Impact of Collaborative Writing on the Complexity, Accuracy, and Fluency of Iranian EFL Learners' L2 Writing

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Abstract

The study aimed at investigating the effects of Individual and collaborative writing on the complexity, accuracy and fluency of Iranian intermediate EFL learners L2 written productions. To this end, sixty EFL learners were divided into two groups. The participants in both groups were asked to compose a story based on the provided picture sheet. One group worked individually, and the other group worked in pairs. T-test results indicated no significant differences in the complexity of the texts produced by the pairs and the individuals. Moreover, the findings demonstrated that collaborative writing fostered more accurate L2 written productions while individual writing promoted more fluent compositions. The results disclosed some pedagogical implications with special relevance to teaching the skill of writing.

Keywords: individual and collaborative writing, complexity, accuracy, fluency

INTRODUCTION

Writing has usually been considered a solitary task because it states the writer's individual opinions and feelings. But in reality collaborative writing is far from unusual specifically in higher education contexts where students use group work to discuss ideas, peer edit, complete joint assignments, or even proofread. They are frequently asked to work in pairs or groups to complete written assignments and this allows them to pool their linguistic resources (Wigglesworth & Storch, 2012).

In the field of L2 writing, researchers (e.g., Ahmadian & Tavakoli, 2011; Ellis, 2009; Foster & Skehan, 1999; Sangarun, 2005; Skehan, 2009; Yuan & Ellis, 2003) have manipulated various aspects of writing conditions (e.g. planning time, topic, guided/unguided), and types of tasks in an attempt to investigate the effect of different task conditions on subsequent task performance. Learners' performance has been analyzed using three dimensions of language production: complexity, accuracy, and fluency (CAF). However, despite the strong pedagogical and theoretical arguments for

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pair work, there has been relatively little empirical research comparing collaborative and individual writing.

All in all, as discussed above, even though a substantial amount of empirical research focuses on individual writing, little research examines the effect of collaborative wiring on the quality of the written productions. It was, therefore, decided to undertake further exploration and to collect additional evidence individual and collaborative in L2 written output

LITERATURE REVIEW

Several issues associated with collaborative writing which were raised from the findings of previous studies are worthy of exploration in the present study. It is well documented that the use of group and pair work can foster L2 development (Ellis, 2003; Wu, 2015). However, compared to research that examined the benefits of collaborative work for the spoken discourse, research investigating the benefits of collaborative writing is scant (Storch, 2005; Storch & Wigglesworth, 2009, Shehadeh, 2011). Consequently, comparing compositions produced collaboratively with compositions produced individually can enhance our understanding of the interactive nature of collaboration in the writing modality.

Over the past years, researchers, investigating the ways in which a learner's orientation to a task may be manipulated to promote L2 production and development, have found that providing L2 learners with pre-task planning time improves their L2 production and may improve their L2 development (e.g., Ortega, 1999; Skehan & Foster, 1999; Tuan & Storch, 2007; Yuan & Ellis, 2003). Numerous planning studies have defined the construct of planning as "the availability of a certain amount of time immediately before performing the experimental tasks" (Ortega, 1999, p. 113). Students are often given time in class to plan and prepare for their writing. Learners may carry out this kind of preparation, referred to by Ellis (2005), as strategic planning: individually or in groups.

In contrast to the large number of studies on oral performance, there have been few empirical studies on written performance (e.g., Dellerman, Coirier, & Marchand, 1996; Ellis & Yuan, 2004). Manchón and Roca de Larios (2007) stated "we do not have a well-established body of literature (in L2 writing research) that unequivocally shows *who* benefits from *what* type of planning and *when*" (p. 556). Ellis and Yuan (2004) examined the effects of different types of planning on L2 narrative writing. Participants were asked to write a story based on a set of six pictures under different task conditions (no planning, pretask planning, and on-line planning). Measures of accuracy, complexity, and fluency were employed to evaluate the quality of the participants' written outputs, which were the same as the quantifiable indices used in studies of oral performance (e.g., Mehnert, 1998; Skehan, 1996; Yuan & Ellis, 2003). Ellis and Yuan (2004) proposed that "the two types of planning impact on different aspects of L2 writing processes, with pretask planning promoting formulation and unpressured on-line planning providing better opportunities for monitoring" (p. 59). On the contrary, the no planning condition

resulted in negative consequences for the measures of accuracy, fluency, and complexity of written products in comparison to the planning conditions.

Another study (Dellerman et al., 1996) specifically examined the effects of planning in argumentative writing. These authors hypothesized that the quality of an argumentative text is dependent on prior planning of the argumentative relationships (logical, thematic, and directional) and the writer's writing proficiency. The participants were asked to complete a constrained argumentative composition based on 13 arguments that were provided in 30 minutes. Although there was no global effect of planning on the quality of written texts, the results showed that planning focused on logical relationships had a significant effect on the argumentative texts produced. As Dellerman et al. expected, planning was most effective for non-proficient writers.

The two studies documented above (Dellerman et al., 1996; Ellis & Yuan, 2004) have supported hypotheses that the presence of planned conditions results in improved written performance. These results are in line with earlier investigations of the effects of planning on L2 oral performance. As stated in Foster and Skehan (1999) this approach (i.e., individual planning) has some drawbacks. First, individual planning is not the only way that learners in classrooms utilize when they involve in planning. In the real classroom setting, it is natural that fellow students engage in the planning activity. Moreover, the use of small group and pair work is supported by the communicative approach to L2 instruction. Individual planning seems to be contrary to the central quality of communicative language teaching, i.e., the need for interaction. Second, the act of collaboration can be productive and the students who work in teams may achieve a higher order of thinking. Solitary planning may, on this basis, not be as efficient as other group-based methods of the planning phase.

Franken and Haslett (2002) conducted an experiment exploring the effects of interaction on the rhetorical features of summary writing and argument writing. The participants were required to finish their composition in two modes: by means of speaking with a peer and without speaking with a peer. The results showed that working individually resulted in significantly higher mean scores for linguistic accuracy and complexity in a summary writing task. But interaction with a peer did not enhance the quality of the written texts and had positive effects on the quantity of the argumentative texts. Franken and Haslett's results implied that interaction with a peer is effective only in argumentative writing that requires writers to have more specific domain knowledge to generate ideas and support their claim than is found in summary writing. However, that interaction did not enhance the quality of the written text.

Along the same line of research, Wigglesworth and Storch (2009) conducted a study to investigate the advantages of collaborative writing in second language contexts. Wiggleworth and Storch (2009) compared argumentative compositions produced by pairs and individuals to identify whether there were any differences in terms of the accuracy, fluency or complexity of the scripts produced. Participants were asked to write an argumentative essay debating the advantages and disadvantages of exam-based assessment. Results revealed that collaboration affected accuracy positively, but

did not affect fluency and complexity. More recently, Shehadeh (2011) revealed that collaboration had positive effects on content, organization, and vocabulary, but not on grammar and mechanics. Considering previous studies as a whole (e.g., Johnson, et. al., 1991; Stroch, 2005; Storch & Wigglesworth, 2009; Shehadeh, 2011), comparison between the writing conditions need to be tested when study designs include potentially mediating variables.

THIS STUDY

One important rationale behind the present study is that it may respond to increased calls for extension of L2 writing research in foreign language (FL) contexts by exploring the issue of pre-task planning in the domain of FL writing. Although many features of FL writing contexts are distinct from SL settings, many aspects of FL writing have been ignored in L2 writing scholarship (Manchón, 2009b). Due to the comprehensive importance of FL writing studies to theory, research and learning, L2 writing scholars emphasize the extension of L2 writing research from SL to FL contexts to broaden the perspective of L2 writing scholarship (Manchón, 2009a, 2009b; Ortega, 2009; Polio & Williams, 2009). Consequently, in an attempt to fill in these gaps in the existing literature, the current research sought to examine the influence of collaborative and individual writing on students' L2 writings in an EFL context.

Research questions and hypotheses

The following research questions were investigated in the current study.

RQ1. Does collaborative writing have any effect on the complexity of Iranian intermediate EFL learners L2 written productions?
RQ2. Does collaborative writing have any effect on the accuracy of Iranian intermediate EFL learners L2 written productions?
RQ3. Does collaborative writing have any effect on the fluency of Iranian intermediate EFL learners L2 written productions?
Based on the aforementioned issues, the following hypotheses were formulated.

$H_0$1. Collaborative writing does not have any effect on the complexity of Iranian intermediate EFL learners L2 written productions.
$H_0$2. Collaborative writing does not have any effect on the accuracy of Iranian intermediate EFL learners L2 written productions.
$H_0$3. Collaborative writing does not have any effect on the fluency of Iranian intermediate EFL learners L2 written productions.

METHOD

Research Design

To find answers to the research questions, a quasi-experimental design was taken in this study using two intact EFL classrooms as the experimental and control groups. The inter-group factor is the writing condition, with two conditions (individual and

collaborative writing conditions). The dependent variables include the three measures of complexity, accuracy, and fluency.

Sixty female intermediate EFL learners with the age ranges from 16 to 28, were selected in the current research based on the results of an Oxford Placement Test (OPT) administered before carrying out the treatment. One class was selected as the collaborative group (N = 29) and one class was chosen as the individual group (N = 31).

Participants

At the beginning of the study Eighty-nine female intermediate EFL learners with the age ranges from 16 to 28, participated in the current research. To confirm the proficiency level of the participants (i.e., intermediate level) an Oxford Placement Test (OPT) was administered before carrying out the treatment. Based on the results of the OPT, one class was selected as the experimental group (N = 29) and one class was chosen as the control group (N = 31) from among the participants whose proficiency fell at intermediate level. Consequently, there remains 29 texts produced by the experimental group and 31 texts by the control group for analysis (total number of compositions = 60).

Instruments

Oxford Placement Test (OPT)

As an indicator to identify intermediate level learners, the results of an OPT was used. The test contained 60 multiple choice items of grammar (20 items), vocabulary (20 items), reading comprehension (20 items). A multiple-choice test format was considered to be appropriate for Iranian learners who had much experience taking tests in a similar format during formal schooling. To determine the participants' level of proficiency, the OPT was administered and intermediate-level learners were selected according to their scores (30-47) on this test. According to the OPT manual the students who can obtain the score range of 30-47 can be considered as intermediate-level.

Essay Writing Task

The writing task which was selected for this study was a narrative writing task. A picture composition task was used to elicit stories from the students. The picture sheet consisted of six pictures that described a short story. Participants were required to compose a story in the given time. The picture-cued narrative activities have been used frequently in previous studies (e.g., Bitchener & Knotch, 2010, Li, 2013; Shintani & Ellis, 2015). These tasks are designed to afford a potential measure to assess the complexity, accuracy, and fluency of L2 written productions.

Measures of task performance (CAF)

As indicated earlier, measures of complexity, accuracy and fluency were used to assess the quality of learners' written productions. In the current study, complexity was measured through calculating the proportion of clauses to T-units (Foster & Skehan,

1996), a further measure which was used is the percentage of dependent clauses to all clauses, which measures the degree of embedding in a text (Wiglesworth & Storch, 2009). In addition, two general measures of accuracy were used as percentages: the proportion of error-free T-units to all T-units and the proportion of error-free clauses to all clauses (Wiglesworth & Storch, 2009). Errors were either errors of syntax such as errors in word order and missing elements or errors of morphology such as errors in use of articles and prepositions, verb tense, subject-verb agreement and errors in word forms. In addition, following Caruso (2014), Tavakoli and Rezazadeh (2014) and Wigglesworth and Storch (2009), fluency was assessed with regards to the average number of words, T-units and clauses per text. Besides, to ensure the internal reliability of the data, inter-rater reliability was obtained by using two raters. The analysis of 30 written texts was carried out by the researchers and a research assistant and the inter-rater reliability coefficient was .82.

Procedure

All the data was collected over a 2-week period in two classes at Donya e Zaban language institute in Isfahan, Iran, during the spring semester of 2016. Before the experiment participants were informed that all details of the procedures would be confidential and their essays would not be graded as part of their academic achievement. A classes was selected as the experimental (collaborative) group (N = 29) and one class was chosen as the control (Individual) group (N = 31). In the first week, to determine the participants' level of proficiency, an OPT was administered to 85 available students and intermediate-level learners were selected.. In the second week, the participants were asked to perform the wiring tasks in a normal classroom setting over the scheduled class periods.

In the individual writing condition, a picture sheet was given to the students and then they were asked to write an essay based on the six pictures on the sheet. In the collaborative writing condition, the pairs were asked to work with each other and then co-write an essay based on the picture sheet given to them. As a result of previous research which has shown that pairs take longer to complete tasks than individuals (Storch, 2005), the pairs and individuals were allocated a different amount of time. The pairs were given 45 minutes to complete the essay and the individuals were given 30 minutes.

Data analysis

SPSS Version 22 was used to perform all the statistical analyses in this study. To address the research questions, scores form the three measures of complexity, accuracy, and fluency in each of the individual and collaborative groups were subjected to a series of Independent samples t-tests.

RESULTS

The effect of collaborative writing on complexity

The first research question tried to investigate if collaborative writing had any effect on the complexity of Iranian intermediate EFL learners L2 written productions. Independent samples t-tests were conducted between the two groups. The mean scores and standard deviations of the two groups with respect to the two complexity measures are presented in Table 1. Additionally, t-tests results are demonstrated in Table 2.

Table 1. Descriptive statistics of the complexity measures

	Group	N	Mean	Std. Deviation	Std. Error Mean
Complexity	Individual	31	1.86	.334	.060
(Clauses/T-unit)	Collaborative	29	1.90	.247	.046
Complexity	Individual	31	39.34	9.696	1.741
(DepClauses/Clauses%)	Collaborative	29	40.90	7.930	1.473

Two measures were utilized to measure complex language used in participants' written products. As shown in Table 1, the mean scores of the collaborative group are slightly higher than that of the individual group. Although the complexity mean scores are slightly different, it is not clear whether this difference is statistically significant or not. Therefore, independent samples t-tests were carried out across the two group (see Table 2).

Table 2. Independent samples t-tests of the complexity measures

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
									Lower	Upper
Complexity (Clauses/ T-unit)	Equal variances assumed	3.283	.075	-.601	58	.550	-.046	.076	-.198	.107
	Equal variances not assumed			-.607	55.157	.547	-.046	.075	-.197	.105
Complexity (DepClauses/ Clauses%)	Equal variances assumed	2.200	.143	-.680	58	.499	-1.560	2.296	-6.156	3.036
	Equal variances not assumed			-.684	57.011	.497	-1.560	2.281	-6.127	3.006

T-test results, reported in Table 2, reveal that there is not any statistically significant difference between the individual and collaborative writers with regards to the two complexity measures (ratio of clauses to T-units: t (58) = - .601, p = .550; percentage of dependent clauses: t (58) = - .680, p = .499). This finding suggested that collaborative writing did not have any effect on the complexity of Iranian intermediate EFL learners L2 written productions.

Based on the obtained results, therefore, no significant differences were found in the way in which the individuals performed the tasks compared to the pairs. Therefore, the first null hypothesis stating collaborative writing does not have any effect on the complexity of Iranian intermediate EFL learners

The effect of collaborative writing on accuracy

The second research question addressed the difference between individual and collaborative writing with respect to the accuracy measures. As in the previous section, between-group analyses were performed in order to investigate the second research hypothesis. That is, two independent samples t-tests were conducted on the scores of the two accuracy measures. Table 3 presents the descriptive statistics for the accuracy scores across the two groups of individual and collaborative writing.

Table 3. Descriptive statistics of the accuracy measures

	Group	N	Mean	Std. Deviation	Std. Error Mean
Accuracy(EFClauses%)	Individual	31	66.07	13.089	2.351
	Collaborative	29	80.90	8.054	1.496
Accuracy(EFTunits%)	Individual	31	47.02	20.570	3.694
	Collaborative	29	65.35	13.644	2.534

As presented in Table 3, the mean score of the first accuracy measure (error free clauses) is greater in the collaborative group (M = 80.90) than in the individual group (M = 66.07). Similarly, Table 3 shows that the subjects in collaborative group (M = 65.35) performed better than the individual group (M = 47.02) with regard to the second measure of accuracy (error free T-unit). Nevertheless, the significance of this difference should be checked in the independent samples t-test table below.

Table 4. Independent samples t-tests of the accuracy measures

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
									Lower	Upper
Accuracy (EFClauses%)	Equal variances assumed	3.109	.083	-5.241	58	.000	-14.828	2.829	-20.491	-9.165
	Equal variances not assumed			-5.322	50.361	.000	-14.828	2.786	-20.423	-9.233
Accuracy (EFTunits%)	Equal variances assumed	1.837	.181	-4.037	58	.000	-18.324	4.539	-27.410	-9.238
	Equal variances not assumed			-4.090	52.428	.000	-18.324	4.480	-27.312	-9.337

The results of the t-tests, illustrated in Table 4, shows that there are statistically significant differences between the two group regarding both accuracy measures of error free clauses (*t* (58) = -5.241, *p* = .000) and error free T-unit (*t* (58) = -4.037, *p* = .000). Therefore, the mean score of both accuracy measures were statistically higher for the collaborative writers than for the individual ones.

Therefore, regarding the effect of collaboration on the accuracy of the composed texts, t-test results indicated that collaborative writers produced significantly more accurate compositions in comparison to the individual writers. Thus, the second null hypothesis predicting that collaborative writing does not have any effect on the accuracy of Iranian intermediate EFL learners L2 written productions was rejected.

The effect of collaborative writing on fluency

The third research question sought to examine the difference between individual and collaborative writing with respect to the fluency measures. To examine the effect of collaborative writing on the fluency of L2 written productions, the three fluency scores were subjected to series of independent samples t-tests. The descriptive statistics for the two groups are demonstrated in Table 5.

Table 5. Descriptive statistics of the fluency measures

	Group	N	Mean	Std. Deviation	Std. Error Mean
Fluency(Words)	Individual	31	171.32	22.903	4.114
	Collaborative	29	155.76	34.828	6.467
Fluency(T-units)	Individual	31	15.26	3.924	.705
	Collaborative	29	11.90	2.335	.434
Fluency(Clauses)	Individual	31	27.65	5.636	1.012
	Collaborative	29	22.48	4.695	.872

As reported in Table 5, the mean scores of the collaborative group were smaller than that of the individual group as far as the three measures of fluency are concerned. That is, collaboration did not lead to more fluent written productions. However, the significance of this difference needs to be checked using the results of the independent samples t-tests presented in Table 6.

Table 6. Independent samples t-tests of the fluency measures

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Fluency (Words)	Equal variances assumed	4.182	.045	2.058	58	.044	15.564	7.562	.426	30.702
	Equal variances not assumed			2.031	47.918	.048	15.564	7.665	.152	30.976
Fluency (T-units)	Equal variances assumed	5.931	.018	3.997	58	.000	3.362	.841	1.678	5.045
	Equal variances not assumed			4.062	49.425	.000	3.362	.827	1.699	5.024
Fluency (Clauses)	Equal variances assumed	2.178	.145	3.840	58	.000	5.162	1.344	2.472	7.853
	Equal variances not assumed			3.864	57.258	.000	5.162	1.336	2.487	7.838

Table 6 shows statistically significant differences between individual and collaborative groups regarding their scores on all of the three rates of fluency: number of word (t (58) = 2.058, p = .044), number of T-units (t (58) = 3.997, p = .000), and number of clauses (t

(58) = 3.840, p = .000). Therefore, the fluency of written texts was statistically lower for the pairs than for the individuals.

The results obtained from the fluency measures suggested that the texts written collaboratively were significantly less fluent than the texts written individually. Consequently, hypothesis three stating that collaborative writing does not have any effect on the fluency of Iranian intermediate EFL learners L2 written productions was rejected.

DISCUSSION

Results of the complexity measures indicated no significant differences in the way in which the individuals performed the tasks compared to the pairs. Therefore, the first null hypothesis was confirmed. The results for complexity are somewhat in agreement with the findings of by Storch and Wigglesworth (2007) and Wigglesworth and Storch (2009). Wigglesworth and Storch (2009) found that collaboration had no impact on grammatical complexity and there were no statistically significant differences between the texts produced by the pairs and those produced by the individuals. However, they noted that the two measures used here reflect the same construct. It is possible that other measures of complexity such might elicit different results.

The results for complexity measures failed to show a significant effect for collaborative writing. This finding contradicts the results of the studies which found that collaboration leads to more complex language use (e.g., Storch, 2001, 2005; Tuan & Storch, 2007). For example, in Storch (2005) pairs tended to write more complex sentences, as measured by the length of the T-units in words, the ratio of clauses to T-units, and the percentage of dependent clauses. It seems that the discussion with regard to the results of the complexity measures demonstrated inconclusive findings in the literature. Therefore, future research needs to be done with regard to this point.

Considering the accuracy of the writings, results indicated that collaborative writers produced significantly more accurate compositions in comparison to the individual writers. This finding is in line with that of Storch (2005), Nixon and McClay (2007), Storch and Wigglesworth (2007), Wigglesworth and Storch (2009), and Jafari and Ansari (2012). The analysis of students' texts by Storch (2005) showed that the texts produced by pairs scored higher than the texts produced by individual students in terms of accuracy. In addition, Nixon and McClay (2007) found that collaborative groups achieved higher scores than individuals on their independent writing in respect to ratings of communicative quality along with organization and linguistic appropriacy. Moreover, Storch and Wigglesworth (2007), and Wigglesworth and Storch (2009) found texts written in pairs were significantly more accurate than those written independently. Likewise, the study by Jafari and Ansari (2012) examined the effect of collaboration on Iranian EFL learners' writing accuracy, and the effect of gender on text production. Students in the experimental group were asked to write in pairs while those in the control group wrote individually. The results revealed that learners in the experimental group produced more accurate texts than those in the control group. Jafari

and Ansari (2012) stated that the improved accuracy in collaborative writing groups may be due to the increased motivation to focus on grammatical accuracy and the engagement in revision process which led to more accurate texts.

On the contrary, the fact that the collaborative writers in the present study produced significantly better texts than did the individuals conflicts with earlier research by Dobao (2012). He found no statistically significant differences in accuracy between collaboratively written texts and independently written ones, although pairs received better scores on most of the accuracy measures than did individual learners. One issue which can account for our findings with regard to accuracy is that collaborative planning afforded students the opportunity to provide and get immediate feedback on language, an opportunity which is absent when learners write individually. This may justify the reason that learners in the collaborative group wrote better texts in term of accuracy. Moreover, according to Wigglesworth and Storch (2009), Another reason might be that, when working in pairs, learners are able to pool their resources, and on the whole, to come up with the correct outcome.

The findings with regard to fluency indicated that the texts written collaboratively were significantly less fluent than the texts written individually. The findings of the present study are in congruence with other research findings such as: Watanabe (2014), Foster and Skehan (1999) and Storch (2005) who used the three measures of average number of words, T units, and clauses to assess the fluency of learners' productions. On the contrary, the results run counters to Storch (2001), Storch and Wigglesworth (2007) and Wigglesworth and Storch, (2009) who reported the similarity rates of fluency across the individual and collaborative writers.

Watanabe (2014) found that the learners produced a statistically significant greater number of words when writing independently than collaboratively, suggesting that independent writing may be more conducive for producing more written text. Additionally, in Storch (2005) the results of the comparison of individually and jointly written texts showed that pairs tended to compose much shorter texts than students who composed individually. Foster and Skehan (1999) found that group-based planning proved to be a relatively unsuccessful condition and provoked less fluency than solitary planning. One explanation is that collaborative writing provided the students with the opportunity to give and receive immediate feedback on language while writing. Therefore, they might lead to having less time to spend writing the text and as a result producing a less fluent composition with regard to the length of production i.e., average number of words, T units, and clauses.

CONCLUSION

Based on the results reported and the discussion conducted in the previous sections, several conclusions can be drawn. First, considering the effect collaborative writing on the complexity of written productions, it can be concluded that there were no significant differences in the way in which the individuals performed the tasks compared to the pairs. As indicated earlier, the discussion with regard to the results of the complexity

measures demonstrated inconclusive findings in the literature. Therefore, future research needs to be done with regard to this point.

Second, with respect to accuracy, deductions can be made that collaborative writers produced significantly more accurate compositions in comparison with the individual writers. That is, collaborative writing had a positive effect on the accuracy of the written texts. In fact, collaboration gave students the opportunity to provide and get immediate feedback on language, an opportunity which is absent when learners write individually. Moreover, when working in pairs, learners are able to pool their resources, and on the whole, to come up with the correct outcome. Third, the findings obtained from the fluency measures suggested that the texts written collaboratively were significantly less fluent than the texts written individually. Therefore, it can be inferred that individual writing may be more advantageous for producing more fluent written text.

All in all, from the obtained findings regarding the CAF measures, it can be concluded that collaborative writing is an effective and suitable technique to be used for EFL students to write more accurate compositions. CW can be used as a pedagogical tool to encourage student collaboration and create a positive social atmosphere in the classroom. Writing does not need to be a solitary act.

The present study has certain limitations that offer opportunities for further research. The students in the present study completed one collaborative writing. However, only one writing might not be able to result in significant effects in improving students' writing performance. Therefore, researchers are suggested to extend the period of treatment and have students complete more collaborative writing tasks. In addition, the measures that have been used in this and other studies to evaluate the three aspects of language use (i.e., fluency, complexity, and accuracy) need to be examined further. Researchers are suggested to consider taking a more holistic approach and try to evaluate the overall organization, cohesion and coherence. Furthermore, all participants in the present study were female students. However, based on the findings of previous research in the EFL context (e.g., Jafari & Ansari, 2012), female students tended to perform better in writing than male students. More research is suggested to examine whether there is gender effect in writing performance in the context of EFL collaborative writing. Different results might have been obtained if male students were also participated in the present study.

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