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INTERLINKING CORRECTIVE FEEDBACK WITH EAP WRITING INSTRUCTION: AN ADVANTAGEOUS ENDEAVOR?

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Abstract

This study attempted to examine the usefulness of specific Written Corrective Feedback (WCF) interventions in EAP writing courses. To this end, 75 intermediatelevel EAP learners were selected from three civil engineering classes at a public university in Iran and were randomly assigned to three groups including direct WCF group, indirect WCF group and control group. The experimental groups were provided with their appropriate WCF during 10 sessions. The researchers made an endeavor to determine the effectiveness of direct and indirect WCF strategies by examining the performances of the groups on a writing pretest and a writing posttest. The results highlighted the superiority of the feedback scenario over the nonfeedback scenario for improving the EAP learners' writing accuracy. Moreover, they underlined the fact that direct WCF was more beneficial for developing the writing skill in comparison with indirect WCF. The findings may highlight the major lines of research for the future empirical studies.

Key words

civil engineering, English for academic purposes, writing, written corrective feedback.

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1. INTRODUCTION

A close examination of the numerous studies (e.g. Bitchener, 2008, 2009, 2018; Bitchener, Young, & Cameron, 2005; Chen & Nassaji, 2018; Ferris, 2010; Karim & Nassaji, 2020a, 2020b: Lopez et al., 2018: Mao & Lee, 2020: Truscott, 1996, 2010a, 2010b) highlights the fact that *corrective feedback* has become a prerequisite of language teaching in both second and foreign language learning contexts. This kind of feedback involves the instructor's response which is triggered by means of the language learners' use of erroneous language forms during the process of interaction (Nassaji & Kartchava, 2017). The perusal of this definition underlines the fact that it focuses on the important role of learner errors in the development of the second language competence, supports the hypothesis of form-focused instruction, and restates the fundamental principle of Schmidt's (1990) noticing hypothesis. More specifically, corrective feedback can be subsumed under Chaudron's (1988) idea of error treatment, which characterizes the teachers' efforts to inform the learners of the existence of specific incongruities between their produced output and native speakers' language use. The description of the main characteristics of this kind of feedback underscores the fact that it provides the language learners with negative target language evidence (Long, 1991). To be more specific, it makes the learners aware of the ungrammatical language structures, enables them to check their correctness, and prompts them to become familiar with their relevant linguistic contexts.

The above-mentioned features describe oral corrective feedback. Notwithstanding, they exist in the definition of Written Corrective Feedback (WCF) and expound on its important assumptions (Ellis et al., 2008). Contrary to the oral corrective feedback, which targets spoken learner output. WCF aims to inform the learners of their erroneous written forms (Truscott, 2007). It is averred that this kind of feedback increases the learners' accuracy in writing and ameliorates their use of complex structures (Sheen, 2007). Furthermore, it improves the learners' target language motivation and empowers them to cast aside their grammar learning inhibitions and to use the relevant structures without hesitation (Storch & Wigglesworth, 2010).

Nonetheless, WCF has proved to be a controversial point in the field of Second Language Acquisition (SLA). The controversy over the usefulness of this type of feedback has been provoked by the supposed significant role of positive evidence in language acquisition (Long, 1996). Namely, a number of second language researchers (e.g. Truscott, 2007, 2010a; Truscott & Hsu, 2008) have highlighted the importance of the learners' exposure to the genuine use of the grammatical structures of the target language and have tried to convince the language instructors that written error correction is not effective. In a pioneering study, Truscott (1996) argued that WCF has to be abandoned in second language writing instruction due to both theoretical and practical considerations. He highlighted the fact that this kind of correction, which focuses mainly on the formal aspects of the target language,

disrupts the learners' natural order and sequence of acquisition and denies them the opportunity to accumulate the knowledge of the target language in a gradual way. Furthermore, he stated that grammar correction constitutes a difficult and laborious process in second language writing courses.

On the other hand, other researchers (e.g. Bitchener, 2008; Bitchener & Ferris, 2012; Ferris, 1999, 2010, 2014, 2015; Van Beuningen, De Jong, & Kuiken, 2012) have emphasized the need for adequate focus on the learners' errors in the relevant writing tasks to increase their written accuracy and have argued that negative evidence empowers the learners to understand the intricacies of second language writing. In this regard, Bitchener (2008) provided English as a Second Language (ESL) learners with WCF on their uses of the definite and indefinite articles. The results of this study highlighted the positive short-term and long-terms effects of WCF on the learners' accurate uses of the articles. Bitchener and Ferris (2012) examined the relevant theoretical discussions and empirical studies of WCF to support the use of WCF in second language writing courses. Ferris (1999, 2010, 2014, 2015) made an effort to corroborate the effectiveness of WCF by investigating Truscott's (1996) research evidence, reviewing the history of WCF, expounding on the EFL instructors' WCF mechanisms, and examining the methodologies of the significant WCF studies respectively. Finally, Van Beuningen et al. (2012) investigated the effect of direct and indirect comprehensive WCF, which focused on all of the categories of second language forms, on the ESL learners' writing accuracy. Based on the results, both direct and indirect WCF resulted in these learners' shortterm and long-term accuracy regarding the uses of the second language forms including nouns, verbs, adjectives, and articles among others. Moreover, the results highlighted the fact that comprehensive WCF did not have a negative effect on the learners' uses of complex grammatical structures and various vocabulary items.

A close examination of the relevant literature (e.g. Bitchener et al., 2005; Ferris & Roberts, 2001; Kepner, 1991) underlines the fact that SLA researchers have been concerned with the effectiveness of WCF in the general English writing courses. For instance, Bitchener et al. (2005) investigated the degree to which WCF had a beneficial impact on the ESL learners' accurate uses of prepositions, simple past tense, and definite article. Ferris and Roberts (2001) tried to determine the effect of different types of WCF on university-level ESL learners' self-editing ability. Finally, Kepner (1991) focused on the impacts of two kinds of WCF on the undergraduate ESL learners' writing skill.

Furthermore, the examination of the experimental studies of WCF shows that SLA researchers have supported certain lines of research at the expense of others. First, most of the relevant WCF studies (e.g. Lizotte, 2001) have focused on the feedback scenarios and have not investigated the non-feedback scenarios. Second, a large number of the relevant experimental studies (Bitchener & Knoch, 2008; Karim & Nassaji, 2020a; Shintani, Ellis, & Suzuki, 2014; Suzuki, Nassaji, & Sato, 2019; Van Beuningen et al., 2012) have focused on general English writing tasks and have not examined the effectiveness of WCF for developing the academic writing skills. Third,

the pertinent studies (e.g. Bitchener et al., 2005; Sheen, Wright, & Moldawa, 2009) have tried to determine the effect of WCF on the learners' ability to revise their drafts and have not explored their capability to use the corrected forms in their subsequent writing tasks.

Therefore, the present study attempts to deal with the above-mentioned inadequacies of the WCF research in the EAP context of Iran. To this end, it tries to determine the efficacy of the feedback scenario in the Civil Engineering EAP writing courses and to compare this scenario with the non-feedback scenario in order to cast aside the lingering doubts about the advantageous or deleterious effects of this kind of feedback on the development of the learners' second language writing skill. That is, it aims to determine the usefulness of WCF which is a type of corrective feedback that informs the language learners about their uses of erroneous written language forms by directing their attention to the relevant forms (i.e. using direct corrective feedback strategies) or attracting their attention to these forms indirectly (i.e. by means of indirect corrective feedback strategies). The study also makes an effort to determine the degree to which WCF enables the learners to take advantage of the provided feedback in their subsequent writing tasks. Consequently, the study intends to answer the following questions:

1. Do direct and indirect WCF strategies improve the EAP learners' accuracy over successive academic writing tasks?

2. Are there any differences between the effects of direct and indirect WCF strategies on the improvement of EAP learners' academic writing accuracy?

3. Does the feedback scenario have a more beneficial impact on the development of the EAP learners' academic writing skill in comparison with the non-feedback scenario?

2. METHOD

2.1. Participants

The researchers selected a public university in Iran as the research site of the present study due largely to the fact that the requisite sample of the study was easily obtainable there, and that this university was the only one in the researchers' area which approved the study. In order to select the participants, first, the researchers contacted the Civil Engineering Department of the Engineering Faculty of the university and obtained the approval of the head of the department and the dean of the faculty to carry out the present study. Seventy-five (40 male and 35 female) intermediate-level EAP learners were selected from three civil engineering classes as the participants of the study based on their results on the *Oxford Placement Test*

(Allan, 2004).¹ These participants were civil engineering seniors, ranged in age from 22 to 31, and were native speakers of Azeri, Kurdish, and Persian. In order to take account of the ethical considerations, the researchers provided the participants with sufficient information on the general aims of the study, notified them of the fact that the participation in the study was voluntary, and obtained their written informed consent before the beginning of the study. Also, they assured the participants of their anonymity and the confidentiality of their data.

2.2. Materials and instruments

2.2.1. Civil engineering reports

The researchers employed 13 civil engineering reports to provide the treatment of the study. These reports involved 9 main sections including: transmittal letter, executive summary, introduction, theory and analysis, experimental procedures, results, discussion, conclusions, and recommendations. The letter of transmittal intends to inform its recipient of information on the main purpose of the report. The executive summary is a section which functions as the abstract of the report and summarizes the purpose, method, results and recommendations of the report. The theory and analysis section provides the requisite information on the theoretical considerations of the experiment including its fundamental principles and equations and presents the relevant figures. The experimental procedures section expounds on the methodology of the report, that is it gives information on the materials which are used in the relevant experiments and provides a detailed description of the performed procedures. The results section uses the pertinent tables and figures in order to present the outcomes of the relevant experimental procedures. The discussion section evaluates the accuracy of the outcomes on the basis of the relevant theoretical considerations and mentions the limitations of the report. The conclusion restates the main findings of the experiments by making references to the obtained results. Finally, the recommendations section offers a number of suggestions for improving the experimental procedures in further experiments.

Based on the aforementioned purposes, the researchers focused on the executive summary section of the reports during the treatment sessions. First, they informed the EAP learners of the major sections of the summaries including: statement of the purpose, explanation of the methodology, clarification of results, conclusions, and recommendations. Second, they asked the learners to extract the relevant information of the executive summary from the different sections of the



¹ According to the test instructions, the test takers whose scores range from 30 to 39 are placed at the intermediate proficiency level.

reports. Finally, they encouraged them to write an executive summary for each of the examined reports.

2.2.2. Writing assessment scale

Based on the main purposes of the study, the researchers employed a slightly modified form of Brown and Bailey's (1984) writing assessment scale in order to evaluate the EAP learners' performances on the writing pretest and posttest of the study. The modified version of this scale enabled the researchers to assess the participants' performances on the above-mentioned tests in three broad and distinct categories including: a) structure; b) punctuation, spelling and mechanics; and c) style and quality of expression. In these categories, the researchers evaluated the participants' writing performance on a 20-point scale according to the instructions of four sub-categories in each of the pertinent categories. In the present study, two of the researchers scored the participants' executive summaries. In order to examine the inter-rater reliability, the researchers used *Cohen's kappa* which is a statistic that determines the average rate of the agreement that exists between the raters' scores. The values of this statistic range from 0 to 1. The Cohen's kappa values which are in the range of .81 to .99 show near perfect agreement. In this study, the results of the statistical analysis showed that the Cohen's kappa coefficient was equal to .83 and the inter-rater reliability of the study was satisfactory.

2.2.3. Writing pretest and posttest

The present study attempted to determine the usefulness of WCF for developing EAP learners' academic writing skill. To this end, the researchers randomly selected two civil engineering reports from among the above-mentioned 13 reports as the basis of the writing pretest and writing posttest of the study. In the writing pretest, the researchers removed the executive summary of the report and asked the participants of all of the groups to write an executive summary for the report on the basis of their instructions on how to extract the relevant information of the summary from the different parts of the report. Likewise, in the writing posttest, the researchers removed the executive summary for the report and requested the EAP learners to write an appropriate summary for it based on the instruction that they had received during the treatment sessions of the study.

2.3. Procedure

The study used an experimental pretest-treatment-posttest design in order to answer the raised research questions. First, the researchers selected 75 intermediate-level EAP learners from three civil engineering classes as the participants of the study. Second, they randomly assigned the participants to two experimental groups – the direct WCF group and the indirect WCF group, and a control group, with 25 EAP learners in each of the above-mentioned groups. Third, in order to administer the writing pretest of the study, they provided the learners in all of the groups with information on the various sections of the executive summaries of civil engineering reports and requested them to write a 250-word summary in 30 minutes based on the information in the different sections of one of the examined reports in the study. Fourth, during the process of the treatment, in each session, the researchers provided the participants in all of the groups with executive summary writing instruction and asked them to write a 250-word executive summary for one of the selected reports in 30 minutes.

After the process of summary writing in each session, in the experimental groups, the researchers provided the learners with appropriate WCF based on Ellis's (2009a) typology of WCF strategies. Namely, in the direct WCF group, the researchers provided the EAP learners with the correct forms of the erroneous parts of their summaries. On the other hand, in the indirect WCF group, they used the margins of the writing task sheets to inform the learners of the presence of errors in the texts of the summaries. The examples of these WCF strategies are provided below:

Example 1: direct WCF

EAP learner's piece of writing: They are used these composites to be constructed much of the bridge structures because they were usefuller that the other composites.

EAP learner's piece of writing with direct WCF: They are used these composites to be-constructed much many of the bridge structures because they were usefuller more useful that-than the other composites.

Example 2: indirect WCF

EAP learner's piece of writing: They had measure compression strength and water absorb when they have developed the concrete mixture.

EAP learner's piece of writing with indirect WCF:

They had measure compression strength	error
and water <u>absorb</u> when they <u>have</u>	error
developed the concrete mixture.	error
	error

In order to follow the non-feedback scenario, the researchers did not provide the learners of the control group with WCF. The experimental groups were provided with their appropriate WCF during 10 sessions. After the end of the treatment, the researchers administered the posttest of the study in a way which was similar to the pretest. More specifically, they requested the learners to write a 250-word executive summary for one of the selected reports in 30 minutes. Brown and Bailey's (1984) writing assessment scale was used to assess the participants' academic writing performance on the aforementioned tests. In this study, the researchers aimed to compare the performances of more than two groups on the writing pretest and posttest of the study, hence they used the one-way ANOVA test. The researchers also

ESP Today Vol. 10(2)(2022): 286-309 attempted to determine the difference between the performances of each of the experimental groups on the writing pretest and posttest and used the pairedsamples *t*-test to this end. Finally, the researchers tried to determine the significant difference between the performances of the two experimental groups on the writing posttest of the study. They therefore used the independent-samples *t*-test to examine the difference between the performances of two independent groups. The obtained data were analyzed using SPSS 20.

3. RESULTS

The results of the preliminary data analysis showed that the data did not violate the assumptions of the parametric tests. More specifically, the data were collected independently and constituted interval data. Independent data collection highlighted the fact that the collection of data on the writing pretest did not influence the collection of the data on the writing posttest of the study. Moreover, the interval nature of the data underlined the fact that the distances between the scores on the writing pretest and posttest of the study were equal and normally distributed based on the results of Kolmogorov-Smirnov and Shapiro-Wilk tests. Therefore, the researchers used one-way ANOVA, paired-samples *t*-test, and independent-samples *t*-test in order to perform the data analysis. Before the beginning of the treatment, the researchers compared the performances of all of the groups on the writing pretest in order to ensure that they were homogeneous in terms of their writing skill. Table 1 provides the results of this comparison:

Groups	N	Mean	Std.	Std.	95% Confidence Interval for		Minimum	Maximum
			Deviation	Error	Me	ean		
					Lower Bound	Upper Bound		
Direct Feedback Group	25	33.16	3.891	.778	31.55	34.77	24	41
Indirect Feedback Group	25	33.60	4.291	.858	31.83	35.37	24	42
Control Group	25	34.40	3.719	.744	32.86	35.94	26	41
Total	75	33.72	3.954	.457	32.81	34.63	24	42

Table 1. Descriptive statistics for the performances of the direct WCF group, indirect WCF group and control group on the writing pretest

In order to determine the significance of the existing differences among the performances of the above-mentioned groups on the writing pretest, a one-way ANOVA test was used. The researchers had to check the homogeneity of the variances of these groups before the examination of the one-way ANOVA test. Table 2 shows these results:

Levene Statistic	df1	df2	Sig.
.447	2	72	.641

Table 2. Levene's test of homogeneity of variances for the performances of direct WCF group, indirect WCF group and control group on the writing pretest

As shown in Table 2, the *p*-value in the results of this test (marked as Sig.) was greater than .05. As a result, the assumption of the homogeneity of variances was not violated and the results of the ANOVA test could be examined. Table 3 provides the results of this test:

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.760	2	9.880	.625	.538
Within Groups	1137.360	72	15.797		
Total	1157.120	74			

Table 3. ANOVA test of the performances of the direct WCF group, indirect WCF group and controlgroup on the writing pretest

As shown in Table 3, the *p*-value in the results of the ANOVA test .538 was greater than .05. Consequently, there were not any significant differences among the performances of the groups on the writing pretest. Figure 1 shows these results:



Figure 1. Comparison among the performances of direct WCF group, indirect WCF group, and control group on the writing pretest

Considering these results, the researchers analyzed the data to answer the relevant research questions. The first research question focused on the effects of direct and indirect WCF strategies on the improvement of EAP learners' writing accuracy. Given this purpose, there was a need to compare the performances of the direct WCF group and the indirect WCF group on the writing pretest with their own performances on the writing posttest. Table 4 provides the results of this comparison for the direct WCF group:

Tests	Mean	N	Std. Deviation	Std. Error Mean
Writing Pretest	33.16	25	3.891	.778
Writing Posttest	44.04	25	3.409	.682

Table 4. Descriptive statistics for the performances of the direct WCF group on the writing pretestand posttest

As shown in Table 4, the direct WCF group had a better performance on the writing posttest (M=44.04) in comparison with the writing pretest (M=33.16). Notwithstanding, a paired-samples *t*-test was used to examine the significance of this difference. Table 5 shows the results of this test:

		Paired Differences					df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confide of the Di				(2 taneu)
				Lower	Upper			
Writing Pretest - Writing Posttest	-10.880	4.764	.953	-12.846	-8.914	-11.420	24	.000

Table 5. Paired-samples *t*-test of the performances of the direct WCF group on the writing pretestand posttest

As shown in Table 5, the *p*-value .000 (marked as Sig.) was less than .05. Therefore, there was a significant difference between the performances of this group on the writing pretest and posttest. Figure 2 shows these results:





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Likewise, the researchers compared the performances of the indirect WCF group on the writing pretest and posttest of the study. Table 6 shows these results:

Tests	Mean	N	Std. Deviation	Std. Error Mean
Writing Pretest	33.60	25	4.291	.858
Writing Posttest	38.68	25	2.428	.486

Table 6. Descriptive statistics for the performances of the indirect WCF group on the writingpretest and posttest

		Р	aired Differe	ences		t	df	Sig. (2-
	Mean	Std.	Std. Error	95% Coi	nfidence			tailed)
		Deviation	Mean	Interva	l of the			
				Diffe	rence			
				Lower	Upper			
Writing Pretest -	-5.080	3.999	.800	-6.731	-3.429	-6.351	24	.000
Writing Posttest	-5.000	3.777	.000	-0.731	-3.427	-0.331	24	.000

Table 7. Paired-samples *t*-test of the performances of the indirect WCF group on the writingpretest and posttest



As shown in Table 7, the *p*-value .000 was less than .05. Therefore, the difference between the performances of the indirect WCF group on the writing pretest and posttest was significant. These results are shown in Figure 3:



Figure 3. Comparison between the performances of the indirect WCF group on the writing pretest and posttest

The second research question of the study tried to determine the differences between the effects of direct and indirect WCF interventions on the improvement of the EAP learners' writing accuracy. Therefore, the researchers compared the performances of the direct WCF group and the indirect WCF group on the writing posttest of the study. Table 8 presents the results of this comparison:

Groups	Ν	Mean	Std. Deviation	Std. Error Mean
Direct WCF Group	25	44.04	3.409	.682
Indirect WCF Group	25	38.68	2.428	.486

Table 8. Descriptive statistics for the performances of direct WCF group and indirect WCF group on the writing posttest

As shown in Table 8, the direct WCF group had a better performance (M=44.04) on the writing posttest in comparison with the indirect WCF group (M=38.68). However, an independent-samples t-test was used to ensure that the above-

		evene's Test for <i>t</i> -test for Equality of Means uality of Variances							
	F	Sig.	t	df	Sig. (2-	Mean	Std. Error		onfidence
					tailed)	Difference	Difference		val of the erence Upper
Equal variances assumed	2.419	.126	6.403	48	.000	5.360	.837	3.677	7.043
Equal variances not assumed			6.403	43.360	.000	5.360	.837	3.672	7.048

mentioned difference between the results of these groups was significant. These results are provided in Table 9:

Table 9. Independent-samples *t*-test of the performances of direct WCF group and indirect WCFgroup on the writing posttest

As shown in Table 9, the *p*-value (.126) in the results of the Levene's Test for Equality of Variances was greater than .05. Therefore, the first line of results (i.e. Equal variances assumed) was used. The examination of this line of results showed that, the *p*-value .000 (marked as Sig.) was less than .05. Therefore, there was a significant difference between the performances of these groups on the writing posttest. Figure 4 shows these results:



Figure 4. Comparison between the performances of the direct WCF group and indirect WCF group on the writing posttest



Finally, the third research question of the study focused on the differences between the effects of the feedback scenario and non-feedback scenario on the improvement of the EAP learners' writing accuracy. Considering this purpose, the researchers compared the performances of all of the groups in the study on the writing posttest. Table 10 presents the results of this comparison:

Groups	Ν	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
			Deviation	EIIOI	Lower Bound	Upper		
						Bound		
Direct WCF Group	25	44.04	3.409	.682	42.63	45.45	37	49
Indirect WCF Group	25	38.68	2.428	.486	37.68	39.68	33	42
Control Group	25	35.08	4.061	.812	33.40	36.76	28	40
Total	75	39.27	4.977	.575	38.12	40.41	28	49

Table 10. Descriptive statistics for the performances of the direct WCF group, indirect WCF groupand control group on the writing posttest

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The researchers used a one-way ANOVA test to determine the significance of the differences among the performances of these groups on the posttest of the study. However, there was a need to check the homogeneity of the variances of these groups before the examination of the results of the ANOVA test. These results are provided in Table 11:

Levene Statistic	df1	df2	Sig.
4.824	2	72	.611

Table 11. Levene's test of homogeneity of variances for the performances of the direct WCF group, indirect WCF group and control group on the writing posttest

As shown in Table 11, the *p*-value .611 in the results of Levene's test was greater than .05. Therefore, the assumption of the homogeneity of the variances was not violated and the results of the ANOVA test could be examined. Table 12 shows the results of this test:

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1016.427	2	508.213	44.829	.000
Within Groups	816.240	72	11.337		
Total	1832.667	74			

Table 12. ANOVA test of the performances of the direct WCF group, indirect WCF group and					
control group on the writing posttest					

As shown in Table 12, the *p*-value .000 in the results of the ANOVA test was less than .05. Therefore, there were a number of significant differences among the performances of these groups. Nonetheless, there was a need to examine the results of the post hoc test to determine the places of the above-mentioned differences. The results of this test are provided in Table 13:

(I) Groups Posttest	(J) Groups Posttest	Mean Difference (I-J)	Std. Error Sig.		95% Confidence Interval	
					Lower Bound	Upper Bound
Direct WCF Group	Indirect WCF Group	5.360*	.952	.000	3.08	7.64
	Control Group	8.960*	.952	.000	6.68	11.24
Indirect WCF Group	Direct WCF Group	-5.360*	.952	.000	-7.64	-3.08
	Control Group	3.600*	.952	.001	1.32	5.88
Control Group	Direct WCF Group	-8.960*	.952	.000	-11.24	-6.68
	Indirect WCF Group	-3.600*	.952	.001	-5.88	-1.32

Table 13. Tukey post hoc test of the performances of the direct WCF group, indirect WCF group and control group on the writing posttest

The examination of the asterisk marks on the Mean Differences column of Table 13 highlighted the fact that there were significant differences among the performances of all of the groups in the study on the writing posttest. The existence of these significant differences was supported by the *p*-values (marked as Sig.) which were less than 0.5. Figure 5 shows these results:



Figure 5. Comparison among the performances of the direct WCF group, indirect WCF group, and control group on the writing posttest

4. DISCUSSION

The first research question of the study evaluated the usefulness of the direct and indirect WCF strategies for improving the EAP learners' accuracy over consecutive witting tasks. The results of the analysis highlighted the fact that both of the abovementioned WCF strategies increased these learners' writing accuracy on the writing posttest of the study. Overall, this study corroborates the results of a large number of the WCF studies (e.g. Bozorgian & Yazdani, 2021; Elfiyanto & Fukazawa, 2021; Ferris & Roberts, 2001; Karim & Endley, 2019; Karim & Nassaji, 2020a; Luquin & García Mayo, 2021; Mohammadi, Ghanbari, & Abbasi, 2019; Pourdana, Nour, & Yousefi, 2021; Suzuki et al., 2019).

A close examination of the relevant literature (e.g. Ellis, 2008, 2009b; Karim & Nassaji, 2020a; Lantolf, 2000; Watson-Gegeo, 2004) shows that the exponents and critics of WCF have taken two main views of second language acquisition – the *i cognitive* view and the *sociocultural* view – in order to support or disprove its efficacy. Ellis (2009b) expounded on the nature of both of these views and argued that the cognitive view relates the learners' acquisition to their internal information processing mechanisms such as their attention. Moreover, it regards the individual learner's thoughts as the major locus of language learning capacity. The examination of this view highlights the fact that it is consistent with the *computational* model of language learning which uses the metaphor of black box in order to describe the learner's brain as a container of the linguistic knowledge (Ellis, 2009b).

Considering the cognitive view of language acquisition, it can be argued that, in the present study, the direct and indirect WCF strategies had a beneficial effect on the EAP learners' writing accuracy due largely to the fact that these strategies directed their conscious attention to the relevant code features and facilitated the transformation of their linguistic input into intake (Ellis et al., 2008; Ferris, 2006; Schmidt, 2001). Moreover, these feedback strategies expedited the learners' progress through the natural sequence and order of language development (Ellis, 2008). Furthermore, they provided the learners with explicit knowledge about the natural use of the target language and enabled them to learn its formal aspects in a conscious way (Ellis, Loewen, & Erlam, 2005). Lastly, the WCF strategies helped the learners to establish accurate form-meaning connections by making cognitive comparisons between their output and native language use.

However, the sociocultural view of language acquisition is in complete contrast to the cognitive view since it emphasizes the dialogic nature of language acquisition and does not describe it as the by-product of interaction (Lantolf, 2000). This view of language acquisition argues that the interaction between experts (i.e. teachers or more competent peers) and novices (i.e. learners) enables the novices to establish an emergent boundary of language learning which can be called Zone of Proximal Development (ZPD) (Lantolf & Thorne, 2006). More specifically, ZPD is the gap between a learner's actual level of development and the stage of development which he/she can achieve with the help of a more competent language user. Considering these issues, it can be stated that, in this study, the WCF strategies bridged the gap between the above-mentioned stages of the learners' development and enabled them to create subsequent ZPDs (Nassaji & Swain, 2000). That is, the researchers' support helped the learners to surpass their actual developmental level and to carry out the tasks which were beyond their capabilities.

The second research question of the study examined the differences between the effects of direct and indirect WCF strategies on the EAP learners' academic writing accuracy. The results highlighted the superiority of the direct WCF over the indirect WCF for developing the learners' writing skill. These results are in line with the results of a number of studies including Carroll and Swain (1993) and Nataga (1993). Still, they are in contradiction to the findings of certain studies such as DeKeyser (1993), and Kim and Mathes (2001) which have reported insignificant differences between the effects of direct and indirect WCF on the development of interlanguage.

Considering the computational model of SLA, the results can be related to the beneficial effect of direct WCF on the EAP learners' *detection* of second language forms. Tomlin and Villa (1994) distinguished learners' *awareness* of the code features of the target language from their detection of the relevant forms. They argued that, while indirect WCF increases the learners' awareness of the formal aspects of the language, it does not guarantee their detection of these forms and might result in hesitation and indecision on the part of the learners. On the other hand, the direct WCF enables the learners to engage in the cognitive registration of

the linguistic input and to transform this kind of input into intake which is indispensable for acquiring the second language. In light of the sociocultural view of SLA, the superiority of direct WCF over indirect WCF might be related to its mediating role in the acquisition of the second language forms. Lantolf and Thorne (2006: 79) explained the notion of mediation and noted that it refers to "the process through which humans deploy culturally constructed artifacts, concepts, and activities to regulate the material world or their own and each other's social and mental activity". The close examination of this definition brings attention to its important components including the notions of *artifact* and *regulation*. Artifacts fall into two main categories including *concrete* artifacts which enable the humans to function as active agents in the material world and symbolic artifacts that help their user to gain control over their thought processes. Regulation is the process of the voluntary domination and organization of the mental activity to expedite learning. Lantolf and Thorne (2006) underlined the fact that language is considered to be the major symbolic artifact which is used to regulate the process of thinking. In this study, the provision of self-correction guidance was the major feature of direct WCF. The examination of this feature of the direct WCF in the present study shows that it exploited the potential of written linguistic input to expedite the learners' acquisition of the target forms. More specifically, it prompted the learners to use the direct WCF as a symbolic artifact to regulate their thought processes and to internalize the target language forms. Two examples of direct WCF are provided below:

Example 1:

EAP learner's piece of writing: The pre-stressed piles of concrete had reinforced by being used polymer bars to add to the flexural strong of the piles.

EAP learner's piece of writing with direct WCF: The pre-stressed piles of concrete had were reinforced by being used using polymer bars to add to increase the flexural strong strength of the piles.

Example 2:

EAP learner's piece of writing: They try to promoting the using of the recycled aggregate concretes in the fixed structures.

EAP learner's piece of writing with direct WCF: They try tried to promoting promote the using use of the recycled aggregate concrete in the fixed repairable structures.

These examples highlight the fact that the linguistic input of the direct WCF guided the EAP learners to correct their errors. That is, the linguistic input mediated the learners' second language acquisition and expedited their cognitive regulation. This issue stems from the fact that humans have a tendency to rely on linguistic stimuli in different situational contexts to streamline the process of thinking.

The third research question of the study aimed to determine the probable differences between the effects of the feedback scenario and non-feedback scenario on the improvement of the EAP learners' writing accuracy. The results of the study showed the superiority of the feedback scenario for developing these learners' writing skill. These results are consistent with the results of a large number of relevant studies (e.g. Bitchener, 2008; Ferris & Roberts, 2001; Karim & Nassaji, 2020a; Luquin & García Mayo, 2021; Pourdana et al., 2021; Sheen, 2007).

In view of the computational model of SLA, these results might be related to the beneficial effect of negative evidence on the development of the learners' interlanguage. Negative evidence involves the input that provides the learners with "direct or indirect evidence of what is ungrammatical" (Long, 1996: 413). In first language acquisition, corrective feedback is considered to be unnecessary since the children who learn their mother tongue take advantage of their language acquisition device (Chomsky, 1965) in order to provide their best performance of the relevant linguistic functions. But, in SLA, corrective feedback is considered to be an important component of interlanguage development due to the fact that the second language learners do not have access to the language acquisition device and mainly depend on their general learning strategies in order to acquire the forms and functions of the relevant target language (White, 1991). Considering these issues, it can be argued that the feedback scenario was more effective than the non-feedback scenario since it compensated for the learners' lack of access to their language acquisition device, made them aware of the ungrammatical formal aspects of the target language, and prompted them to develop a more native-like interlanguage.

Considering the sociocultural view of SLA, these results can be related to the learners' gradual *self-regulation* of the target forms. More specifically, WCF prompts the learners to take advantage of other-regulation to achieve self-regulation (Ohta, 2001). That is, it motivates them to use the WCF which is provided by the teacher in order to gain control over their thinking and to expedite their language learning. The learners' self-regulation leads to their *internalization* of the code features of the target language. Internalization involves "the movement of language from environment to brain" (Ohta, 2001:11). These issues highlight the fact that, in the present study, the superiority of the feedback scenario over the non-feedback scenario could stem from the potential of the direct and indirect WCF strategies to facilitate the movement of the language from the researchers' feedback to the EAP learners' brain and to expedite their internalization of the formal aspects of the target language.

5. CONCLUSION

The present study attempted to determine the usefulness of WCF for developing EAP learners' writing skill. The results of the study highlighted the superiority of the feedback scenario for increasing these learners' writing accuracy. Moreover, they underlined the fact that the direct WCF was a more beneficial writing development strategy in comparison with the indirect WCF.

It seems that a number of provisional conclusions can be drawn based on the aforementioned results. First, there is a need to reform the syllabi of the EAP writing

courses and to improve their methodology (see e.g. Miin-Hwa Lim & Luo, 2020 on how to upgrade students' writing of research reports, and Walkowá & Bradford, 2022 on constructing an argument in EAP students' writing). Most of these courses depend on the Grammar-Translation method in order to develop the learners' writing skill. The syllabus designers and teachers should realize that EAP writing proficiency is not a by-product of the second language reading competence. Second, our results were in contrast to Truscott's (1996) argument that WCF becomes ineffective over successive writing tasks. Therefore, adopting an approach to the instruction of academic writing skill which is placed on a continuum between focuson-forms and focus-on-form approaches might be a more reasonable instructional alternative in comparison with depending on the zero-option approach. Third, the results underlined the fact that implementing the direct and indirect WCF strategies in a systematic way had a beneficial impact on the development of the learners' writing skill. It seems that the mixed results of the pertinent research stem from the inconsistent, non-salient, and sporadic provision of WCF in the studies which have tried to disprove the effectiveness of this type of feedback. Lastly, the beneficial effects of indirect WCF on the development of academic writing skill should not be downplayed due to the fact that it may be useful at higher proficiency levels.

Numerous individual and contextual factors might influence the effectiveness of the WCF strategies. Therefore, caution should be exercised about the generalization of the results of this study to similar situations. Selecting the participants from different academic fields, age groups, education backgrounds, proficiency levels, and native language backgrounds can mediate the effects of different WCF strategies on the learners' development of academic writing competence. This study delimited itself to the examination of the direct and indirect WCF. Further empirical research may focus on metalinguistic, reformulation and electronic WCF strategies. Moreover, the other studies can investigate the effectiveness of the above-mentioned WCF strategies for expediting the learners' acquisition of specific aspects of the target language system including its tense system and inflectional morphemes among others. Furthermore, the present study used Brown and Bailey's (1984) writing assessment scale in order to evaluate the EAP learners' writing performances due to the lack of a suitable assessment scale of civil engineering reports in the relevant literature. This instrument focuses on the general features of academic writing and does not examine the discipline-specific features of writing in the civil engineering field. Therefore, future studies have to make an attempt to use specific instruments which focus on the discipline-specific aspects of the civil engineering reports. Finally, research has to assess the potential of the WCF to develop the ESP learners' writing skill in various writing tasks such as the nursing reports among others.

> [Paper submitted 7 Feb 2022] [Revised version received 3 May 2022] [Revised version accepted for publication 15 May 2022]

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