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Research Paper

Effect of Online Collaborative Learning via Google Docs on Writing Performance of Iranian EFL Learners

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Abstract

In recent years, technology-mediated collaborative writing has received great attention in the research literature. The purpose of the present study is to compare the effects of online collaborative writing using Google Docs and individual writing in a face-to-face conventional classroom on the writing performance of Iranian EFL learners. To this aim, a sample of 32 homogeneous intermediate learners was selected as the study's participants. They were then randomly divided into an experimental group (N = 16) and a control group (N = 16). Then, the experimental group participants performed online collaborative writing using Google Docs while the control group fulfilled individual papers in the face-to-face classroom. Two writing tasks by the students were employed to gather the data. Later, data were analyzed through paired-sample t-tests to investigate differences in writing in each group. Finally, ANCOVA was used to investigate the difference in writing performance between the two groups. This study added further insights concerning the contribution of Google Docs in technological research in technology-mediated collaborative writing and provided some pertinent pedagogical implications

Keywords: *Collaborative writing; Google Docs; individual learning; online learning; writing*

تأثیر یادگیری مشارکتی آنلاین از طریق **Google Docs** بر عملکرد نوشتاری زبان آموزان ایرانی

در سال‌های اخیر، نوشتن مشارکتی با واسطه‌ی فناوری توجه زیادی در ادبیات پژوهشی به خود جلب کرده است. هدف پژوهش حاضر مقایسه تأثیر نوشتن مشارکتی آنلاین با استفاده از Google Docs و نوشتن فردی در یک کلاس درس معمولی رو در رو بر عملکرد نوشتاری زبان آموزان ایرانی زبان انگلیسی است. برای این منظور، نمونه ای متشکل از ۳۲ فراگیر متوسط همگن به عنوان شرکت کنندگان در پژوهش انتخاب شدند. سپس به طور تصادفی به یک گروه آزمایشی (۱۶ نفر) و یک گروه کنترل (۱۶ نفر) تقسیم شدند. سپس، شرکت‌کنندگان گروه آزمایشی، نوشتن مشارکتی آنلاین را با استفاده از Google Docs انجام دادند در حالی که گروه کنترل مقالات فردی را در کلاس رو در رو انجام دادند. برای جمع‌آوری داده‌ها از دو وظیفه نوشتاری توسط دانشجویان استفاده شد. سپس داده‌ها با استفاده از آزمون t زوجی برای بررسی تفاوت‌های نوشتاری در هر گروه مورد تجزیه و تحلیل قرار گرفت. در نهایت برای بررسی تفاوت عملکرد نوشتاری بین دو گروه از ANCOVA استفاده شد. این مطالعه بینش‌های بیشتری در مورد سهم Google Docs در تحقیقات فناوری در نوشتن مشارکتی با واسطه فناوری اضافه کرد و برخی مفاهیم آموزشی مرتبط را ارائه کرد.

کلمات کلیدی: نوشتن مشارکتی; پرونده های گوگل؛ یادگیری فردی؛ یادگیری آنلاین؛ نوشتن

Introduction

Acquiring the skill of writing seems to involve a complex process comprising various sub-processes and activities that need to be internalized. For learners of English as a foreign language (EFL), writing is considered the most challenging skill due to their limited language proficiency and awareness of content, structure, and language required for composition (Weigle, 2002). According to Richards and Renandya (2002), whether in a first or second language, learning to write is one of the most difficult tasks students encounter. Unfortunately, writing is often neglected among the four language skills for EFL students despite its potential for helping them internalize vocabulary and grammar (El-Salahat, 2014). In EFL contexts where English is not frequently used, learners often see writing as a way to reinforce language forms and structures (Forbes, 2019). However, EFL learners exhibit diverse learning styles, and those with limited proficiency may require more guidance and mentoring, particularly in academic writing skills.

In contemporary communication and educational settings, the importance of effective writing skills has significantly increased (Ghoorchaei et al., 2010). One popular approach for teaching writing is collaborative work, where learners work together in pairs or small groups to write (Adams & Hamm, 1990). Previous research in L1 teaching has shown that EFL students benefit from exposure to diverse perspectives when working in pairs, leading to improved critical reflective competency as well as ample opportunities to practice the target language in various roles (Jafari & Ansari, 2012). Similarly, collaborative writing has received great attention in second language acquisition contexts. Previous research has shown that collaborative writing (CW) enhances writing quality, deepens content understanding, improves writing accuracy, and facilitates vocabulary acquisition (Coffin, 2020; Latifi et al., 2021). CW also provides opportunities for learners to brainstorm, give feedback, and create meaning (Alghasab et al., 2019).

This approach is believed to develop not only effective writing skills but also real-world social and professional skills (McDonough et al., 2019) . Collaborative writing is a dynamic area of research within the field of writing studies, involving multiple individuals working together to create written texts. In this process, learners engage in collaborative learning, interacting with, reading, and providing feedback on their peers' work in a non-threatening and comfortable environment.

In the same vein, some researchers have utilized web-based collaborative writing (WBCW) tools like Google Docs (GD) or Wikis to study learners' interaction patterns and the characteristics of CW (Yanguas, 2020). According to Parsazadeh et al. (2018), online interactive tools enhance teamwork and alleviate the problem of unequal participation. Additionally, online platforms like Google Docs offer promising features such as corrective peer-feedback, peer editing, and tracking the changes in writing courses. It seems that collaborative writing through technologies like Google Docs might be more promising than traditional face to face environments to foster writing performance of EFL students. Besides, they allow each learner in a group to edit a text and view changes made by other learners simultaneously (Al-Mansour, 2012).

Despite the interest in WBCW for its writing skill potential, there is limited research on the collaboration and interaction within small groups of culturally and linguistically diverse EFL students in Iranian context to fully explore the potentials of this tool. Against this backdrop, the present study aims to investigate impact of collaborative learning on the writing performance of Iranian EFL learners. The following the objective will be pursued in this research: to investigate the effect of online collaborative learning using Google Docs on Iranian EFL learners' writing performance versus individual face-to-face learning.

Online Collaborative Learning (OCL)

The rise of technology has brought about significant changes in the field of education, leading to the evolution of hybrid learning approaches. Online learning technology, in particular, is gaining popularity, with many established colleges now offering free online courses. This approach provides a convenient and straightforward way to access information on a wide range of subjects. Additionally, online learning has emerged as a viable option for those who face constraints in attending traditional college classes, such as limited time or financial resources.

The intersection of constructivist approaches to learning and the widespread use of the internet has given rise to a specialized form of education initially known as computer-mediated communication or networking learning, which later evolved into online collaborative learning (Carver, 2012). Online collaborative learning is a learning model that promotes and supports learners in working together to create knowledge. In this approach, students collaborate to explore innovative ideas, search for conceptual knowledge, and solve problems rather than simply memorizing presumed correct answers. While online collaborative learning requires active participation from learners to construct knowledge, it is not solely self-sufficient for effective learning. The teacher plays a crucial role as a facilitator, serving as a link to the knowledge community within the discipline.

Online collaborative learning draws upon various theoretical foundations, including conversational learning (Pask, 1978), conditions for deep learning (Marton & Säaljö, 1976), development of academic knowledge (Laurillard, 2001), and knowledge construction (Scardamalia & Bereiter, 2006). Leveraging the affordances of the internet, online collaborative learning enables students to gradually construct knowledge in discussions with other learners and interacting with teachers via learning management systems .

These online systems or forums differ from traditional classrooms in several ways (Carver, 2012). Firstly, instead of being oral, the discussions in online forums are text-based. Secondly, these online discussion systems are asynchronous, allowing students to access and participate at their own convenience, regardless of time or location. Additionally, the structure of online discussions allows individuals to follow the progression of comments and responses on a specific topic, facilitating the development of multiple sub-topics over time and enabling students to expand their discussions on various subjects.

Harasim (2012, cited in Carver, 2012) outlined three primary phases in the process of constructing knowledge through online collaborative learning: idea generation, idea organization, and intellectual convergence. During the idea generation phase, individuals within a group brainstorm and gather divergent ideas. Subsequently, they engage in comparing, analyzing, and categorizing the collected ideas through argumentation and discussion in the idea organizing phase. Finally, in the intellectual convergence phase, students reach agreement on certain ideas, synthesize them, and collaboratively create a piece of work, such as an essay. In this process, the instructor assumes a pivotal role, not only providing resources and activities but also representing a knowledge community or subject domain. In the digital age, most online classes incorporate digital curricula and tools to enhance the learning experience. One such digital application is Google Docs, known for its user-friendly interface. Google Docs proves to be an excellent tool for organizing digital writing workshops that encourage peer editing and collaborative group work. The group of individuals can simultaneously work on a document and observe real-time changes made by others through this collaborative editing feature (Chinnery, 2008).

Kessler et al. (2012) highlighted that Google Docs is a web-based word processing tool that goes beyond standard features. One of its notable functions is the ability for multiple users to access and edit the same document simultaneously, with automatic saving occurring every six seconds. This real-time collaborative editing capability allows students to engage in virtual mini-conferences regardless of their location. Additionally, Google Docs provides synchronous

communication through its built-in chatting application, making it easy for users to interact without requiring extensive training or technical expertise. Another remarkable aspect of Google Docs is that documents can be shared, opened, and edited by multiple users simultaneously, with all collaborators observing changes character-by-character. The collaborative nature of Google Docs allows multiple users to view, revise, and edit documents simultaneously, fostering a collaborative writing environment. This collaborative nature makes Google Docs a powerful tool for sharing and maintaining online documents (Woodrich & Fan, 2017). Consequently, students have the convenience of accessing their tasks at any time and from any location. The combination of these unique features makes Google Docs an indispensable application for collaborative work and document management

Method

Participants
A sample of 32 intermediate EFL learners in a private language institute in Tehran, Iran, were the participants of the present study. The aim was to investigate the effect of online collaborative learning using Google Docs on EFL learners' writing performance. The participants did not have previous experience of using Google Docs for learning. Although the learners were homogeneous in terms of their level of language proficiency (i.e. intermediate level based on the records of the language institute), a version of Preliminary English Test (PET) was administered. Based on the scores of PET, a number of 32 learners whose scores fell between +1SD and -1SD from the mean were recruited as the sample of the study. Then, they were divided into one experimental group and one control group based on the objective of the study. To avoid the effect of gender as a moderator or confounding variable, only male students were selected to participate in this study. The participants' age ranged from 20 to 26, and Persian was their first language.

Design
The study uses an experimental quantitative design. Collaborative learning using Google Docs and individual face-to-face writing were independent variables, and learners' writing scores comprised the dependent variable of the present study respectively.

Instruments
The study consisted of two main instruments: 1) an English Proficiency Test 2) a Writing test

English Proficiency Test
In order to select a representative group of students for the study, an English Proficiency Test (PET) published by Cambridge English for Speakers of Other Languages (ESOL, 2009) was administered to the English as Foreign Language (EFL) learners. This PET sample consisted of three sections: Reading (with a total of 35 points) and Listening (with a total of 25 points). The reliability coefficient for the reading and listening sections, assessed using Cronbach's Alpha formula, was found to be 0.84.

Writing Tasks
To evaluate the writing abilities of the EFL participants, they were instructed to complete a writing task both as a pre-test and a post-test. For this purpose, participants from both groups were assigned two different writing topics: A: career choice. Topic B: talking about your value.

Data Collection Procedure
This research was carried out at a private language institute during the winter of 2022. At the outset of the course, a PET version was administered to ensure the comparability of the study

participants. The experimental group engaged in collaborative writing using Google Docs, while the control group conducted individual writing sessions in a traditional classroom setting. In the initial session, participants completed a timed-writing task to establish their baseline writing proficiency**.**The learners were divided into four groups in order to share comments and edit peers' written products employing Google Docs outside the classroom. They were urged to consider key features of content, organization, language use, vocabulary, and mechanics while completing their writing tasks. More particularly, the participants had to write the first draft, share it with their peers on Google Docs in which they receive feedback. Then, they revised their writing and produced the final draft**.** In the meantime, the participants in the control group went through conventional individual writing. Specifically, they were urged to write the first draft individually inside the class. The teacher provided them with some general comments regarding the quality of their written tasks regarding content, organization, language use, vocabulary, and mechanics. Next session, the students delivered the revised version to their teacher. At the end of the course, the other writing task (Topic B) was administered to the participants to measure their writing performance as the post-test of the study.

Data Analysis Procedure
First, a Kolmogorov-Smirnov test was run to check the normality of data. Then, an independent-samples t-test was administered to compare the mean scores of PET test of the experimental and control groups (Table2). Next, paired-samples t-tests were implemented to trace the change in the mean scores of the experimental group using Google Docs as well as the control group in the pre and post-test (table3). Finally, One-Way Analysis of Covariance (ANCOVA) was run to compare the scores of experimental and control groups (Table4). In this analysis, the independent variables included online collaborative writing and individual writing and the dependent variable was the scores of the participants on the pre and post-test of writing performance.

Results
To check the normality of data, Kolmogorov-Smirnov test of normality was used (table1).

Table 1
Kolmogorov-Smirnov Test of Normality for Research Variables

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	**Df**	**Sig.**	**Statistic**	**df**	**Sig.**
Control	.365	16	.006	.871	16	.003
Experimental	.236	16	.009	.847	16	.002

As Table 1 shows, results obtained from the Kolmogorov-Smirnov test confirmed that the data satisfied the assumption of normality and therefore a parametric statistical approach was feasible for the statistical analysis of the data.
An independent-sample t-test was used to compare the PET mean scores of both groups.

Table 2
Results of the PET for experimental and control groups

Group	M	SD	T	Sig.
Experimental	64.02	14.98	-.592	.435
Control	65.89	15.66		

The findings presented in Table 2 indicated that there existed no statistically significant. The results (Table 2) showed that there was no statistically significant difference between the mean

scores of the experimental group (M = 64.02, SD = 14.98) and the control group (M = 65.89, SD = 15.66); t (32) = -.592, p > 0.00), suggesting that the two groups were not different in terms of English proficiency before the study. Then, to investigate the effects of online collaborative writing using Google Docs and individual face-to-face writing on the writing performance, a paired-samples t-test was administered to investigate the probable changes in the mean scores of the experimental group and the control group after the study.

Table 3
Results of Paired Samples T-test for Writing Performance Scores

	Pre-test		Post-test			
Group	M	SD	M	SD	T	Sig.
Experimental	10.96	3.68	16.73	4.11	-12.14	0.00
Control	10.04	3.75	14.16	3.97	-8.33	0.00

As Table 3 shows, a statistically significant increase was observed between pretest and posttest of writing performance for both the experimental group (t (16) = -13.12 p < 0.00) and the control group (t (16) = -9.45, p < 0.00). As presented in Table 2, the mean score for writing performance of the experimental group increased from 11.56 (SD = 3.85) on the pretest to 16.92 (SD = 4.01) on the posttest. In the same vein, the mean score of writing performance for the control group increased from 10.94 (SD = 3.91) on the pretest to 14.26 (SD = 3.97) on the posttest, indicating that both online collaborative learning and conventional face-to-face learning significantly improved the writing performance of the participants.

In addition, a One-Way Analysis of Covariance (ANCOVA) was performed to investigate the effects of the online collaborative learning and face-to-face learning on the EFL writing performance. In this analysis, the independent variable was the type of treatment namely online collaborative writing and individual writing in the conventional face-to-face classroom, and the dependent variable was the participants' post-test scores of writing performance.

Table 4
ANCOVA Results for Writing Performance Scores

Source	df	Mean square	F	Sig.		Partial Eta Squared
Covariate(pre-test)	1	205.566	101.845	.000	.744	
Between-subjects	1	43.762	21.681	.000		.383
Within-subjects	31	2.018				

The results of the ANCOVA analysis (see Table 4) using the General Linear Modeling technique showed that there was a statistically significant difference between the experimental group and the control group in terms mean scores of the posttest of writing performance; F(1, 31) = 21.681, p = 0.000, partial eta squared = 0.383). More specifically, the results highlighted the fact that online collaborative writing using Google Docs was more effective than individual writing in the face-to-face classroom .

Besides, Norrish's error categorization scheme (1983) was used to identify types of errors made by the participants in both groups. Based on this categorization, errors were classified into twenty-four categories. Based on the collected results in online mode using Google Docs, incomplete sentences were found to be the most problematic followed by word choice, and subject-verb agreement. In both groups, the participants had difficulty using appropriate determinants and verb tenses. However, the percentage of some errors like using correct prepositions was higher in the face-to-face classroom.

Discussion

The purpose of the current study was to compare the impacts of online collaborative writing using Google Docs versus individual writing in the face-to-face classroom on the writing performance of Iranian EFL learners. The results revealed that the writing performance of participants in both groups improved. However, online collaborative learning using Google Docs turned out to be more effective than the conventional face-to-face classroom.

The findings of the present study were in line with those of Ebadi and Rahimi (2017) who found that EFL student' academic writing abilities through Google Docs in both short-term and long-term was improved. The results of the current study may be attributed to more collaborative and convenient characteristics of Google Docs for peer-editing compared to face-to-face classroom. In addition, better performance of the experimental group might be related to the positive attitudes of the participants toward Google Docs. supported collaborative writing, as was revealed in the qualitative data of Ebadi and Rahimi (2017).

It can be argued that Google Docs, a user-friendly application, provided the participants with the ability to edit the writing of their peers easily and without time and space restrictions. Therefore, the participants were able to think about their writing assignments more deeply at their own pace and in their convenient time. But the collaborative writing in the face-to-face classroom was negatively affected by the potentially anxiety-provoking learning atmosphere due to the presence of teacher and their peers as well as time constraints for doing the written tasks (Riley Huff, 2010 .(

This finding corroborates those of Marandi and Seyyedrezaie (2017) who found that Google Drive-integrated writing instruction contributed to reducing writing anxiety of the EFL learners as the anxious students were provided with the opportunity to improve their drafts by receiving feedbacks from peers and teacher. Also, it can be stated that participants were able to not only share their written tasks with their peers by the use of Google Docs but they also could easily change, revise, and omit the texts. Therefore, they could have learned from the editing of their peers as well as the multiple comments and feedback of the others, thereby transferring what they had learned from their peers to their own written tasks.

In addition, since the participants knew that their writing would be viewed by their peers, they devoted more effort and attention to writing better quality drafts. This is in line with the findings of Blau and Caspi (2009) who corroborated the significance of peer-editing and giving feedback in improving the writing competencies of the learners. As discussed above, peer feedback which serves as a kind of peer scaffolding can help writers to carry out writing tasks more successfully. Based on the related theoretical backgrounds (Aljaafreh & Lantolf, 1994), the effective feedback should be interactively occurring between teacher and learner or between learner and learner. The findings of this study revealed that online collaborative writing using Google Docs provided effective feedback by overcoming the problems of time and space constraints, usually associated with face-to-face classrooms. In this regard, Koch (2010) claimed that nowadays students are likely to be more willing to use Google Docs as an out-of-class and online collaborative platform rather than to meet their classmates in a face-to-face classroom .

The findings of the study also indicated that online collaborative writing using Google Docs was effective in enhancing the writing self-regulation of the participants. This finding is partially in line with that of Boykin et al. (2019) who found that computer-mediated instruction accompanied by embedded self-regulation strategies could substantially improve students' writing performance. It may be argued that online collaborative writing with the use of Google Docs might have enhanced EFL learners' self-regulation strategies, such as goal setting, brainstorming, planning and monitoring, as well as their self-evaluation and metacognitive abilities in doing writing tasks. In addition, the participants who received Google Docs-supported

writing instruction felt more responsibility and took charge of their own writing, a process in which the writers began to regulate their own learning more effectively.

As postulated by Fathi et al. (2019) the use of Google Docs is likely to have increased learners' sense of agency as they were actively involved in peer editing, setting goals as well as planning and monitoring their own writing, receiving and giving feedback, thereby increasing their self-awareness and employment of control strategies in doing writing tasks. Also, peer editing and peer feedback through the use of Google Docs provided a kind of collective scaffolding (Donato, 1994) which contributed to developing effective strategies among the participants to self-regulate their learning when they were doing their writing tasks (Csizér & Tankó, 2017). Furthermore, since the participants observed peer editing and received peer feedback, they became more conscious of the criteria for an acceptable piece of writing. As a result of this further awareness, the EFL students exerted much effort in planning and monitoring their writing tasks.

Conclusions

The present investigation aimed to assess the effects of utilizing Google Docs for online collaborative writing versus individual face-to-face classroom settings on the writing performance of Iranian EFL learners. The learners collaborated in small groups in to share comments and edit peers' writings via Google Docs outside the classroom. The participants were urged to focus on content, organization, language use, vocabulary, and mechanics. In the meantime, the participants in the control group practiced conventional individual writing. The teacher provided them with some general comments regarding the quality of their written tasks. The analysis of both the control and experimental groups demonstrated that engaging in collaborative writing through Google Docs resulted in improvements in the participants' writing performance. Essentially, the findings of this study showcased a significant advancement in the writing abilities of Iranian EFL learners who participated in online collaborative writing with Google Docs. This method, involving shared tasks and peer editing, was observed to substantially contribute to the enhancement of the participants' writing skills. Google Docs facilitated tasks such as sharing, reviewing, peer editing, exchanging feedback, revising, and redrafting assignments. Additionally, Google Docs provided a practical and cost-effective platform, enabling L2 writers to submit drafts to peers and instructors for feedback and comments, thereby nurturing the development of writing skills both within and beyond the conventional classroom environment.

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Biodata

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