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Web-based and collaborative corrective feedback: Exploring options for reducing the dependence on the teacher in l2 writing

Afsar Rouhi[1]
Assistant Professor, Payame Noor University

Hossein Vafadar
Islamic Azad University, Ardabil Branch

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Abstract

This paper reports a study that examined the effect of web-based and collaborative corrective feedback (CF) on the use of English articles in the written mode. Sixty four Iranian learners of English were placed in the web-based CF, the collaborative CF, and the control group. During two treatment sessions, all participants were required to narrate their accounts of reading 2 fables in a fixed time span. The targeted forms used incorrectly in the narration of the web-based CF group were specified and sent back to participants as a hyperlink to a concordance file designed for this study. Later, the group was required to exploit concordances for self-correction using an online concordance website. Participants in the collaborative CF group revised their narrations collaboratively. The control group, however, received no CF. Results of repeated measures ANOVAs run on the data obtained revealed that although both web-based and collaborative CF improved learners' L2 writing in terms of English articles significantly, web-based CF showed some superiority over collaborative CF. The findings also suggested, though implicitly, that

[1] Corresponding author: afsar.rouhi@pnu.ac.ir

participants assumed more responsibility and independence in revising their own writing as a result of the CFs given in this study.

Keywords: web-based CF, collaborative CF, L2 writing, concordancing

1. Introduction

There is now a growing consensus among researchers and practitioners that corrective feedback (CF) is an essential factor for encouraging and reinforcing students' writing (e.g., Ashwell, 2000; Cho & Schunn, 2007; Fathman & Whalley, 1990; Ferris & Roberts, 2001; Hu, 2002; Magno & Amarles, 2011). Lightbown and Spada (1999) define CF as "any indication to the learners that their use of the target language is incorrect. This includes various responses that the learners receive" (pp. 171-172). Providing feedback on students' writing only by the teacher, however, is criticized on the grounds that teacher's feedback may be unclear, inaccurate, and may lack sensitivity to different contexts as well as to varying levels of need, ability, and other individual differences of students (Cohen & Cavalcanti, 1990; Conrad & Goldstein, 1999; Ferris, Pezone, Tade, & Tinti, 1997; Hyland, 1998). On the other hand, it is argued that the teachers' feedback makes students lose their self-sufficiency (e.g., Hyland, 2000; Liu & Sadler, 2003; Paulus, 1999; Tsui & Ng, 2000). The present study aimed 1) to investigate whether web-based and collaborative CF, as alternatives to teachers authority in providing feedback in response to learners errors in L2 writing, lead to improved accuracy in new pieces of writing, and 2) to compare web-based and collaborative CF in fostering autonomy on the part of learners as reflected in their ability to take more responsibility of making corrections to errors in their L2 writing.

Collaborative CF– also referred to as "peer feedback", "peer response", "peer revision", "peer tutoring", "peer critiquing", and "peer review"–is now taken to be a salient characteristic of process-oriented writing instruction. It is a collaborative activity regarding

learners reading, critiquing, and providing feedback on each other's writing. At the same time with the advent of technology the role of computer in delivering and mediating feedback has become a salient area for research (Stapleton & Radia, 2010). Recently, computer-assisted language learning programs have shifted from tutoring students in classroom setting to helping them make decisions for themselves and become more independent outside the classroom. Hyland (2003), for instance, argued that concordance software is used as a tool to provide a great deal of information that helps students solve their language problems on their own. Accordingly, web-based CF is likely to foster autonomous learning outside the classroom, can alter traditional writing practice significantly, and might encourage students to take on gradually more responsibility for their own writing. Web-based CF which primarily utilizes concordance software is a type of CF in which a hyperlink is provided where an error occurs. The hyperlink leads directly to a concordance file or an online concordance website and enables students to have access to copious, authentic, and numerous instances of particular features on large collections of wordlists and texts.

Web-based and collaborative CF are assumed to foster differing degrees of autonomy on the part of L2 learners. A learner who is able to perform a task independently thanks to his ability and willingness is taken to be an autonomous learner (Littlewood, 1996). Since in the web-based CF condition, as operationalized in the present study, learners are detached from the teacher and his authority, need to reflect on their erroneous wittings, and also have to take independent action (Little, 1991) in making corrections to their erroneous pieces of language, it is assumed to exercise some degree of autonomy on the part of L2 learners. In collaborative CF too learners experience some degree of detachment from the teacher and rely on themselves in giving feedback to their writings.

Given that one's ability relates to his or her knowledge and skills, L2 learners with different levels of L2 proficiency would possess varying degrees of this component of autonomy. And since the willingness component is triggered by the motivation and the

confidence (Littlewood, 1996), L2 learners, due to their individual differences, would possess differing levels of autonomy.

In the present study, we take collaborative CF as a sort of partial autonomy since L2 learners instead of being fully dependent on the authority of the teacher in providing feedback are dependent on each other's knowledge and skills and finally choose to give CF. And in web-based CF, the learners experience higher degrees of independence from their teacher since they have to stretch their knowledge and skills to make corrections to their erroneous pieces of writing which cannot be operationalized without their willingness to do so.

It is imperative to stress that unfettered autonomy where the learner independently chooses aims and sets goals would "amount to nothing more than a romantic ideal which does not square with reality" (Thanasoulas, 2000, p. 2). To reiterate, if carried out with enough scrutiny and vigilance, the redistribution of power and authority can lead to learner autonomy rather than learner bewilderment which is a natural result of leaving learners on their own to take the full responsibility of learning with no intervention involved.

Stated differently, autonomy has to be placed on a continuum with prescription and assistance by the teacher at one end and full autonomy where L2 learners are able to set their own learning goals and create appropriate conditions for learning to take place at the opposite end. It does not seem logical to expect L2 learners to exercise autonomy from the very first day of learning rather it has to be experienced gradually starting from next to zero to full-scale autonomy.

In this study English articles with the functions of the first mention and anaphoric reference were chosen to be focused on as the targeted forms as some researchers (e.g., Bitchener, Young, & Cameron, 2005; Butler, 2002; Liu & Gleason, 2002; Sheen, 2007) have rightly claimed that learners with varying language proficiency levels have difficulty in using English articles. They belong to the most frequently occurring words in English according to the COBUILD corpus (Sinclair, 1991) but infrequently corrected

simply because they are not communicatively salient enough (Akakura, 2011; Sheen, 2007). Furthermore, when directed to a limited number of error types, learners are likely to understand the nature of the errors and make required corrections (Bitchener & Knoch, 2008).

2. Literature Review

2.1 Web-based CF and L2 Writing

Recent modes of learning (e.g., distance learning, flexible learning, and blended learning) stimulated by the availability of new technologies require teachers more than ever to take learners autonomy into account (Lamb, 2007). The prevalence of computers, increased opportunities of access to the Internet, and availability of large amounts of target language data have ignited language teachers' interest in the active use of concordance in the classroom (Conrad, 2000; Hewings & Hewings, 2002; Hyland, 2003; Kennedy & Miceli, 2001; Krajaka, 2007; Kuo, 2008; Lee & Swales, 2006; Sun, 2000). Students might search out concordances by using an online website or concordance software, or the teacher might provide concordances for them to work on.

Web-based CF is consistent with the tenets of discovery-based approach which gives EFL novice writers cognitive support to reach decisions about appropriate choices of language rules (Bloch, 2009; Kennedy & Miceli, 2001; Kuo, 2008). According to this approach, "learning" can take place as a result of "doing". O'Sullivan (2007) argued that working with corpus data can benefit learners by developing a process-oriented view of language learning and fostering their active involvement. It might also make learners take on more responsibility in learning and upgrade their knowledge.

There are indications that the use of concordance can improve L2 students' motivation, attitudes, and confidence in writing (Hyland, 2003; Hyland & Hyland, 2006; Kennedy & Miceli, 2010; Yoon & Hirvela, 2004). In her survey of the use of concordance software, Chambers (2007, as cited in Bloch, 2009) argues that students' engagement in the process of "data-driven" learning can be a step towards achieving the long-term goal of teachers to have

students become autonomous learners. Hyland (2003) notes that immediate online assistance can be extremely useful for raising students' awareness, developing independent learning skills, and improving writing products. He suggests that if students submit their writing electronically, teachers can hyperlink errors directly to a concordance file where students can examine the contexts, examples, and collocation of the words they have misused. Kennedy and Miceli (2010) stress the importance of guiding students through concordance activities to help them develop effective learning strategies.

Concordances have also been found to help L2 writers across ability levels. Gaskell and Cobb (2004) conducted a study in which low-intermediate learners used a concordance to practice corrections upon having certain grammar and collocation errors pointed out to them. Having studied the examples of the grammatically correct usage provided by the concordance, they were able to correct their initial errors. At a higher level, Lee and Swales (2006) introduced concordances to their doctoral students. Instead of consulting native speakers or reference books, students were asked to use the software. Then, they were instructed to apply their own appropriate choices, taken from the software, in terms of collocations and grammar instead of relying on an authority. In Todd's (2001) study, students made concordances of the lexical items from the Internet; they then were able to induce valid patterns from their self-selected concordances and made valid self-corrections of their errors. A few studies have surveyed students' attitudes toward concordance in English for academic purposes (Gaskell & Cobb, 2004; Lee & Swales, 2006; Yoon & Hirvela, 2004). In such studies, concordance approach was perceived to benefit the development of L2 writing skill and to increase confidence toward L2 writing.

2.2 Collaborative CF and L2 Writing

Collaborative CF is argued to have the capacity to help students become more autonomous writers inside the classroom. It utilizes cooperative activities such as reading, reviewing, and providing

feedback by students, both to procure immediate textual improvements over time and develop writing competence via a mutual scaffolding (Tsui & Ng, 2000; Zhu, 2001). According to Franco (2008), in collaborative CF students learn from each other in groups. Vygotsky's (1978) zone of proximal development (ZPD) provides the theoretical base for peer collaboration. The ZPD has been used in association with the concept of scaffolding by which an expert can help a novice learner achieve higher levels of control. The function of the ZPD distinguishes between two developmental levels in the learner: the actual developmental level and the potential level of development. The former is identified by what the learner can do alone. The latter, however, is related to what the learner can do when scaffolded by a more capable peer. Wertsch (1979, as cited in Hyland & Hyland, 2006) noted that the learner moves from interpsychological to intrapsychological activity. Such a movement occurs from other-regulation to complete self-regulation (DiCamilla & Anton, 2004).

Collaborative CF encourages students to approach writing as a social meaning-making process (Tuzi, 2004) and generates more positive attitudes towards writing (Min, 2005). It also fosters a sense of text ownership (Tsui & Ng, 2000) by giving students opportunities to explain, defend, and elucidate their points of view (Villamil & De Guerrero, 1996). It also helps students constitute the social basis for the development of cognitive processes (Villamil & De Guerrero, 1996) and increases students' awareness of revision strategies (Hedgcock & Lefkowitz, 1992), confidence, and language skills (Byrd, 2003; Min, 2006).

Students can provide very helpful feedback (Berg, 1999; Ferris, 2003; Hedgcock & Lefkowitz, 1992; Nelson & Murphy, 1992; Rollinson, 2005) and they are more likely to take peer suggestion seriously (Tsui & Ng, 2000). Collaborative CF can also establish an important complementary source of feedback (Villamil & De Guerrero, 1998). Some researchers (e.g., Jacobs, Curtis, Brain, & Huang, 1998; Tsui & Ng, 2000) claim that collaborative CF can even be more instructive than teacher feedback because peers perform at a comparable level and therefore tend to understand each other better.

Research has also identified a number of problems associated with the use of collaborative CF. The primary problem concerns students' poor knowledge of the target language and its rhetorical conventions, making it hard to assess the appropriateness of peer feedback (Leki, 1990; Saito & Fujito, 2004; Tsui & Ng, 2000; Villamil & De Guerrero, 1996). The second problem might originate from the nature of the comments provided by peers. Leki (1990) noted that students just focus on surface language issues in their feedback. They tend to provide unclear comments when they are involved with larger issues concerning content, organization, and idea development (Liu & Sadler, 2003). The third problem might arise from inappropriate views that students may bring to collaborative CF. Peers might be hostile or over-critical towards other students' writing (Nelson & Murphy, 1992). Some students feel afraid of being ridiculed by their peers for language problems (Nelson & Carson, 1998). Some may react negatively to critical comments (Villamil & De Guerrero, 1994) and become over-defensive. The fourth problem arises from cross-cultural issues; those who come from different cultural backgrounds have varied sociolinguistic rules of peer communication and different views of good writing, which can lead to inappropriate suggestions in mixed groups (Nelson & Murphy, 1992). Students from teacher-centered cultures may think that their peers are not qualified enough to critique their writing and may mistrust their comments (Nelson & Murphy, 1992; Paulus, 1999). The problems outlined above need to be taken into consideration by teachers who choose to practice such feedback in classroom settings. As the preceding section revealed, a great number of studies have investigated the effect of collaborative CF on L2 writing. This study compares the impact of collaborative CF with that of web-based CF on the accuracy of L2 writing. The study will be guided by the following research questions:

1. How would web-based CF followed by self-correction with less dependency on the teacher affect the accuracy of students' L2 writing?

2. How would collaborative CF followed by collaborative correction with less dependency on the teacher affect the accuracy of students' L2 writing?

3. Method

3.1 Design

The study followed the design of a pretest, two treatment sessions, an immediate posttest, and a delayed posttest. Three groups of intermediate English learners participated in the study. Group one received web-based CF; group two received collaborative CF on their writing in the classroom; group three was the control group which received no treatment. The design of the study is summarized in Figure 1 below.

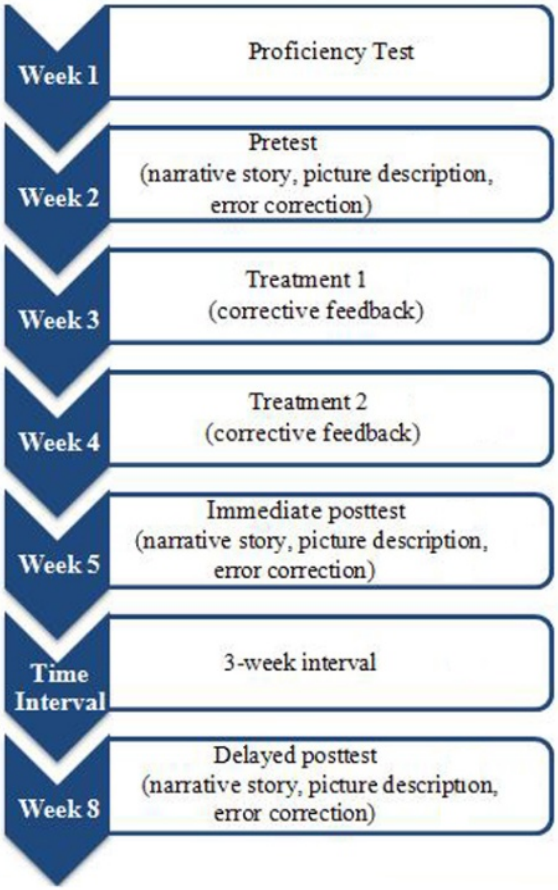

Figure 1: The design of the study

3.2 Participants

One hundred and ten Iranian learners of English (male and female aged from 18 to 28) from Payame Noor University, Islamic Azad University, and Rose English Institute in Ardabil participated in this study. Participants' proficiency level was determined intermediate based on their scores in the Oxford proficiency test. Their mother tongue was Azari-Turkish. Participants from the first university (collaborative CF group) were majoring in Translation Studies and were all junior students. Participants from the second university

(control group) were majoring in TEFL and were in their eighth academic semester. Participants of the web-based CF group were EFL learners from the institute, who had completed the first year of a communication-oriented program. From the total number of individuals involved, 37 students were excluded from the study, simply because they did not want to participate. The scores of nine students were excluded from further consideration because of their low proficiency level or their failure to participate in all measures of the study. From this pool, 64 participants were assigned to three groups: a web-based CF (n = 20), a collaborative CF (n = 22), and a control group (n = 22). A one-way ANOVA run on the scores confirmed that there was no significant difference across the three participating groups. Furthermore, one-way ANOVAs run on the scores obtained from the pretest revealed no statistically significant difference among the three participating groups in relation to the narrative story, the picture description task, and the error correction test which are briefly presented in the next section.

3.3 Materials

The study included three testing instruments: (a) a narrative story task, (b) a picture description task, and (c) an error correction test. The narrative story task included three Aesop's fables (http://storyarts.org): *How the Dalmation Got its Spots* (fable 1), *The Fox and the Crow* (fable 2), and *Running for His Life* (fable 3). Fable 1 was used on the three testing occasions. The fables' readability was checked through readability software 1.0. The FKRT readability indices computed for fable 1, fable 2, and fable 3 appeared to be 81.42, 88.55, and 78.90, respectively. In the Flesch-Kincaid readability test, higher numbers (90.0−100.0) imply that the passages are easier to read and lower numbers (0−30.0) mark passages that are more difficult to read. Accordingly, indices computed revealed that the fables were appropriately understood by participants of the study. Table 1 summarizes the results of the readability test.

Table 1: Summary of the readability test of fables

Fables	FKRT	Ws	Syll	Ss	Ws per S	Syll per W
Fable 1	81.42	137	187	14	9.37	1.36
Fable 2	88.55	161	194	10	16.1	1.20
Fable 3	78.90	136	181	9	15.11	1.33

FKRT = Flesch-Kincaid Readability test, Ws = words, Syll = syllables, S = sentence

It is worth noting that the fables selected had enough obligatory occasions for the use of the forms in focus and thus they provided a reliable condition for the analysis of participants' accuracy of using those forms.

The second instrument included four sequential pictures with some word prompts placed next to each picture such as *old man, paint, and picture,* which had to be reconstructed as follows: *The old man likes to paint a picture in the park*. The picture description contained five definite and five indefinite articles. It was chosen because, as Bitchener and Knoch (2008) argue, the range of people, objects, and activities illustrated in the pictures predispose participants to using articles. The third instrument contained 17 items with four items as distracters, eight definite, and five indefinite articles. Each item comprised two related sentences, one of which was underlined. The underlined sentence contained at least one error:

Example: I saw a very interesting movie last night. I forgot the name of movie.
Correction: I saw a very interesting movie last night. I forgot the name of the movie.

The reason for choosing the error correction test was that each item in the test contained one or two sentences involving an article-obligatory context. The error correction test and picture description task were adapted from Muranoi's (2000; personal communication, May 20, 2010) testing instruments for English articles.

The same testing instruments were used in both the pre- and the post-tests. *The Fox and the Crow* and *Running for His Life*–which were used in the treatment sessions–were adapted from Aesop's

fables (http://storyarts.org). The procedure adopted for the narrative writing task is described in the procedure section below. For the error correction test, participants were given 15 minutes to correct the underlined sentences. Participants were required to write a short story for the picture description task based on the word prompts provided next to each picture in 15 minutes.

Solutions Placement Test was also used to assess participants' general knowledge of language. The test contains 50 multiple-choice items which assess students' knowledge of grammar and vocabulary from elementary to intermediate levels, a reading text with 10 graded comprehension questions, and an optional writing task that assesses students' ability to produce the language. The 50 multiple-choice items and the reading task are designed to be done together in 45 minutes. The writing can be done in, approximately, 20 minutes. Participants whose scores fall on the borderlines of 0-20, 21-30, 30^{+} should be placed in elementary, pre-intermediate, and intermediate, respectively.

The other instrument used in this study was concordance software 3.3. Concordances are general-purpose working tools for the study of texts, whether the texts are literary, linguistic, historical, religious, philosophical, legal, commercial, or of any other kind. A concordance is first of all a comprehensive index to a text, similar to the index at the back of a book, except that every occurrence of each word in the text can have an entry in a concordance. By looking up a word in a full concordance you can be certain you have found every instance of that word in the text. In addition, every instance of each word is shown in an illustrative context, and is provided with a reference to show whereabouts of the word (and its context) in the original text. Since words are given with their contexts the concordance makes it easy to compare all usages of any word in a text or body of writing and provides all kinds of insights into potential meaning and usage. Words are shown with their frequency of occurrence. This opens up rich possibilities for studying the language of your texts and comparing it with the language of other texts. The concordance software was used to make wordlists, word frequency lists and indexes, full concordances to texts of any size, selective concordances, and web

concordances. Participants might have faced a problem in picking out the relevant examples (Kennedy & Miceli, 2001) or in working with multi-word patterns (Granger & Meunier, 2008); therefore, we limited a wordlist-group along with any words we selected. Upon doing concordance by the software, a full wordlist of concordances and the original text could be simultaneously viewed in pop-up web browser in an independent window. Then, the concordance file was translated into HTML for publishing on a web server.

3.4 Procedure

Prior to the pretest, participants were required to take a proficiency test. On the first day, the pretest, which included an error correction test, a narrative story, and a picture description task, was administered to all participants in the three groups involved. Then, the treatment sessions began a week later. The web-based CF group received writing tasks for two sessions; in the first treatment session, participants were required to write at least 130 words in 20 minutes on a carbon copy. The procedure was as follows: we distributed the story with the attached blank sheet of paper and asked them to read the fable silently. Participants were also provided with the meaning of the keywords of the story. Having accomplished the reading, participants were required to return the stories. Then, the second author read the story loudly once while they were just listening. Afterwards, we asked participants to write the story in as much detail as they could remember. After 20 minutes, we collected the carbon copy of their narratives. Finally, students were required to transcribe the original version of their writing and send it from home via email.

After participants had emailed their writings to us, we provided feedback over the targeted structures (*a* and *an* as the first mention and *the* as the anaphoric reference) as a hyperlink to the concordance file that we prepared by the concordance software. We placed the concordance file in a sharing website (http://www.persiangig.com) to make its URL accessible to the participants in a given hyperlink. As participants moved the cursor on the given hyperlinks, the type of error would appear and a click

on the given hyperlink would lead them to the concordance file that showed examples of correct usage.

To mask the focus of the study, i.e., the targeted structures, we also provided feedback on some of the errors related to other categories. Having provided feedback on each participant's writings, we sent them to participants via email to have them study the provided feedback, and revise their draft. Participants were required to email the revised version of their writing back prior to the next session of the treatment. To ensure that they would revise their writings on the basis of the given feedback, we asked some questions about the content of the concordance file upon attending the next treatment session.

In the next session of the treatment, we just highlighted the errors, each with a tag that displayed the type of error on a given hyperlink to an online concordance website (http://www.lextutor.ca/concord_writer); participants were advised to search out concordances for the highlighted errors independently, by using the online concordance website. It needs to be mentioned that participants were given instruction (before attending the second treatment session) on how to conduct concordance searches themselves by using the website given. In week 5, the immediate posttest was administered, containing all the three testing instruments used as the pretest. In order to examine the effect of CF manipulated in the present study in the long run, the delayed posttest was given after three weeks; participants received the same testing instruments given in the pretest and immediate posttest.

The collaborative CF group in the study also received two treatment sessions in week 3 and 4. Participants were given a narrative task to write, following the same procedure used for the web-based CF group. But, in this group, participants were not required to write on the carbon copy and send the original version via email. Rather, we assigned participants to six groups of three and a group of four. Upon completion of the writing task by participants, they were given 15 minutes for the negotiation of possible errors and for providing feedback on their writing; they were required to revise and correct the errors in their writing within the allocated time. Finally, we collected the revised version of their

writings. In week 5, participants received the same tests and package of testing instruments used for the web-based CF group.

The control group was assigned to a no-treatment condition; that is, they had only their own regular classes. They received no treatment and placebo. They only received the pretest, the immediate posttest, and the delayed posttest.

The obligatory uses of the targeted forms were identified in participants' writing in the three groups for each of the three testing occasions. Accuracy was then computed for each participant by dividing the total number of articles supplied correctly by the total number of obligatory occasions. Finally, the figures obtained were multiplied by 100 and expressed as percentages.

We did an inter-rater reliability check on the scores. A second rater scored a sample of 15% of the total data coming equally from the pretest and the posttest 1 and 2. The inter-rater reliability for the narrative story, picture description tasks, and error correction test were .99, .98, and 1.00, respectively.

4. Results

4.1 Narrative Story Task

Table 2 represents the descriptive statistics for the narrative story task.

Table 2: Descriptive statistics for the narrative story task

Treatment		Pretest		Posttest 1		Posttest 2	
CF	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Web-based	20	30.62	11.08	51.87	11.30	58.43	14.66
Collaborative	22	27.27	16.98	42.32	16.01	46.30	16.99
Control	22	26.39	15.15	33.23	19.89	33.23	16.85
Total	64	28.01	14.59	42.18	17.71	45.60	19.01

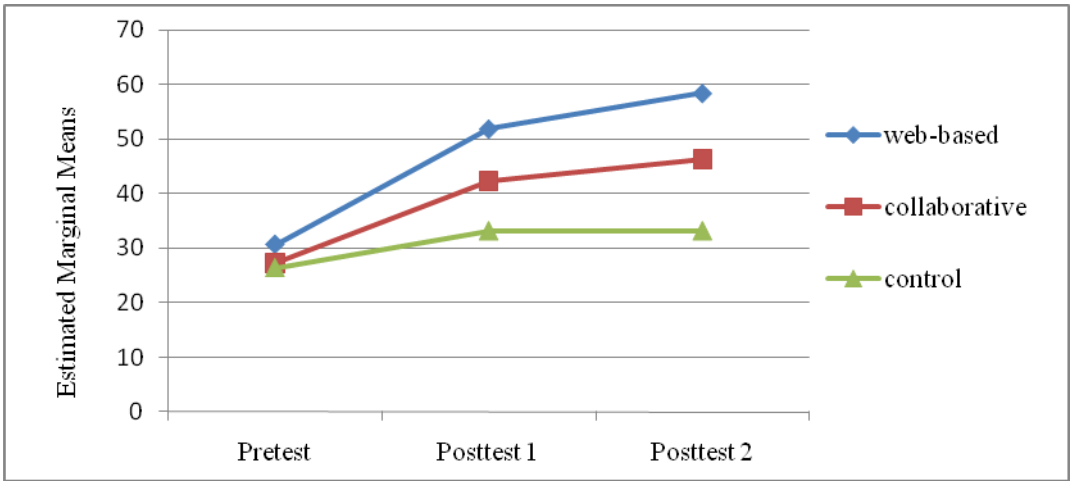

Figure 2: Group means on the narrative story task

Figure 2 graphically illustrates the means of groups over time. As it shows visually, there is an increase in the three participating groups from the pretest to the posttest 1. The web-based and collaborative group revealed gains with a small mean difference from the posttest 1 to 2. Meanwhile, the control group began to level out from the posttest 1 to 2. As it can be seen visually in Figure 2, the web-based group revealed a marked rise compared with the other two groups in the narrative story task over the three testing times. The scores obtained from the three testing occasions for the narrative story task were submitted to repeated measures ANOVA. This analysis yielded a significant main effect for time with a big effect size, $F = 62.62$, $p < .001$, $\eta_p^2 = .67$ and a main significant effect for CF treatment with a big effect size, $F = 6.52$, $p < .01$, $\eta_p^2 = .17$. Additionally, there was a significant interaction effect between time and CF treatment with a big effect size, $F = 6.18$, $p < .001$, $\eta_p^2 = .17$.

A closer inspection of these groups' performance through post-ANOVA analysis coupled with the pairwise mean comparisons revealed that the difference between the web-based and the collaborative group was not significant, $p = .065$. Neither was the difference between the collaborative and control group significant,

p = .081. There was, however, a statistically significant difference between the web-based and the control group, p < .001. Table 3 shows the SPSS output for the post-ANOVA analysis for the narrative story task.

Table 3: SPSS output for the post-ANOVA analysis (the narrative story task)

Posttest 1: web-based > collaborative > control	
Posttest 2: web-based > collaborative > control	
Posttest 1	Posttest 2
web-based > collaborative	web-based > collaborative
web-based > control*	web-based > control*
collaborative > control	collaborative > control*

The results pertaining to the post-ANOVA analysis (Bonferroni adjustment) comparing groups in the posttest 1 and 2, as shown in Table 3, revealed that the web-based group outperformed the collaborative and the control groups in the posttest 1 and 2, indicating a significant difference between the web-based and the control groups, p < .05 in both testing times. Additionally, the collaborative group performed better than the control group in the posttest 1 and 2 with a significant difference in the posttest 2, p < .05.

4.2 Picture Description Task

Table 4 presents the means and standard deviations for the picture description task.

Table 4: Descriptive statistics for the picture description task

Treatment		Pretest		Posttest 1		Posttest 2	
CF	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Web-based	20	56.50	21.58	80.50	16.05	87.00	14.90
Collaborative	22	47.72	25.99	56.81	23.78	62.27	19.74
Control	22	45.45	22.19	52.27	26.53	55.00	24.83
Total	64	49.68	23.50	62.65	25.52	67.50	24.23

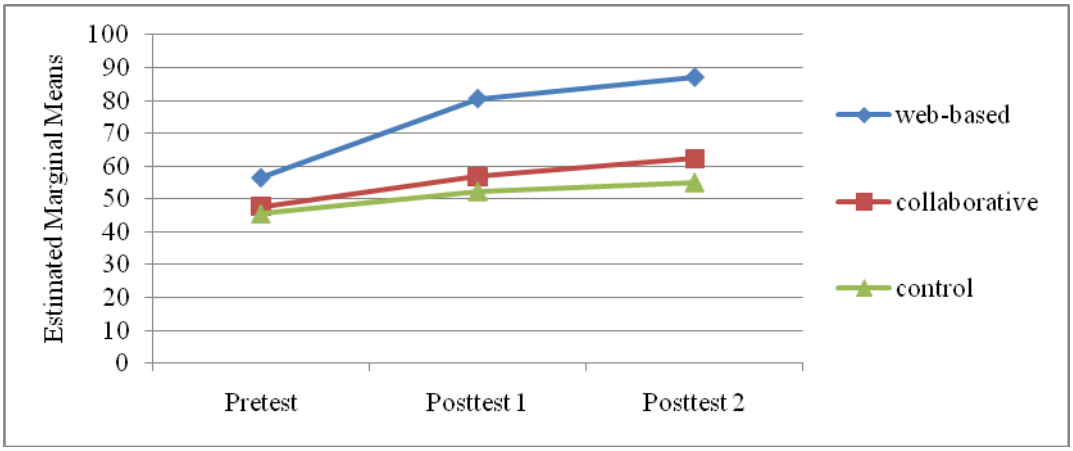

Figure 3: Group means on the picture description task

Figure 3 displays the means of the three participating groups in the pretest, posttest 1, and 2 for the picture description task. As shown in Figure 3, all the three groups showed improvements over time from the pretest to the posttest 2. However, the improvement was notable in the web-based group compared to the other two groups.

The repeated measures ANOVA run on the scores obtained from the three testing occasions for the picture description task revealed a main significant effect for time with a large effect size, $F = 29.24$, $p < .001$, $\eta_p^2 = .49$ and CF treatment with a large effect size, $F = 8.13$, $p < .001$, $\eta_p^2 = .21$. Moreover, the analysis manifested a significant interaction effect between time and CF treatment with a moderate effect size, $F = 3.51$, $p < .01$, $\eta_p^2 = .10$, suggesting that the groups' performance was different over time.

To statistically determine where the significant differences lay among the groups, we ran a post-ANOVA analysis (Bonferroni adjustment) to come up with the pairwise mean comparisons. The analysis indicated that the difference between the web-based and collaborative group was significant, $p < .05$. Similarly, this significant difference appeared to hold true between the web-based and the control group, $p < .05$. Meanwhile, the difference between

the collaborative and the control groups was not significant, p = .440. Furthermore, the web-based group outperformed the collaborative and control groups significantly in the posttest 1 and 2, $p < .05$. Also, the collaborative group performed better than the control group in the posttest 1 and 2. Table 5 displays the results of the post-ANOVA analysis for the picture description task.

Table 5: SPSS output for the post-ANOVA analysis (the picture description task**)**

Posttest 1: web-based > collaborative > control
Posttest 2: web-based > collaborative > control

Posttest 1	Posttest 2
web-based > collaborative*	web-based > collaborative*
web-based > control*	web-based > control*
collaborative > control	collaborative > control

4.3 Error Correction Test

Table 6 displays the descriptive statistics for the error correction test. The pattern displaying the means of the three groups in Figure 4 shows that the gains for the web-based and collaborative groups were marked from the pretest to the posttest 2. This turned out to hold true for the control group with a relatively moderate gains from the pretest to the posttest 2. Furthermore, there was a sharp rise in the web-based group from the pretest to the posttest 1. Meanwhile, all groups manifested a marginal increase from the posttest 1 to 2. More specifically, the web-based group revealed more notable rise than the other two groups in the three testing occasions.

Table 6: Descriptive statistics for the error correction test

Treatment		Pretest		Posttest 1		Posttest 2	
CF	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Web-based	20	21.42	18.96	45.35	18.58	49.28	16.20
Collaborative	22	18.83	22.85	31.16	27.49	34.41	30.83
control	22	20.45	20.23	23.70	20.48	25.64	21.67
Total	64	20.20	20.50	33.03	23.99	36.04	25.43

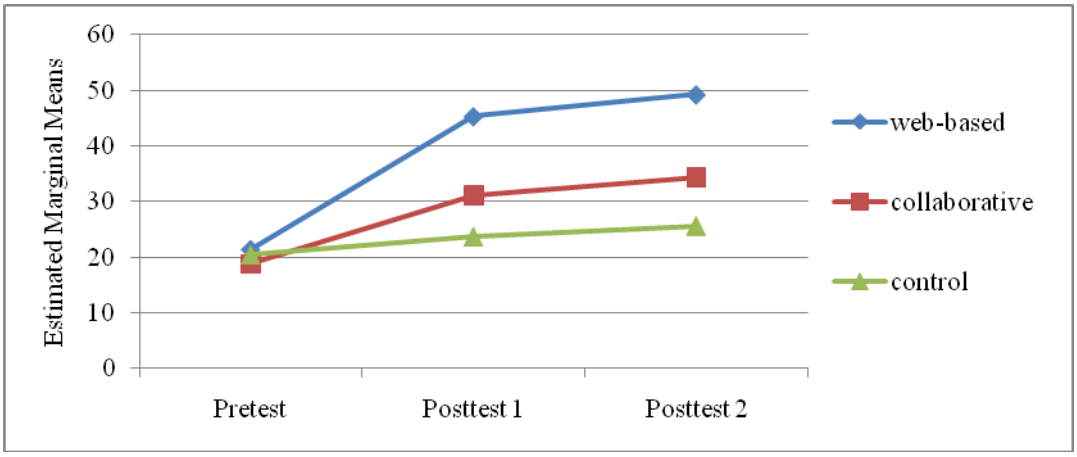

Figure 4: Group means on the error correction test

The repeated measures ANOVA performed on the scores obtained from the three testing times revealed a significant effect for time with a large effect size, $F = 35.71$, $p < .001$, $\eta_p^2 = .54$. There was a trend for the CF treatment, $F = 2.85$, $p = .065$, $\eta_p^2 = .08$, indicating that the effect for the CF treatment was a bit higher than the alpha level set at $p < .05$. Moreover, a significant interaction effect was observed between time and CF treatment with a small effect size, $F = 5.92$, $p < .001$, $\eta_p^2 = .016$.

The post-ANOVA analysis (Bonferroni adjustment) merged with the pairwise mean comparisons displayed in Table 7 demonstrated no statistically significant difference between the web-based and the collaborative groups, $p = .113$, while a significant difference was found between the web-based and the control groups, $p = .022$. Additionally, no significant difference was observed between the collaborative and control groups, $p = .450$. More specifically, the web-based group outperformed the collaborative and control groups in the posttest 1 and 2, indicating a significant difference between the web-based and control groups. In addition, the collaborative group performed better than the control

group in the posttest 1 and 2. Table 7 presents the summary of the post-ANOVA analysis of the error correction test.

Table 7: SPSS output for post-ANOVA analysis (the error correction test)

Posttest 1: web-based > collaborative > control
Posttest 2: web-based > collaborative > control

Posttest 1	Posttest 2
web-based > collaborative	web-based > collaborative
web-based > control*	web-based > control*
collaborative > control	collaborative > control

5. Discussion

5.1 Web-based CF and L2 Accuracy

Central to research question 1 of the study was the effect of web-based CF followed by self-correction with less dependency on the teacher on students' L2 writing. With respect to the results obtained from the narrative story task, the web-based group outperformed both the collaborative CF and control groups in the posttest 1 and 2. Meanwhile, the web-based and collaborative CF groups significantly outperformed the control group in the posttest 1 and 2. These findings are in line with those of previous studies (e.g., Bloch, 2009; Gaskell & Cobb, 2004; Hyland, 2003; Hyland & Hyland, 2006; Lee & Swales, 2006; Todd, 2001; Yoon & Hirvela, 2004) which investigated the effect of concordance on students' writing and found it a useful tool for promoting their writing skill. This pattern of the results is also consistent with Kennedy and Miceli's (2010) study, which supported the positive effect of web-based CF on participants' writing. They argued that sufficient scaffolding through concordance activities actuates students' ZPD to focus on linguistic forms and helps students develop effective learning strategies (Lee, 2008), raises language awareness (Hyland, 2003; Jabbour, 2001; Yoon, 2008), and gives novice writers a cognitive support (Bloch, 2009; Kennedy & Miceli, 2001; Kuo, 2008). The web-based CF can be linked to discovery-based

approach which leaves participants to have hands-on experience and to get involved in active learning (O'Sullivan, 2007).

5.2. Collaborative CF and L2 Accuracy

Research question 2, however, addressed the potentiality of collaborative CF in improving the accuracy of L2 writing. The results demonstrated that the collaborative CF group improved their writing accuracy and significantly outperformed the control group, particularly in the narrative story task. The pattern of findings is in line with some studies (e.g., Byrd, 2003; Ferris, 2003; Franco, 2008; Min, 2005, 2006; Rollinson, 2005; Tsui & Ng, 2000; Zhu, 2001) suggesting that collaborative CF fosters cooperative activity, mutual scaffolding, consciousness-raising, and social meaning-making process. Viewed from the cognitive perspective, collaborative CF allows learners to notice the gap between their erroneous language production and the input provided by the peer and enables them to restructure their output in the light of collaborative CF and lead to the production of more correct grammatical structures (Swain & Lapkin, 2002). The finding can also be explained in the light of Vygotsky's sociocultural theory (1986, as cited in Kozulin, 1986), which indicates that learners can only acquire information within their ZPD, establishing the actual development, what the novice learner can do alone versus the potential development, what the learner can do when helped by a more capable peer or an expert. Collaborative CF offers learners the opportunity to stretch their ability within their ZPD and makes them move from other-regulated to self-regulated activity (Dicamilla & Anton, 2004). The concept of the ZPD was later accompanied by joint scaffolding where each learner helps the other by providing extra support (e.g., Teo, 2006; Villamil & De Guerrero, 2000; Warwick & Maloch, 2003).

The results for the picture description task revealed almost the same pattern observed in the narrative writing task, that is, the web-based group significantly outperformed the collaborative and control groups. This finding can be accounted for by discovery-based approach, Schmidt's (1995, 2001) view of awareness in L2 acquisition, and scaffolding through concordance activities, which were favorably used in the web-based group (Kennedy & Miceli,

2010). The collaborative group outscored the control group in the posttest 1 and 2 in the picture description task. This finding can be justified by Swain and Lapkin's (2002) cognitive perspective and Vygotsky's (1986, as cited in Kozulin, 1986) sociocultural theory which were elaborated on earlier.

Regarding the error correction test, the results obtained from the three testing occasions showed that the web-based group performed better than the collaborative and control groups, indicating a significant difference between the web-based and control groups. All groups revealed a significant effect for time and a significant interaction effect between time and CF treatment. A significant effect for CF treatment was observed in the narrative writing and picture description tasks. Contrary to our expectation, there was a trend for CF treatment in the error correction test, that is, all groups showed almost the same degrees of increase in the posttest 1 and 2. A possible explanation for this might be the resemblance of the narrative story and picture description tasks to the treatment given, which required participants to produce narratives as opposed to the error correction test that required participants to recognize the erroneous forms and correct them (Sheen, 2008).

5.3 Web-based and Collaborative CF and Learner Autonomy

In this study, participants' writings received web-based and collaborative CF that required them respectively to either self-correct independently or collaboratively to foster less dependency on the teacher. Given the potentiality of web-based and collaborative CF in fostering autonomy through self- and peer-corrections as well as the degree of accuracy that participants achieved in revising their own writing as a result of CF, the present study also contributes to the literature of autonomy. Such a claim can be better justified by Littlewoods's (1996) framework of autonomy which identifies "autonomy as a learner" containing "(a) the ability to engage in independent work (e.g., self-directed learning); and (b) the ability to use appropriate learning strategies, both inside and outside the classroom" (p. 431). The framework

depends on two main components: "ability" and "willingness". The former is comprised of "knowledge" and "skills"; the latter is subdivided into "motivation" and "confidence". The results indicated that the participants possessed the components of ability and willingness. They were able to gain the knowledge (e.g., using concordance examples, collaborating and negotiating in groups) about the alternatives from which choices had to be made in self- and peer-correction and the necessary skills for applying the choices which seemed the most appropriate. Participants also possessed the motivation component because their motivation was fostered by clarifying its relation to their own needs and goals. Participants appeared confident in their self- and peer-correction by indicating a notable number of corrections, making decisions independently about choices both outside and inside the classroom that have traditionally belonged to teachers, creating a non-threatening atmosphere, and providing techniques for furthering participants' ability to self- and peer-correction. Overall, the participants demonstrated an ability to perform independently and a willingness to attempt for more accuracy in their writing.

Littlewood (1996) also made a distinction between "proactive" and "reactive" autonomy. The proactive autonomy is acquired when learners are able to take charge of their own learning, determine their own goals, select methods and techniques, and evaluate what has been acquired. As Little (1991) points out, in this way they can "establish a personal agenda" for learning (p. 431), which confirms their individuality and sets up directions in a world which they themselves have partially created. Littlewood (1999) describes reactive autonomy as the kind of autonomy which does not create its own directions, but once the direction has been initiated, enables learners to organize their resources autonomously in order to achieve their goal. However, he argues that, although for many autonomy researchers, proactive autonomy is the only kind that counts, in talking about education it is useful to consider reactive autonomy as well which can be considered either as a preliminary step towards proactive autonomy or as a goal in its own right. He also states that we need to match different aspects of autonomy with the characteristics and needs of learners in different contexts.

Participants in the present study obtained both proactive and reactive requirements, that is, we set the direction for participants to work on tasks (e.g., by giving hyperlink to an already prepared concordance file, placing a guiding tag on errors, giving directions on how to work in group and negotiate errors collaboratively) and then they appeared to manage their own resources independently in order to reach their aim (e.g., searching out online concordances, giving and receiving feedback).

6. Conclusion

The current study sought to answer the question if web-based and collaborative CF would result in more improvements on L2 writing accuracy in the use of English articles (*a* and *an* as the first mention and *the* as the anaphoric reference) over the three testing occasions: pretest, immediate posttest, and delayed posttest. On the whole, web-based and collaborative CF appeared to have a significant effect on the L2 writing accuracy in the use of English articles over time. Compared to the collaborative and control group, the web-based group made the most favorable improvements over time. Also participants' autonomy was examined with respect to Littlewood's (1996) framework of autonomy. The results revealed that participants who got engaged in self- and peer-correction reduced their dependency on the teacher both outside and inside the classroom successfully.

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