

## The impact of synchronous collaborative writing and *Google Docs* collaborative features on enhancing students' individual writing performance

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### ABSTRACT

Collaborative writing has gained researchers' attention due to its efficiency in enhancing students' writing abilities compared to traditional writing. More recently, more emphasis has been on computer-based versions of collaborative writing because of the introduction of *Web 2.0* and other cloud-based writing tools, such as *Google Docs* and *Wikis*, especially at the tertiary level. However, there is still a dearth of research regarding synchronous collaborative writing in mainstream K-12 classes. Therefore, this quasi-experimental quantitative study aims to investigate the impact of synchronous collaborative writing on developing fourth-grade EFL students' writing. The data were collected from the pre-tests and the post-tests of 49 students in a technology-supportive K-12 school in Riyadh-Saudi Arabia and were analyzed using independent samples t-test via SPSS version 23. The analysis of individual writing performance in the pre- and post- tests revealed that the total mean scores of the Content, Language use, and Organisation measurements increased in both the experimental group, after experiencing collaborative writing using *Google Docs*, and the control group, who used traditional pen-and-paper writing. In addition, significant differences existed in the three writing tasks (Narrative, Argumentative, and Informative) in the post-test scores of the experimental group as well as in the post-test scores between the groups, with the experimental group scoring higher than the traditional writing group. However, no significant difference was revealed between the pre- and post- test scores of the control group. In addition, it was found that the task type variable plays a vital role in collaborative writing. These findings are significant for both educators and students in implementing computer-based collaborative writing in mainstream classes and for researchers who are interested in web-based education and E-learning.

**Keywords:** CALL; Covid-19 pandemic; e-learning; *Google Docs*; synchronous collaborative L2 writing, *Wikis*

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### INTRODUCTION

Learners nowadays are born into a technology-supportive world, where they prefer easier and more accessible information processing methods, engaging activities, and instant feedback. Apparently, these learning preferences are driven and facilitated by technology (Alwahoub, 2020). Accordingly, research that interconnects technology

and language learning has increased, especially with the implementation of new technologies that support and facilitate computer-based language learning and instruction, such as *Google Docs* during the Covid-19 pandemic. Originally, Computer-Assisted Language Learning (CALL) software was basically based on the principle of passively transmitted instructions. After that, it was built on the principles

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of constructivism, where learners get more choices and independence in language use, aiming to conceptualize their own individual model (Warschauer, 1997). Surprisingly, both of these principles are considered outdated now due to the introduction of dialogism principles, where the CALL software has evolved to motivate interaction between the individual and the social audience (Warschauer, 1997).

Moreover, the continuous expansion and growth of Information and Communication Technologies (ICTs) has led to innovative trends in CALL and Technology-Enhanced Learning and Teaching (TELL) (Coniam & Kit, 2008). Accordingly, the traditional face-to-face language learning and teaching paradigm have renovated to the technology-enhanced online or blended settings in most education classrooms around the globe. In addition, web-based online education has continued to develop as innovative smart technologies have made the sophisticated web-based learning environment more attainable and efficient (Alwahoub et al., 2020; Jeong, 2015).

Web-based online learning and teaching platforms, such as *Google Docs* and *Wikis* were confirmed to improve communication, participation, and collaboration in the classroom, get learners more engaged in meaningful and authentic learning activities, and enhance learners' educational environment (Goold et al., 2010; Jeong & Hmelo-Silver, 2016). Thus, significant efforts have been exerted to implement smart technology into English writing instruction which aims to achieve a social interaction through this technology in the age of web-based education and improve students' writing and language as a whole. *Google Docs*, as one of these new social synchronous web-based tools, has been revealed to be an effective online collaborative writing tool for English teaching and learning in both L2 and FL settings when it is used synchronously in collaborative writing (Jeong & Hmelo-Silver, 2016; Khalil, 2018; Seyyedrezaie et al., 2016).

Collaborative writing is the co-authoring or the joint construction of a text, whereby the writers share the ownership of this outcome (Storch, 2005). Collaborative writing's theoretical basis originated from Vygotsky's (1978) theory of sociocultural and constructivism, which supports the natural development of learning using different means of interaction among the members of a community. Vygotsky (1978) also believes that cognitive and linguistic development happens only through social interaction. Recently, collaborative writing has become more common, especially with the high spread of cloud-based, also called web-based, storage services, such as Google Drive, Microsoft OneDrive, and Dropbox, that meet collaborative writing's needs and make sharing (Olson et al., 2017). Researchers in the field of Human-Computer

Interactions (HCI) insist on studying collaborative writing systems to support co-authors and collaborative writing. The findings of previous studies have revealed fruitful results and new theoretical frameworks for collaborative writing. Hence, synchronous collaborative writing has been significantly developed thanks to the development of cloud-based technology and Web 2.0 that enables simultaneous writing, chat, and messaging using tools such as *Google Docs* and *Wikis*. Consequently, many studies have researched the impact of computer-based collaborative writing activities (i.e., social interaction, peer feedback, and peer scaffolding) (Abrams, 2019; Alsubaie & Ashuraidah, 2017; Bhowmik et al., 2019; Liu & Lan, 2016; Suwantarathip & Wichadee, 2014; Yim, 2017) and Web 2.0 applications tools, such as *Google Docs* and wikis, on students' individual writing in various educational contexts (Ambrose & Palpanathan, 2017; Bikowski & Vithanage, 2016; Ebadi & Rahimi, 2017; Mudawe, 2018; Seyyedrezaie et al., 2016). Overall, these studies have confirmed the positive impact of these activities and tools on developing and enhancing students' writing abilities. However, the majority of these studies have investigated computer-supported collaborative writing at the tertiary and secondary levels, whereas only few studies have investigated this issue at the primary school level. Consequently, there is a dearth of research that investigated the outcomes of synchronous collaborative writing in mainstream K-12 classes (Bikowski & Vithanage, 2016; Savaşçı & Kaygisiz, 2019; Yim, 2017), especially in the EFL context. Accordingly, this study aims to thoroughly examine the impact of synchronous collaborative writing on the fourth-grade students' individual writing performance on a deeper level of understanding (i.e., content, organization, and language use) using a human-based scoring rubric in comparison with the traditional pen-and-paper writing technique.

### **Literature Review**

Many studies have investigated the new methods of collaborative writing using *Google Docs* and *Wikis* at the tertiary level. These studies have discussed various topics such as learners' perceptions of collaborative writing and its relationship with the editing behaviors (Bikowski & Vithanage, 2016; Liu & Lan, 2016; Seyyedrezaie et al., 2016; Strobl, 2013). Besides, other researchers investigated the impact of collaborative writing on developing students' writing quality and quantity (Storch, 2005; Yim, 2017) and the sense of audience (Donato, 1994). Other studies have investigated the patterns of interaction in collaborative writing, peer editing, constructive feedback, interaction, and scaffolding (Abrams, 2019; Bhowmik et al., 2019; Cho, 2017; Ebadi & Rahimi, 2019; Jeong & Hmelo-Silver, 2016; Yim, 2017; Yim et al., 2017). The findings of

these studies have highlighted the positive impact of computer-assisted collaborative writing on improving L2 writing performance (Liu & Lan, 2016; Seyyedrezaie et al., 2016; Suwantarathip & Wichadee, 2014). In the Saudi context, Aljafen (2018) and Mudawe (2018) investigated the implementation of web-based collaborative platforms (such as *Google Docs* and *Wikis*) and students' perceptions of collaborative writing platforms.

Recently, research investigating technology and language learning has gradually increased with the employment of new technologies that support and facilitate the learning process. Thus, Computer-assisted language learning (CALL) has grown through the intersection of technology and education (Warschauer & Whittaker, 1997). Moreover, other research has examined the role of cloud-based learning in facilitating language development and confirmed that online learning and teaching platforms, such as *Google Docs* and *Wikis*, could improve collaboration and interaction and help learners participate in more meaningful and authentic learning activities (Goold et al., 2010). In their study, Jeong and Hmelo-Silver (2016) confirmed that the growing attention to online collaborative technologies among educators is because of the ability of such tools to improve learners' educational environment. However, many studies investigating collaborative writing were conducted using *Google Docs* because they can be used in both synchronous and asynchronous modes. In this present study, the researchers used *Google Docs* to investigate the impact of synchronous collaborative writing on developing students' individual writing. Accordingly, the researchers divided former research into two groups: the first one investigated collaborative writing activities, and the second one investigated collaborative writing mainly using *Google Docs*.

As for studies that investigated collaborative writing activities, their focus was on students' interaction, peer-editing, constructive feedback, and peer feedback and how these activities impact learners' writing abilities. For instance, Zheng et al. (2015) investigated the texts of 257 six-grade ESL students and how they exchanged feedback in a cloud-based classroom via *Google Docs*. Their study revealed that cloud-based technology could be used in a K-12 classroom to enhance students' writing. Moreover, Bhowmik et al. (2019) highlighted the benefits of collaborative peer writing, such as participants' awareness of language use which enhanced their understanding of the meaning-making processes while writing. In a quasi-experimental study, Strobl (2013) found that collaborators scored higher on organization and content selection and that collaboration led to higher text accuracy, which was also confirmed by Donato (2014). Similarly, Yeh (2014) examined the effects

of synchronous collaborative writing on 54 EFL students' writing and found that collaborators scored better in fluency and accuracy measures. In addition, he found that synchronous writing and interactions between students helped in correcting students' linguistic misconceptions and resolving problems related to their writing. These findings are in line with Talib and Cheung (2017), who also conducted a synthesis of collaborative writing on ESL and EFL students in different levels and contexts and found that collaborative writing can develop students' writing competencies, and it has an active role in improving students' writing accuracy. In a similar token, Bikowski and Vithanage (2016) highlighted the positive role of collaboration in improving students' individual writing because the study found that collaborative groups experienced more important improvements in their individual writing, and they outperformed the less-collaborative groups. These findings were also confirmed by Liu and Lan (2016), who also found that the participants who wrote collaboratively outperformed those who wrote individually. Other studies revealed significant growths in students' scores in the collaborative group after using collaborative writing (Alsubaie & Ashuraidah, 2017; Ebadi & Rahimi, 2019). Similarly, Yim (2017) investigated the impact of collaborative writing on students' writing using three different writing tasks and highlighted the importance of task type in collaborative writing, where he found that the narrative task seemed to weaken the organizational aspect.

Other studies emphasized the role of *Google Docs* in promoting students' writing through the features of *Google Docs*, such as chat, suggestions, peer-edit, and feedback. In this context, Suwantarathip and Wichadee (2014) and Seyyedrezaie et al. (2016) found that *Google Docs* is an effective tool in enhancing students' writing abilities and writing performance because of its interactive features. Besides, Ishtaiwa and Aburezeq (2015) confirmed that collaborative writing using *Google Docs* can develop students' content and interface interactions, which will be positively reflected in students' writing. Likewise, Jeong and Hmelo-Silver (2016) found that *Google Docs* enabled students to interact more effectively; consequently, they were able to improve autonomous class participation. Furthermore, Ambrose and Palpanathan (2017) reported that there was an enhancement in students' writing outcomes after using *Google Docs*. In addition, Mudawe (2018) reported that *Google Docs* enhanced students' editing and revision writing abilities in a motivating environment.

In contrast, not all research conducted on collaborative writing had a positive impact or a significant difference. For instance, Lawrence and Lee (2016) found that students, while writing collaboratively, focused on the form rather than the

meaning. More specifically, they found that students did not correct all the errors they had while writing collaboratively, thus indicating a lack of mastery of grammatical accuracy. Furthermore, Woodrich and Fan (2017) reported that face-to-face writing groups had a higher overall score in their post-tests compared with the collaborative groups. However, most of the literature that has examined the impact of collaboration on developing students' writing was at the tertiary level. Thus, there is a lack of research that has investigated the effects of collaborative writing in mainstream K-12 classes, specifically in the Arab world. Consequently, more research is needed to address this gap in the literature. Thus, this study aims to examine the impact of collaborative writing on improving fourth-grade students' writing in the Saudi Arabia context.

Therefore, this study aims to investigate where there is a significant difference in students' individual writing performance in the three writing tasks (Narrative, Argumentative, and Informative) using the three measurements of Content, Language use, and Organization between groups writing collaboratively, using *Google Docs*, and those writing traditionally using pen-and-paper.

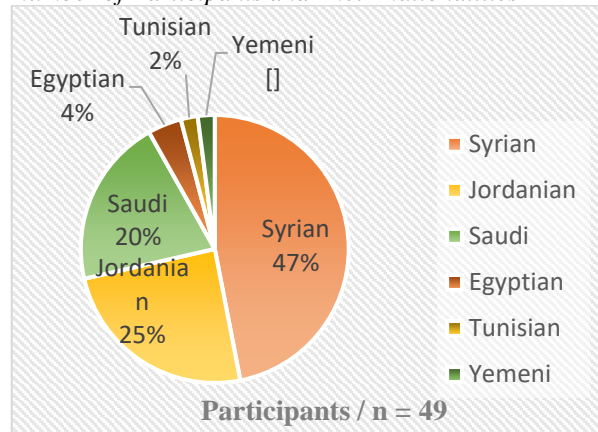
**METHOD**

**Participants**

The participants are EFL students (n=49) who most likely speak the Arabic language at home as their mother tongue, and they practise English only at school. They are mainly from Syria (Sy 47%), Jordan (Jo 25%), Saudi Arabia (SA 20%), Egypt (Egy 04%), Tunisia (Tu 02%), and Yemen (Ye 02%) (see Figure 1). This study used non-probability convenience sampling, whereby the individuals were selected because they were already available, convenient, and represented some characteristics of the aims of this study (Creswell, 2012), i.e., primary school students. Frankfort-Nachmias and Nachmias (2008) also confirmed that when random sampling is not available, non-probability sampling can be used.

**Figure 1**

*Number of Participants and Their Nationalities*



**Research Design**

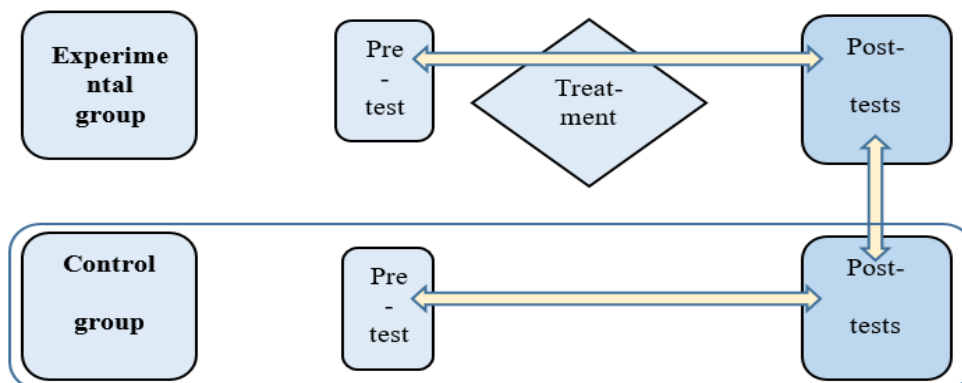
This study aims to investigate the impact of synchronous collaborative writing on developing fourth-grade students' individual writing performance using a human-based scoring rubric. This quantitative quasi-experimental study employed the Two Group Control Group Design (see Figure 2) in a technology-supportive K-12 school in Riyadh, Saudi Arabia. The participants were 4 fourth-grade EFL students divided into three classes by school (Classes 4/A & 4/B were the experimental group who used Collaborative writing using *Google Docs*, whereas 4/C was the control group that used pen-and-paper writing). The non-probability convenience sampling was used as the participants were already available in the researchers' site, and they represented some characteristics sought to study by the researchers (Creswell, 2012).

**Instrumentation**

In this study, the researchers used an experiment because, in experiments, an idea, a practice, or a procedure is being tested to decide whether it affects an outcome or a dependent variable among two groups (Creswell, 2012).

**Figure 2**

*Two-Group Control Group Design*



By using the Non-Equivalent Control Group Design, the researcher conducted a pre-test, including three writing tasks: Narrative, Argumentative, and Informative (see Table 1) for all participants (n=49; 33 in the collaborative writing group and 16 in the traditional writing group) to compare the characteristics of the experimental and the control groups and measure students' levels before the intervention.

The two groups were grouped according to their classes (Grade 4/A and 4/B as the experimental group) and (Grade 4/C as the control group) as it was difficult to mix them randomly during the regular classes. The intervention group underwent the treatment two times a week for 45 minutes per session, whereby they wrote three essays collaboratively instead of writing traditionally using pen and paper. It is important to mention that collaborative groups were distributed according to students' levels, using their GPAs, whereby capable

students were inserted into each group to make sure they motivated other peers. Both groups (the experimental and control groups) had the same prompts, materials, and handouts, and the only difference was in the method of writing (collaboratively using *Google Docs* vs. traditionally using pen and paper). Using the extended writing prompts provided by the curriculum, extra reading text, and task-relevant worksheets, three collaborative writing tasks of three different genres were assigned to both groups (i.e., Narrative, Argumentative, and Informative). In contrast, the traditional group conducted all their learning and assignments individually in classes using pen and paper. After the intervention, the post-tests were conducted for both the experimental and the control groups with different prompts to strengthen the validity of this study as students write better the more they are exposed to the same task or topic.

**Table 1**  
*Description of the Three Writing Tasks*

Task	Pre-tests Writing Tasks	Post-tests Writing Tasks
Task 1 (Narrative)	"A frightening experience you have had" by sequencing events of rising action, climax, and resolution.	"A bad experience you have had" by sequencing events of rising action, climax, and resolution.
Task (Argumentative)	How can overweight people reduce weight?	What is the best way to encourage students to read more books?
Task 3 (Informative)	E-Books and Paper Books.	Buying things online vs. shopping at malls

**Data Collection and Analysis**

As the researchers had 49 students in this study, 293 pre- and post- tests essays were obtained from the experiment. However, one student in the experimental group did not administer a pre-test. The pre-tests of the three writing genres were conducted every two days. After that, the intervention group did online collaborative writing using *Google Docs* for ten weeks, two times a week, for about 45 minutes per session. The post-tests were also conducted for both the experimental and the control groups in the same three writing genres (i.e., Narrative, Argumentative, and Informative) but using different prompts from those used in the pre-tests. The post-tests were also conducted every other day aiming to grant the participants time between each task.

Aiming to strengthen the validity of this study, the researchers included three inter-raters, who have taught and assessed writing for more than ten years. Moreover, they also used a customized human-based scoring rubric adapted from Suwantarathip and Wichadee (2014) to score these tests. According to the rubric, students got 10 points in total: Content (four points), Organisation (three points), and Language use (three points). The results of the inter-rater reliability tests were 0.536 (A-B)

and 0.645 (A-C) for the pre=tests and 0.661 (A-B) and 0.533 (A-C) for the post-tests. According to the guidelines from Landis and Koch (1977), a kappa (k) of 0.41 to 0.60 is moderate, and 0.61 to 0.80 is substantial, indicating that the three ratters had statistically significant inter-rater reliability. The numeric data obtained from the experiment were computed and analyzed using SPSS version 23 using independent-samples t-test to check any significant differences between the experimental and the control groups. Independent samples t-test was used as the study sample was 49 participants (33 in the experimental group and 16 in the control group), and it compared the mean scores of two samples (i.e., pre- and post- tests). This study computed the overall mean scores of each task alone, then it measured the mean scores of each measurement separately.

**FINDINGS**

The findings revealed a significant difference in the overall mean scores of the post-test in the experimental and control groups over the three writing tasks (p=.0001). Similarly, the pre-tests and the post-tests in the experimental group also had a significant difference (p=.000) as shown in Table 2.

**Table 2**

*Overall Mean Scores of the Pre-tests and the Post- tests of the Experimental and Control Groups in the Three Writing Tasks*

		N	Mean	SD	t	Df	Sig-(2-tailed)
Post-tests	Experimental	99	6.33	1.75	4.58	145	.0001
	Control	48	4.91	1.76			
Experimental	Pre-tests	99	5.21	1.44	-4.907	189	.000
	Post-tests	99	6.33	1.75			
Control	Pre-tests	48	4.83	1.71	-.235	94	.815
	Post-tests	48	4.91	1.76			

However, no significant difference was found in the pre- and post-tests of the control group ( $p=.815$ ). In the Narrative task, the overall mean scores of the three measurements revealed a significant difference within-group and between-group comparisons (see Table 3). However, as for

the measurements, unlike the Content and the Organization measurements, the Language use measurement succeeded in revealing a significant difference within-group ( $p=.008$ ) and between-group ( $p=.005$ ) comparisons (see Table 8).

**Table 3**

*Narrative Task Overall Mean Scores in the Experimental and Control Groups*

		N	Mean	SD	T	Df	Sig-(2-tailed)
Experimental	Pre-tests	33	4.90	1.52	-2.571	64	.012
	Post-tests	33	5.96	1.81			
Post-tests	Experimental	33	5.97	1.81	2.160	47	.036
	Control	16	4.68	2.21			

In addition, the overall mean scores of the three measurements in the Argumentative task revealed a significant difference within-group and between-group comparisons (see Table 4). However, as for the measurements, no significant difference was found in the Content and Language

use measurements in the Argumentative task between-groups and within-groups comparisons. In contrast, a significant difference was revealed in the Organization measurement in both between groups ( $p=.0006$ ) and within-groups ( $p=.003$ ) comparisons (see Table 8).

**Table 4**

*Argumentative Task Overall Mean Scores in the Experimental and Control Groups*

		N	Mean	SD	T	df	Sig-(2-tailed)
Experimental	Pre-tests	33	4.94	1.34	-2.830	64	.006
	Post-tests	33	6.06	1.83			
Post-tests	Experimental	33	6.06	1.83	2.226	47	.031
	Control	16	4.87	1.54			

This study used a customized human-based scoring rubric (see Table 5), which was adapted from Suwantarathip and Wichadee (2014) to score the pre- and the post -tests by three ratters who are experienced in teaching and scoring writing compositions. For each piece of writing, students got 10 points in total, with up to four points for the Content measurement, three points for the Organization measurement, and three points for the Language use measurement (grammar and spelling). In Table 6, the writing of Participant 01 reveals an improvement in the Organization and the Language use measurements in the post-tests, whereby he

followed the structure of the Compare and Contrast Essay and supported his essay with more details. For example, in the pre-test, How can overweight people reduce weight?, the participant wrote random short sentences, opinions, advice, and instructions. In the post-test, What is the best way to encourage students to read more books?, the participant organized his essay better by introducing an introduction (claim) and reasons that support his claim. Moreover, the contribution was higher in the post-test, and they corrected many punctuation mistakes though there are still many grammatical and spelling errors

**Table 5**  
*Human-Based Scoring Rubric*

Category	0 point	1 point	2 points	3 points	4 points
Content	No supporting details, examples, or events.	The main idea is supported by inappropriate reasons and examples, problems, and solutions, or comparisons, and contrasts.	The main idea is well supported by appropriate reasons, problems, or comparisons, but incorrect or inappropriate examples, solutions, or contrasts.	The main idea is well supported with only one appropriate reasons and examples, problems, and solutions, or comparisons, and contrasts.	The main idea is well supported by some appropriate reasons and examples, problems, and solutions, or comparisons, and contrasts.
Language Use	A lot of grammatical mistakes or misspellings	Some grammatical mistakes or misspellings	A few grammatical mistakes or misspellings	No grammatical mistakes or misspellings	-
Organization	The paragraph includes some elements of paragraph (topic sentence, supporting details, and conclusion) but no or incorrect use of transitional words.	The paragraph includes some elements of paragraph (topic sentence, supporting details, and conclusion) with correct use of transitional words.	The paragraph includes all elements of paragraph (topic sentence, supporting details, and conclusion) but no or incorrect use of transitional words.	The paragraph includes all elements of paragraph (topic sentence, supporting details, and conclusion), (rising action, climax, and resolution), or (introduction, problem, solution, and conclusion) with correct use of transitional words.	-

**Table 6**  
*A Sample of the Pre-tests and the Post-tests of Participant 01\**

Argumentative Task / Pre-test	Argumentative Task / Post-test
How can overweight people reduce their weight? So many people have problems when they are fat, And they may be sick, being fit is better.	Reading books In our countries, the children is not reading books because they have a lot thing to do and they are busy a lot and need a lot of time.
When people get fat, you can't walk, or run, you can't play with your friend, and no one will love you, so you will be alone. and you will eat so much. All around you will laugh at you.	Childrens can't because they may have a lot of home work or maybe exam and they don't have time and some of them, waste there time playing video games or sports for a match and they had sleep airily and some don't have money to take or bory books so they can't even to see the books.
You had to make exercise, and eat healthy food, and don't eat so much, don't eat before you sleep, that's how you will be fit.	One solution is that parents can let children to read more and the can put challenges. that who read more so they will read a lot to win and make it a lot. Another solution that poor people we can give them book or money to read and entertain and read more and love reading more, so they will improve the reading.
Remember don't eat so much candies and chocolate. and eat healthy food.	I think people had to read and learn better than wasting there time, so their future will be good, and learn more information about new things, or to open the computer or any device and read more books.

\*These samples have not been edited or modified, and they have been transcribed exactly as the participants wrote them.

Finally, within-group and between-group overall mean scores of the three measurements also succeeded in revealing a significant difference in the Informative task (see Table 7). Regarding the three measurements, the results showed a significant

difference between-groups and within-groups comparisons on the Content and the Organization measurements ( $p=.005$  and  $p=.0006$ , respectively). However, the results failed to reveal a significant difference in the Language use measurement (see

Table 9). For example, in Table 8, the writing of Participant 02 revealed an improvement in the Organization and the Language use measurements in the post-tests, whereby he followed the structure of the Compare and Contrast Essay and supported his essays with more details. In the Argumentative Task, for example, Participant 01 wrote a short unorganized essay in the pre-test. However, the participant developed the content, organization, and language use of his essay in the post-test, whereby he started his essay with the background information

about the topic, then he introduced the problem and solution, and finally, he concluded the essay with his opinion. Moreover, his contribution (word count) was higher in the post-test, and he corrected many punctuation mistakes though there are still many grammatical and spelling errors. In case of participant 02, he ended all his sentences with periods and added a comma after ‘finally’, which reflects an improvement in punctuation, which he missed in the pre-test (see Table 8).

**Table 7**

*Informative Task Overall Mean Scores in the Experimental and Control Groups*

Group type		N	Mean	SD	t	df	Sig-(2-tailed)
Experimental	Pre-tests	33	4.93	1.34	-2.830	64	.006
	Post-tests	33	6.06	1.83			
Post-tests	Experimental	33	6.96	1.46	3.944	47	.00001
	Control	16	5.18	1.51			

**Table 8**

*A Sample of the Original Pre-tests and the Post-tests of Participant 02\**

Informative Task / Pre-test	Informative Task / Post-test
Many people is saying E-books is beter but I think paper books although paper Books is beter to eyes although E-books you can take it with your hand easily it's not heavy.	online vs mall shopping Although shopping at mall is not dangerous at online you use your device at any device at online sometimes they trike you.
I think because paper book is simaler with e-book you can read in the ipad and laptop but they are diferent the e-book need network however paper Book you have to buy it in school you would take paper books sometimes you take E-book, the E-book is beter in any book you need you will get it. but in paper Book you go to see the Book you want and the other has finished. The tow give you information.	at online and shopping at mall there are the same things they both have somany good thing like a didas and nike. Online have days to bring it but shopping at mall you want to bring something you take it fast and in online you make search for your som ething and you got it at shopping mode you walk to the mall you want.
	Finally, I think shopping at mall is more easyier for people always go to them on and online the people aomment at thing to now if it good.

\*These samples have not been edited or modified, and they have been transcribed exactly as the participants wrote them.

It is crucial to mention that all mean scores in the experimental group increased from pre-tests to post-tests in the three writing tasks and on all three measurements. However, the control group failed to reveal any significant difference in all three measurements and tasks, but the mean scores of the pre- and post- tests had an increase in both the Content and Organisation measurements in all three writing tasks, but no increase existed in the Language use measurement (see Table 10). It might be worth noting that the standard deviations in the control group were mostly higher than the standard deviations in the treatment group in many measurements and tasks (see Table 11). Moreover, although the overall mean scores of the three writing tasks revealed a significant difference in the three

measurements of Content, Language use, and Organization, the detailed analyses of the three measurements showed that in some tasks, the same measurements failed to demonstrate a significant difference. To illustrate, the Content measurement failed to show a significant difference in the Narrative and the Argumentative tasks, but it succeeded in showing a difference in the Informative task. Moreover, the Language use measurement succeeded in revealing a difference in the Narrative task, but it failed to reveal a difference in the Informative and Argumentative tasks. Finally, the Organization measurement failed to show a difference in the Narrative task, but it succeeded in revealing a difference in the Argumentative and the Informative tasks (see Table 9).



**Table 9**

*T-test Mean Scores of the Three Measurements in the Three Writing Tasks*

Task Type	Content			Language Use			Organization		
	Experimental group Pre- and Post-tests	Control group Pre- and Post-tests	Post-tests of the two groups	Experimental group Pre- and Post-tests	Control group Pre- and Post-tests	Post-tests of the two groups	Experimental group Pre- and Post-tests	Control group Pre- and Post-tests	Post-tests of the two groups
Narrative	.056	.649	.222	.008	.480	.005	.083	.220	.203
Argumentative	.239	.100	.139	.053	.219	.232	.00006	.1000	.00003
Informative	.018	.666	.005	.134	.142	.096	.000	.325	.000006

**Table 10**

*Mean Scores of the Experimental and the Control Groups in the Three Writing Tasks*

Task Type	Test Type	Content		Language use		Organisation	
		Experimental	Control	Experimental	Control	Experimental	Control
Narrative	Pre-t	1.9697	1.8750	1.1818	1.1875	1.7576	1.4375
	Post-t	2.2727	2.0000	1.6970	.9375	2.0000	1.7500
Argumentative	Pre-t	2.1515	1.6250	1.0000	1.3750	1.7879	1.7500
	Post-t	2.3636	2.0000	1.3030	1.1250	2.3939	1.7500
Informative	Pre-t	2.4242	2.0000	1.1818	1.4375	2.1818	1.8125
	Post-t	2.7879	2.1250	1.4242	1.0625	2.7576	2.0000

**Table 11**

*Standard Deviations of the Experimental and Control Groups in the Three Writing Tasks*

Task Type	Test Type	Content		Language use		Organisation	
		Experimental	Control	Experimental	Control	Experimental	Control
Narrative	Pre-t	.58549	.71880	.76871	.98107	.50189	.72744
	Post-t	.67420	.81650	.76994	.99791	.61237	.68313
Argumentative	Pre-t	.75503	.50000	.61237	.61914	.54530	.57735
	Post-t	.82228	.73030	.63663	.50000	.60927	.77460
Informative	Pre-t	.61392	.63246	.58387	.72744	.46466	.54391
	Post-t	.59987	.95743	.70844	.68007	.43519	.51640

**DISCUSSION**

This quantitative quasi-experimental study aimed to investigate the impact of collaborative writing activities and Google Docs' collaborative features on developing students' individual writing performance. The findings showed that within-group and between-group comparisons succeeded in revealing significant differences between students' pre-tests and post-tests in the three writing tasks in the treatment group. However, the control group (traditional writing group) failed to reveal any significant difference in the three writing tasks. Although the control group had no significant difference, there were score gains in most measurements which also proved an overall

improvement in students' writing. Overall, the mean scores of the pre-tests and the post-tests of the three writing tasks demonstrated a significant difference in the experimental group that used collaborative writing (Narrative  $p=.012$ , Argumentative  $p=.006$ , and Informative  $p=.006$ ).

Vygotsky's (1978) theory of sociocultural and constructivism supports the natural development of learning using different means of interaction among the community members, where cognitive and linguistic development happens only through social interaction. Thus, this study confirmed Vygotsky's theory and earlier studies (Abrams, 2019; Alsubaie & Ashuraidah, 2017; Ambrose & Palpanathan, 2017; Bikowski & Vithanage, 2016; Cho, 2017;

Ebadi & Rahimi, 2019; Ishtaiwa & Aburezeq, 2015; Liu & Lan, 2016; Mudawe, 2018; Seyyedrezaie et al., 2016; Woodrich & Fan, 2017; Yeh, 2014; Yim, 2017; Zheng et al., 2015) that have reported the positive impact of Google Docs' collaborative features, such as chat, comments, suggestions, peer-editing, and peer interaction, and collaborative writing activities on improving students' individual writing performance and providing constructive and corrective feedback and interactions to the collaborators, thereby enhancing their individual writing abilities.

Consequently, it can be assumed that through collaborative writing activities and Google Docs' collaborative features, students were able to decrease their language defects and improve other writing aspects, such as content (the main idea), organization (essay structure and transition words), and language use (grammar and spelling). These gains were attained using peer scaffolding and collective scaffolding (Ebadi & Rahimi, 2017; Ishtaiwa & Aburezeq, 2015; Mudawe, 2018), whereby the mean scores of the pre-tests and the post-tests of the three writing tasks revealed a significant difference in the experimental group that used collaborative writing (Narrative  $p=.012$ , Argumentative  $p=.006$ , and Informative  $p=.006$ ). In line with these findings, Suwantarathip and Wichadee (2014) confirmed that students who worked and interacted with their peers via Google Docs outperformed other students even in individual writing. Similarly, Yeh (2014) found that the learners in his study benefitted from synchronous collaborative dialogues in correcting their linguistic misconceptions and getting peer feedback that helped them resolve their writing problems.

Synchronous collaborative writing using Google Docs allows students to practice the target language in situations where such practice may be difficult. So, students can use this kind of immediate interaction to improve their writing skills. In this context, the findings were found to be in accordance with Strobl (2013), who confirmed that collaborative texts were better in organization and content selection. Moreover, this study showed that collaborative writing activities such as peer interaction had a critical role in enhancing students' writing performance which agreed with Abrams (2019). Abrams (2019) also found that students' interactions in the collaborative groups, including twenty-eight first-year learners working in small groups to complete a creative writing task, motivated meaning-making and produced texts with better content and coherence ( $p=000$ ).

Furthermore, it seems that *Google Docs* had a significant role in this growth of students' writing because of its built-in features, such as interaction, editing, and feedback in motivating students' writing abilities. In line with these findings, Mudawe (2018), Seyyedrezaie et al. (2016), and

Jeong and Hmelo-Silver (2016) illustrated that *Google Docs* enhanced participation and collaboration as well as classroom interactions between students which led to the overall development in their writing. Besides, Ebadi and Rahimi (2019), Ishtaiwa and Aburezeq (2015), and Zheng et al. (2015) revealed the positive role of *Google Docs* in developing students' areas of mechanics and grammar errors correction. Likewise, Ambrose and Palpanathan (2017) confirmed that *Google Docs* is an effective tool in improving students' writing abilities.

One of the most critical findings in this study was the important role of the task-type on collaborative writing, whereby some measurements that revealed a significant difference in specific writing tasks, such as informative, argumentative, or narrative ones, failed to show any differences in other tasks. For example, the Content measurement revealed a significant difference only in the Informative task. In addition, the Language use measurement also had a difference only in the Narrative Task. However, the Organization measurement revealed a significant difference in both the Argumentative and the Informative Tasks (see Table 8). These findings align with previous studies (Aydin & Yildiz, 2014; Olson, et al., 2017; Yim, 2017) that highlighted the importance of task-type in collaborative writing and related the genre of the writing text with the text quality. Another study by Aydin and Yildiz (2014) found that the task type variable might affect the level and degree of collaboration. Although this study aimed to investigate the impact of collaborative writing on students' individual writing of the experimental group, the control groups' gains cannot be ignored. In other words, the control group did not succeed to reveal any significant difference over the three writing tasks, and its overall performance was somehow good since no treatment received at all. More specifically, the results showed score gains in the mean scores comparing between the pre-tests ( $M=4.50$  Narrative,  $M=4.75$  Argumentative) and the post-tests ( $M=4.68$  Narrative,  $M=4.87$  Argumentative) in two of the writing tasks after using traditional pen-and-paper writing.

## CONCLUSION

The results of this study illustrated the positive impact of synchronous collaborative writing using *Google Docs* on developing students' individual writing performance, particularly on the three measurements of Content, Language use, and Organisation, as significant differences were revealed in the three different writing tasks (Narrative  $p=.012$ , Argumentative  $p=.006$ , and Informative  $p=.006$ ). The results also showed an essential role of the task-type variable on collaborative writing, whereby it was noticed that

collaborative writing had a positive effect on some measurements in specific writing genres, but it failed to show any significant differences in the exact measurements in different writing tasks. Consequently, the findings of this study are beneficial for both ESL and EFL language teachers, students, and teacher trainers who aim at implementing collaborative writing in their language classes, as collaborative writing appeared to have a significant effect on EFL students' writing performance. Notably, this use of web-based technology and the collaborative features of Web 2.0 tools may extend the possibility of FL writing development and support it with better opportunities to participate in meaningful interactions that may facilitate individual linguistic growth. However, while trying to implement synchronous collaborative writing activities in the FL setting, it is essential to consider which tasks and instructions could be more beneficial and well-received by

learners. Both teachers and researchers should consider specific linguistic variables of interest and create opportunities for meaningful practice and research that best address their objectives. For instance, synchronous, in-class, time-restricted collaborative writing activities might be more beneficial to fostering qualitative development in FL writing. Moreover, the data were collected using convenience sampling during a relatively short treatment period (ten weeks). In addition, because students in the present study were already assigned to classes beforehand, it was impossible to assign participants to the experimental and control groups randomly, so quasi-experimental research was the solution. In light of these limitations, this study would recommend future researchers to conduct a true experiment instead of a quasi-experiment where the participants of the experimental and control groups will be randomly assigned into groups.

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