruited. Participation was voluntary, and students were invited to join the study through announcements distributed via departmental emails and social media channels. No course credit or other incentives were provided.

Participants were assigned to either the experimental group ($n = 20$, Collaborative Writing) or the control group ($n = 20$, Non-Collaborative Writing) using random assignment. Both groups were comparable in prior academic writing experience and demographic characteristics. To minimize contamination, experimental group materials and activities were hosted on a private online platform, and participants were instructed not to share content with peers in the control group. Instructor effects were controlled by ensuring that the same instructor facilitated both groups, providing comparable guidance and feedback. To address expectancy effects, participants were informed that the study aimed to explore different methods of abstract writing instruction, without explicitly stating that one approach was expected to be superior. All participants completed the pre-test and post-test, with no attrition reported, ensuring complete data for analysis.

Materials and Instruments

Academic Writing Placement Test

In order to ensure the homogeneity of the participants, the Academic Writing Placement Test (AWPT) was administered to the participants before running the intervention. The test is a timed assessment lasting 60 minutes, during which test-takers are required to complete a single academic essay of at least 500 words. Essays are judged based on four key factors:

- The clarity and logical flow of ideas
- The depth and organization of content
- Accuracy in grammar, vocabulary, and mechanics
- Proper use of academic conventions, such as formal style and citation practices.

Online Collaborative Course

The course was developed in accordance with Hyland's (2003) genre-based framework, which includes the stages of modeling, joint text construction, and independent text construction, as illustrated in Figure 1.

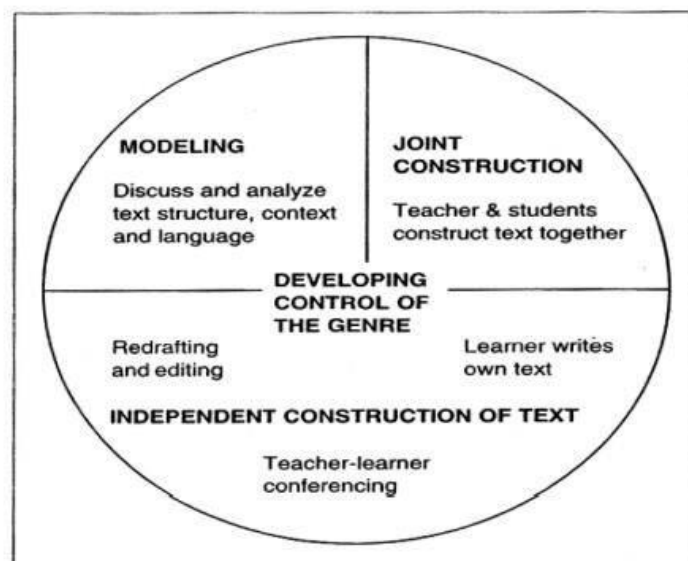


Figure 1. Hyland's Model of Genre Teaching and Learning Cycle

In addition, the content of the course was based on viewing collaborative writing as a cognitive process (Flower & Hayes, 2004), which comprises three stages of planning (pre-writing), interpreting (writing), and reviewing (post-writing) and collaborative writing as a social process (Storch, 2019), which highlights principles such as interacting with peers, sharing responsibilities, providing peer feedback, etc. Excluding the pre and post-test sessions, the course was designed for 10 sessions (5 weeks, 15 hours) of synchronous teaching on the Adobe Connect platform and 15 hours of asynchronous practice on Google Docs. The lessons and their pertinent writing tasks were devised to reinforce the participants' abstract writing skills in content, structure, and language. Figure 2 details the purposes relevant to each stage of instruction:

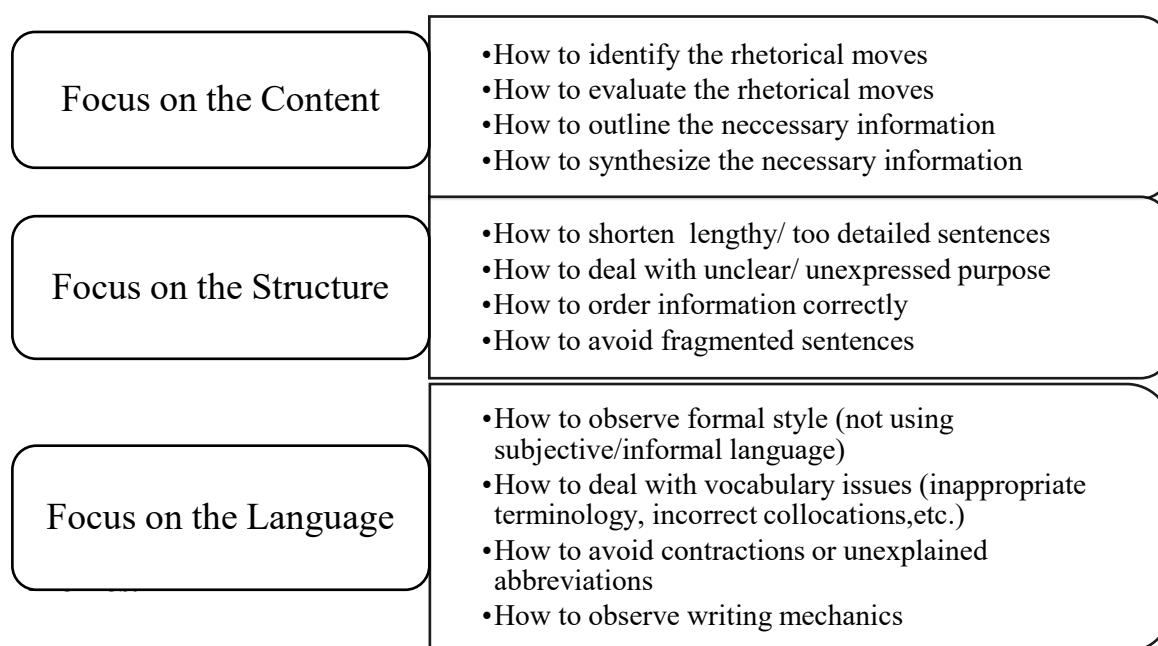


Figure 2. *Different Areas of Abstract Writing*

The researcher conducted a pre-test to collect baseline data on participants' initial performance in writing an abstract. The pre-test was based on a research article titled "*How does teacher support contribute to learners' grit? The role of learning enjoyment,*" co-authored by Hejazi and Sadoughi (2022), which focuses on second language teaching and learning.

Post-Test

A post-test was administered to assess the effectiveness of an intervention on participants' abstract writing performance. The study referenced a research article titled "*Teacher support, growth language mindset, and academic engagement: The mediating role of L2 grit*", co-authored by Sadoughi and Hejazi (2023), which falls within the field of second language teaching and learning.

Abstract Writing Assessment Checklist

To determine the effectiveness of the online collaborative course for abstract writing, an abstract assessment checklist was devised by analyzing McCombes's (2023) checklist. This checklist included 26 items that assessed the quality of abstracts based on:

- Content: 18 items evaluating rhetorical moves and sub-moves.
- Structure: 2 items assessing organization, length, and clarity.
- Language: 9 items focusing on grammar, vocabulary, and style.

Each item was rated on a five-point scale ranging from 1 (absent) to 5 (excellent). The checklist's content validity was established through review by three independent experts. With respect to reliability, the coefficients for the pre-test and post-test were 0.78 and 0.86, respectively, both exceeding the acceptable threshold of 0.60 (Tabachnick & Fidell, 2013).

Procedure

Before commencing the course, the initial abstract writing abilities of the participants in both the experimental and control groups were assessed. During the online pre-test, they neither had access to the abstract nor the title of the article. They were given 45 minutes to create their own 150–250-word abstract for the article without any collaboration or reference to other resources. After the time was up, the participants were required to email their abstracts to the researcher. After the pre-test, the course was run two sessions a week, and each session took 90 minutes. As mentioned earlier, the course was designed on Hyland's (2003) genre-based writing approach

The Modeling Phase

In the first session, prior to concentrating specifically on abstract writing, participants explored the overall structure of a research article through Swales's (1990) hourglass metaphor and Glasman-Deal's (2010) IMRD (Introduction, Methods, Results, Discussion) framework to identify key components of the introduction, methods, results, and discussion sections. Guided by the instructor, they examined a high-quality research article, breaking down its sections and discussing their communicative purposes and preferred stylistic features in breakout rooms. The second session focused on the content of the abstract, during which participants were introduced to its format and significance. They also learned to recognize different rhetorical moves in abstracts, following the model presented by Sidek (2017) in Figure 3.

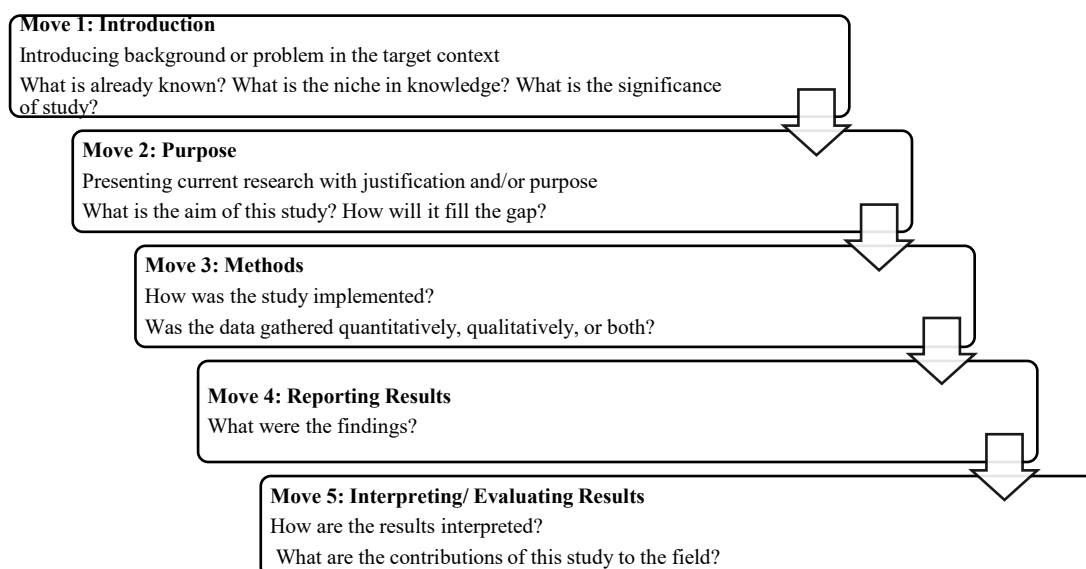


Figure 3. *Rhetorical Moves in an Abstract*

In the second session, participants engaged in breakout-room discussions about research article abstracts, addressing their features, essential components, writing challenges, and experiences with unclear abstracts. The instructor then presented examples from both high- and low-quality journals for analysis. Collaborative activities included deconstructing abstracts, applying checklists, completing tables, and reorganizing mixed-up abstracts according to rhetorical moves, fostering interaction among students and between students and the instructor.

The third session focused on the language of abstracts, where participants explored and discussed academic vocabulary, phrases, and collocational patterns associated with each rhetorical move. Activities included analyzing a table of rhetorical moves with suggested phrases, matching informal words with academic equivalents, and completing cloze exercises, all designed to encourage collaboration in breakout rooms. Participants also identified collocations within abstracts and worked together to construct grammatically and contextually appropriate sentences.

During the fourth session, attention shifted to grammar and transition words. The instructor highlighted appropriate verb tenses for each rhetorical move, and participants completed tasks requiring them to select tenses that aligned with the communicative purpose of the moves. The latter part of the session emphasized transition in connecting sentences, with participants practicing by evaluating sentences as True/False and selecting suitable transition words in complete abstracts, thereby promoting critical thinking through group discussion.

The fifth session was devoted to reviewing content from previous sessions. Participants analyzed abstracts for both content and language, responded to questions, and shared insights during group discussions, consolidating their understanding of abstract writing.

The Joint Construction Phase

In the sixth session, participants were introduced to Google Docs as a platform for collaborative drafting and were guided through the stages of the writing process, including pre-writing, drafting, and post-writing. Instruction focused on pre-writing techniques such as mind mapping, outlining, and Cornell note-taking. Following the instructions, participants worked in groups to extract relevant information from a research article and integrated their contributions into a shared document, which was subsequently submitted to the researcher.

The seventh session concentrated on the drafting stage, with particular attention to information synthesis and grammatical accuracy, including the use of different sentence structures (simple, compound, and complex). Participants practiced sentence-combining strategies, such as using participles and infinitives, and then developed their outlines into coherent paragraphs under instructor supervision, culminating in the submission of a one-paragraph abstract.

The eighth session focused on the post-writing phase, emphasizing reviewing, revising, and editing. Participants were provided with a sample abstract to critique and improve, offering feedback on organization, coherence, and common drafting problems. The instructor delivered individualized feedback, and selected abstracts were discussed in the main room to address questions and provide clarification.

The Independent Construction Phase

In the ninth session, in line with Hyland's (2003) independent construction stage, participants were asked to read a research article without an abstract and spend 20 minutes independently preparing an outline, followed by 40 minutes composing a complete abstract, which they submitted to the researcher via email. The tenth session was devoted to peer review, during which participants assessed one another's abstracts in breakout rooms and discussed issues related to content, organization, and language. Guiding questions directed attention to

rhetorical moves, verb tense, informal expressions, collocations, and punctuation. The instructor subsequently reviewed selected abstracts and provided further feedback and clarification.

Throughout the course, the experimental group completed asynchronous writing tasks through Google Docs, working in small groups to comment on, revise, and provide feedback on each other's drafts. They participated in all three instructional phases—modeling, joint construction, and independent construction—analyzing sample abstracts, drafting texts, and revising their work based on peer and instructor feedback.

By contrast, the control group was taught through a traditional teacher-centered approach. The instructor modeled abstracts and conducted whole-class discussions, with feedback delivered primarily in a unidirectional manner. Peer review was limited, and opportunities for collaboration and self-regulation were minimal. Although the control group received the same instruction on abstract writing, they did not engage in collaborative or joint writing tasks. Overall, the experimental design contrasted the effects of scaffolded, collaborative writing with those of conventional, non-collaborative instruction.

At the conclusion of the course, a post-test was administered to examine the impact of the intervention on participants' abstract writing performance. Given that only the article title or abstract was available, participants in both the experimental and control groups were required to write an abstract for the article within 45 minutes and submit it electronically to the researcher.

Data Analysis

All abstracts produced in the pre-test and post-test phases were independently evaluated by two trained raters to establish interrater reliability. Before scoring, the raters participated in a calibration session using a sample of abstracts to become familiar with the 26-item analytic checklist and the anchor descriptors. To reduce potential scoring bias, the raters were blind to both participants' group assignment and the testing phase. Interrater agreement was assessed using the intraclass correlation coefficient (ICC), which revealed a high level of consistency.

Baseline equivalence between the experimental and control groups was examined through an independent-samples t-test on pre-test scores, confirming the absence of a statistically significant difference before the intervention. To address the primary research question, post-test scores were compared using an independent-samples t-test, while within-group changes from pre-test to post-test were analyzed using paired-samples t-tests. Effect sizes for both between-group and within-group comparisons were computed using Cohen's *d*, and 95% confidence intervals were reported.

As a robustness check, an analysis of covariance (ANCOVA) was performed, with post-test scores as the dependent variable, group as the fixed factor, and pre-test scores entered as the covariate to control for any remaining baseline differences.

All statistical analyses were carried out using SPSS with a significance level of $\alpha = .05$. The assumptions of normality and homogeneity of variance were examined using the Shapiro–Wilk and Levene's tests, and no serious violations were observed. An a priori power analysis

conducted with G*Power indicated that a total sample of 40 participants provided .80 power to detect a large effect size ($d = 0.80$).

Results

Inter-Rater Consistency

Table 1 below presents the descriptive statistics of the scores given to the two groups by two raters before and after the treatment.

Table 1. *Descriptive Statistics of the Two Groups' Writing Scores Given by Two Raters*

			N	Min.	Max.	Mean	SD	Skewness	
								Statistic	S.E.
Control	Pretest	Rater1	20	69.00	94.00	82.05	7.6946	.018	.512
		Rater2	20	70.00	95.00	82.10	7.7724	.044	.512
	Posttest	Rater1	20	74.00	110.00	93.20	7.6475	-.189	.512
		Rater2	20	77.00	108.00	93.00	6.5454	-.041	.512
Experimental	Pretest	Rater1	20	68.00	96.00	80.35	10.1425	-.533	.512
		Rater2	20	69.00	95.00	79.90	9.3971	-.335	.512
	Posttest	Rater1	20	98.00	123.00	111.40	7.9100	-.051	.512
		Rater2	20	100.00	123.00	111.30	7.8679	-.028	.512

As reported in Table 1, within all tests, the mean values obtained from the ratings of the first and second raters were close to each other. Moreover, the inspection of skewness ratios (skewness statistics divided by its standard error (S.E.)) showed that none of the distributions were significantly skewed as the values fell within the legitimate range of ± 1.96 for normal distributions (Tabachnick & Fidell, 2013). Therefore, running a parametric Pearson correlation to measure the inter-rater consistency was legitimized. Table 2 reports the results.

Table 2. *Inter-Rater Consistency*

		VAR00008	VAR00009
VAR00008	Pearson Correlation	1	.991**
	Sig. (2-tailed)		.000
	N	80	80
VAR00009	Pearson Correlation	.991**	1
	Sig. (2-tailed)	.000	
	N	80	80

** . Correlation is significant at the 0.01 level (2-tailed).

As reported, the two raters had high ($r = .991$) and significant ($p < .01$) consistency in scoring the writing papers.

Descriptive Statistics

The abstract writing performance of the two groups was measured both before and after the treatment. Table 4.3 below provides the descriptive statistics of the scores.

Table 3. Descriptive Statistics of the Abstract Writing Scores of the Two Groups

Group		N	Min.	Max.	Mean	SD	Skewness	
							Statistic	Std. Error
Control	Pretest	20	70.00	94.50	82.0750	7.6558	.039	.512
	Posttest	20	75.50	109.00	93.1000	7.0367	-.121	.512
Experimental	Pretest	20	56.50	95.50	80.1250	9.7250	-.436	.512
	Posttest	20	99.00	123.00	111.3500	7.8339	-.041	.512

The values reported in Table 3 indicate that the two groups' mean scores were relatively close in the pretest, but they showed a considerable difference in the posttest. The inspection of the skewness ratios (statistics / std. error) indicated that all distributions were normal, as the value fell within the legitimate range of ± 1.96 . This acknowledges the meeting of the assumption of normality stated above in section 4.2 for writing scores.

Initial Homogeneity

As reported above, the two groups' writing scores in the pretest were close to one another. However, to test if the existing difference is significant, an independent samples t-test was run (Table 4).

Table 4. Independent Samples T-Test on Two Groups' Writing Pretest Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	(2-Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	.810	.374	.705	38	.485	1.95000	2.76756	-3.65264	7.55264
	Equal variances not assumed			.705	36.015	.486	1.95000	2.76756	-3.66280	7.56280

The results presented in Table 4 indicate that the variances of the two groups were not significantly different (Levene's $F = 0.81$, $p = 0.374 > .05$). Consequently, the t-test was reported under the assumption of equal variances (first row of the table). The resulting t-value of 0.705 was not significant ($p = 0.485 > .05$), suggesting no initial difference in writing scores between the groups. Thus, any significant differences observed in post-test performance can be attributed to the effect of the intervention.

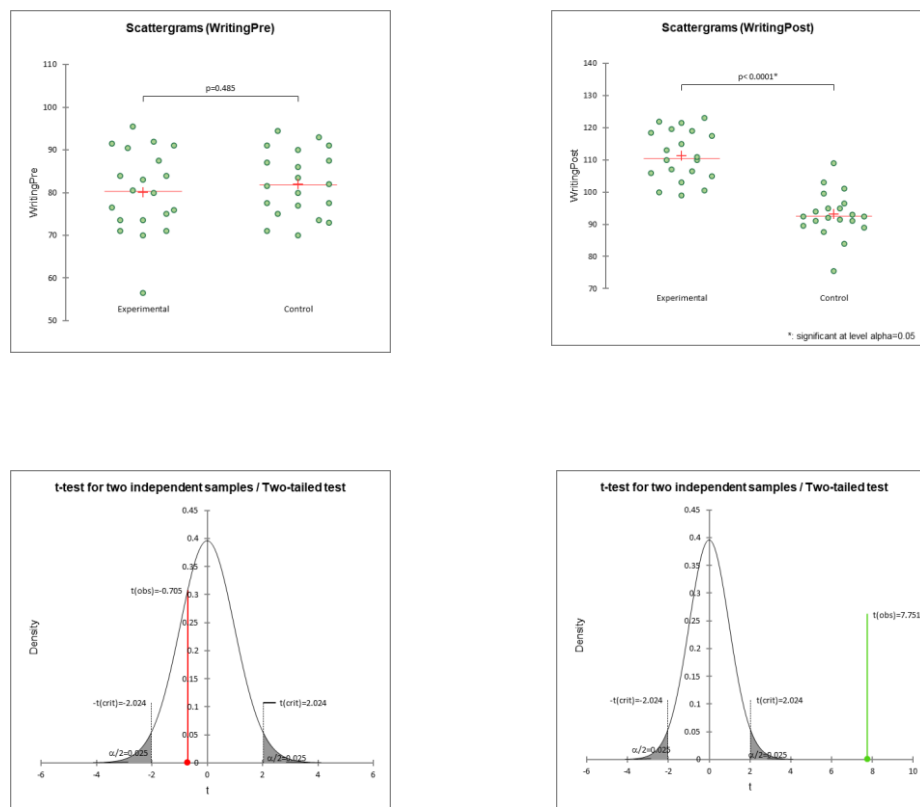
Impact of Online Collaborative Writing Course

An independent samples t-test was conducted on the post-test scores to address the research question. Since the groups were confirmed to have no significant differences in abstract writing prior to the intervention, comparing their post-test scores provides insight into the effect of the treatment. The results are presented in Table 5.

Table 5. Independent Samples T-Test on Two Groups' Writing Posttest Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	(2-Mean Difference	Std. Error Difference	Lower Upper
Posttest	Equal variances assumed	1.766	.192	7.751	38	.000	18.25000	2.35464	13.48328 23.01672
	Equal variances not assumed			7.751	37.571	.000	18.25000	2.35464	13.48149 23.01851

The results in Table 5 showed that the two groups' variances were not significantly different from one another (Levene's $F = 1.766$, $p = .192 > .05$). Therefore, the results of the t-test were reported assuming equal variances (the first row in the table).



a) Pretest

b) Posttest

Figure 4. Scattergram and Significance Testing of the Scores of the Participants' Writing scores in the Pre-test and post-test

The t-test results ($t(38) = 7.751$, $p = .000 < .05$) indicate a significant difference between the post-test mean scores of the two groups, with the experimental group outperforming the control

group (Figure 4). The effect size, calculated using Cohen's d ($d = f$), was 1.25, indicating a large effect.

Discussion

The present investigation explored whether engagement in an online collaborative academic writing course could improve the abstract writing performance of Iranian TEFL doctoral candidates. The t-test analyses revealed that although both the experimental and control groups demonstrated gains from pre-test to post-test, the experimental group, which received collaborative writing instruction, achieved significantly higher post-test scores than the control group. This result is consistent with earlier studies highlighting the supportive role of online collaborative writing in enhancing writing performance (Hsu, 2020; Selcuk et al., 2021; Teng, 2021). Importantly, this study extends previous literature by showing that online collaborative writing not only benefits general academic writing genres but can also enhance performance in **genre-specific tasks**, such as writing research article abstracts.

The superior performance of the experimental group can be attributed to several factors inherent in the collaborative writing tasks. Synchronous online sessions fostered active learner interaction, community building, and accountability, encouraging deeper engagement in the writing process (Lowry et al., 2004; Dobao, 2012). From a Self-Determination Theory perspective, these collaborative interactions likely satisfied learners' need for **relatedness**, fostering intrinsic motivation to participate actively and invest effort in refining their abstracts. Furthermore, thought-provoking questions and structured group discussions encouraged participants to adopt a reflective and strategic approach to writing, supporting critical thinking and consensus-building, consistent with Mandusic and Blaskovic's (2015) assertion that collaborative learning stimulates higher-order cognitive skills.

The use of Google Docs and other asynchronous collaborative assignments contributed to improved information retention and writing quality (Ebadi & Rahimi, 2017). By allowing participants to engage with tasks at their own pace, edit collaboratively, and receive peer input without temporal or spatial constraints, the intervention provided a sense of **autonomy**, which, according to SDT, is critical for enhancing intrinsic motivation. Participants could decide when and how to complete tasks, select strategies for group collaboration, and contribute meaningfully to their writing groups, thereby reinforcing their engagement and ownership of the writing process (AlMarvani, 2020; Yeh et al., 2011).

Reflective practices and peer feedback played a crucial role in enhancing both competence and writing performance. Participants received and provided structured feedback, critically evaluated their own and others' work, and iteratively revised their abstracts, aligning with Kessler's (2018) emphasis on reflective practice and Weissberg's (2006) discussion of ownership in writing. According to SDT, opportunities to demonstrate and improve skills satisfy the need for competence, strengthening learners' confidence and motivation. Reciprocal peer feedback also fostered a sense of value and inclusion, further enhancing relatedness and the collaborative learning experience (Lam, 2021; Aydin & Yıldız, 2014; Liu & Carless, 2006).

Additionally, small-group discussions and live collaborative planning encouraged social interaction, dialogue, and joint problem-solving, which enhanced learners' critical engagement with content, structure, and language choices. These activities not only strengthened abstract writing skills but also reinforced intrinsic motivation through **psychological need satisfaction**, as posited by SDT. The integrated approach of combining **genre-based instruction with online collaborative activities** created a supportive learning environment in which autonomy, competence, and relatedness were simultaneously addressed, providing a theoretical explanation for the observed improvements in abstract writing performance.

Overall, the findings suggest that online collaborative writing interventions guided by **Self-Determination Theory principles** can effectively enhance both **writing performance and learner motivation** in higher education contexts. By designing tasks that promote autonomy, competence, and relatedness, instructors can create engaging, learner-centered environments that foster sustained motivation, deeper engagement, and improved outcomes in genre-specific academic writing tasks such as research article abstracts. These results provide practical implications for TEFL teacher trainers, professors, and curriculum designers seeking to incorporate technology-mediated collaborative writing strategies to strengthen doctoral students' academic writing skills.

Limitations and Suggestions for Further Research

Like any study, this research has limitations. The primary constraint is the limited generalizability of the findings, as the study focused on 40 PhD TEFL candidates in Iran, a relatively small and specific population compared to bachelor's or master's students. This sample size and educational context may limit the applicability of the results to other academic writing sub-genres or to international settings with different instructional practices. Another limitation is the short duration of the intervention, which lasted only five weeks. These limitations highlight opportunities for future research, suggesting that larger samples and longer interventions could yield more robust and reliable outcomes. Extended programs may better support iterative drafting and revision, while increased sample sizes would enhance the generalizability and reliability of findings.

Conclusion and Implications

The results indicate that online collaborative writing yields substantial advantages for both instructors and learners in EAP contexts. It supports learners' understanding of language use, facilitates the practice of rhetorical strategies, and promotes mastery of writing conventions, thereby functioning as an effective writing-to-learn approach. The integration of collaborative activities alongside traditional individual tasks is therefore recommended to improve learning outcomes. The study further demonstrates the positive influence of tools such as Google Docs on students' writing engagement and motivation, with wider implications for technology-enhanced teaching and academic writing instruction. From a practical perspective, the findings emphasize the importance of preparing teachers for technology-mediated writing instruction in order to develop the necessary pedagogical skills. Future research is encouraged to explore long-term impacts, learners' perceptions, and applications across additional genres. Overall, the study offers practical guidance for EAP practitioners, TEFL teacher educators, and curriculum developers seeking to address doctoral students' writing needs in EFL settings.

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