

The Impact of Timing in Written Corrective Feedback on Collaborative Writing and L2 Accuracy Development

Gabriel Michaud
Université de Montréal

Kim McDonough
Concordia University

Mariane Parent
Université de Montréal

Abstract

This study examines the impact of written corrective feedback (WCF) timing on the collaborative writing process and writing accuracy development of adult learners of French as a second language. Forty-eight learners were divided into three groups to complete a collaborative writing task in pairs. The first group received immediate WCF via Google Docs while writing, the second group received delayed WCF one week later with 10 minutes allocated for error correction, and the third group performed the writing task without receiving any feedback. All discussions during the collaborative writing were recorded and analyzed for language-related episodes (LREs). Writing accuracy was assessed through pretests, immediate posttests, and delayed posttests using story-retelling tasks. The findings revealed that the delayed feedback group engaged in more extensive discussions about linguistic forms compared to the other two groups. In terms of writing accuracy, the immediate feedback group showed the most significant improvements over time.

Résumé

Cette étude examine l'impact du moment de la rétroaction corrective écrite sur le processus d'écriture collaborative et sur le développement de l'exactitude de l'écriture chez les apprenants adultes du français langue seconde. Quarante-huit apprenants ont été répartis en trois groupes pour accomplir une tâche d'écriture collaborative en binômes. Le premier groupe a reçu une rétroaction corrective écrite immédiate via Google Docs pendant le processus d'écriture, le deuxième groupe a reçu une rétroaction différée une semaine plus tard, avec 10 minutes allouées pour corriger les erreurs, et le troisième groupe a accompli la tâche sans recevoir de rétroaction. Toutes les discussions collaboratives ont été enregistrées et analysées pour identifier les épisodes liés au langage, tandis que l'exactitude de l'écriture a été mesurée à l'aide de prétests, de post-tests immédiats et de post-tests différés, basés sur des tâches de reformulation d'histoires. Les résultats ont montré que le groupe ayant reçu une rétroaction différée s'est engagé dans des discussions plus approfondies sur les formes linguistiques par rapport aux autres groupes. Cependant, le groupe ayant reçu une rétroaction immédiate a montré les améliorations les plus significatives en termes d'exactitude de l'écriture au fil du temps.

The Impact of Timing in Written Corrective Feedback on Collaborative Writing and L2 Accuracy Development

Introduction

Considerable research on written corrective feedback (WCF) has highlighted its key role in improving second language (L2) learners' writing accuracy (Brown et al., 2023; Kang & Han, 2015). For language teachers, who invest considerable time and effort into providing feedback, understanding the optimal strategies for delivering WCF is crucial (Liu & Brown, 2015). Recent meta-analyses have shown that studies have focused on several characteristics of WCF, such as the type of WCF (direct, providing the correct form, vs. indirect, using codes or symbols to signify the presence of an error types of feedback), and the proficiency level of learners. Traditionally, WCF has mostly been provided in a delayed manner; that is, after the writing was completed by learners, but new advances in writing tools allows the possibility to provide immediate WCF; that is, while the learners are engaged in the writing process (Aubrey & Shintani, 2021). Immediate WCF has emerged as a pedagogical strategy, gaining traction in both computer-mediated and paper and pen environment (Cho et al., 2021; Kim & Emeliyanova, 2021; Shintani & Aubrey, 2016; Yamashita, 2022). To make this practice manageable, many teachers employ collaborative writing, wherein learners work in pairs or groups, reducing the overall number of texts requiring immediate correction (Cho et al., 2021; Yamashita, 2021, 2022). While these studies demonstrate the feasibility of immediate WCF in classroom settings, empirical evidence on the combined effects of collaborative writing and immediate WCF remains limited.

Existing research has primarily compared immediate and delayed feedback in controlled laboratory settings, often involving one-on-one feedback rather than group-based collaborative tasks (Arroyo & Yilmaz, 2018; Henderson, 2021; Shintani & Aubrey, 2016). These studies raise questions about whether immediate feedback fosters deeper collaboration and engagement with linguistic forms or promotes more significant gains in writing accuracy, especially in authentic classroom environments. Additionally, most studies fail to investigate how WCF impacts the writing process during collaborative writing tasks, particularly in terms of learners' cognitive engagement and discussion of language forms (Kim & Emeliyanova, 2021). This study seeks to address these gaps by investigating how the timing of WCF influences learner discussions about language forms during collaborative writing tasks and its effects on their writing accuracy in subsequent texts. By focusing on the interaction between feedback timing and collaborative writing, this research aims to understand how WCF timing affect learners' engagement with language and accuracy development in L2 classrooms.

Literature Review

Cognitive and Sociocultural Perspectives

The theoretical underpinnings of corrective feedback during collaborative writing can be explored from both cognitive and sociocultural perspectives. From a cognitive standpoint, Schmidt's Noticing Hypothesis (2001) argues that learners must consciously notice language forms in order to acquire them. Feedback, when provided during the

writing process, draws learners' attention to errors, thus creating opportunities for noticing and hypothesis testing, especially in collaborative writing contexts where multiple learners are engaged in the task (Storch, 2021). Cognitive-interactionist theories (Long, 2007) similarly suggest that feedback during writing enhances learners' attention to form, thus aiding in the transition from input to intake. In collaborative settings, immediate feedback may allow learners to compare their output with target forms in real-time, leading to more meaningful language processing and retention. Swain's Output Hypothesis (2005) further emphasizes the role of language production in deepening learners' processing of linguistic knowledge. Collaborative writing offers learners the opportunity to test their language hypotheses in real-time, and immediate feedback during this process can help clarify linguistic uncertainties. This interaction fosters a dynamic learning environment where learners are actively involved in both producing and revising language forms, promoting the internalization of new linguistic knowledge (Storch, 2021). From a Transfer-Appropriate Processing (TAP) perspective (Segalowitz & Lightbown, 1999; Spada & Lightbown, 2008), immediate feedback has the potential to promote better retention when the learning conditions mirror the actual use of the language. Providing feedback while learners are actively engaged in the writing process mirrors real-world language use, thereby improving their ability to retrieve and apply linguistic knowledge in future writing tasks. Immediate feedback in collaborative writing settings offers an ideal context for this type of processing, as learners attend to language forms in a task-oriented environment, promoting retention and application of feedback (Li et al., 2016).

From a sociocultural perspective (Vygotsky, 1978), social interaction and negotiation are essential for cognitive development. Feedback delivered during collaborative writing can act as a scaffold, helping learners to move through their zone of proximal development by working together to solve linguistic problems (Storch, 2021). Within this framework, feedback is not just a corrective mechanism but a form of mediated learning, where learners co-construct knowledge with the support of their peers and instructors. Collaborative writing tasks, coupled with immediate feedback, create opportunities for learners to engage in language-related episodes (LREs) where they negotiate meaning and discuss language forms (Swain & Lapkin, 1998). Donato's (1994) concept of collective scaffolding further supports the role that each learner can have, providing assistance that helps their peers reach higher levels of language proficiency. Immediate feedback in this context can enhance these scaffolding opportunities by encouraging real-time dialogue and joint problem-solving (Cho et al., 2021). As learners negotiate meaning and discuss feedback, they are not only correcting errors but also internalizing linguistic rules and structures, which can lead to long-term improvements in accuracy (Storch & Wigglesworth, 2010).

The key distinction between immediate and delayed corrective feedback lies in the conditions under which feedback is processed and its impact on cognitive resources. Immediate feedback, both oral and written, offers the advantage of addressing errors while learners are still engaged with the task, thus allowing them to focus on both the form and meaning of their message. Doughty (2001) suggested that corrections should ideally occur within 40 seconds of the error to maintain this dual focus. Shintani (2016) supported this in the context of written feedback, showing that learners responded to feedback promptly, often within this critical window, facilitating their ability to simultaneously process form and meaning. Theoretically, a benefit of immediate feedback is its ability to promote transfer-appropriate processing, a concept derived from the work of Segalowitz and

Lightbown (1999) and Spada and Lightbown (2008). Transfer-appropriate processing suggests that knowledge is best retrieved under conditions similar to those in which it was acquired. Therefore, when teachers draw learners' attention to language form while they are actively using it, it mirrors the conditions of actual language use, which can result in better long-term retention. Immediate feedback ensures that learners are attending to the formal properties of language in real-time, enhancing the likelihood of successful language acquisition.

However, this benefit comes with potential cognitive costs. Writing, as described by the models of Hayes and Flower (1980) and Kellogg (1996), is a cognitively demanding process involving simultaneous tasks such as planning, composing, and revising. Adding immediate corrective feedback into this mix can strain learners' limited cognitive capacities (Skehan, 1998). If learners are already allocating their mental resources to the act of writing, planning their ideas, and structuring their text, immediate feedback may overload their cognitive systems. This can hinder rather than help, as they may struggle to process the feedback effectively while simultaneously engaging in other writing-related tasks. The concern, therefore, is about cognitive overload. While immediate feedback offers benefits in promoting attention to language form during its use, it can also add to the cognitive load imposed by the complex processes involved in feedback processing (Fu & Li, 2021). In such cases, delayed feedback might allow learners to engage with feedback when they have more cognitive capacity to process it thoroughly, leading to more effective learning outcomes.

Timing of Corrective Feedback

The timing of corrective feedback has emerged as a recent area of investigation in second language acquisition research, with studies comparing immediate and delayed feedback across both oral and written modalities. While early research predominantly focused on oral corrective feedback, recent studies have also explored the timing of written feedback.

Studies comparing the effects of immediate versus delayed oral corrective feedback on language learning have generally shown minimal differences in overall learning outcomes. For instance, Quinn (2014) examined the impact of feedback timing across three tasks and found no statistically significant differences in performance between the groups, although there were slight advantages for immediate feedback in terms of effect size. This pattern was echoed by Li et al. (2016), who used a dictogloss task to compare the two types of feedback. While the group receiving immediate feedback showed larger effect sizes on a grammaticality judgment task, the differences between the groups remained statistically insignificant.

More recent work by Fu and Li (2022) and Canals et al. (2021) has further reinforced these findings. Fu and Li reported no significant differences between immediate and delayed feedback groups, though, as in previous studies, the immediate feedback group consistently exhibited larger effect sizes. Similarly, Canals et al. (2021) focused on the acquisition of participial adjectives in video-based communication and found that the immediate feedback group demonstrated larger gains compared to the control group. However, as with earlier research, the difference between immediate and delayed feedback was not statistically significant. These studies collectively suggest that while immediate

oral feedback may offer slight advantages, particularly in terms of effect size, these benefits often fall short of statistical significance.

Research on WCF has also explored the relative benefits of immediate versus delayed feedback, but with a focus on writing performance. Shintani and Aubrey (2016) compared the effects of feedback timing on learners' performance with conditional verb forms using Google Docs. Both the immediate and delayed feedback groups outperformed the control group, with the immediate feedback group showing a larger effect size. This trend aligns with the findings of Arroyo and Yilmaz (2018), who reported that learners receiving immediate feedback during one-on-one chat sessions outperformed both delayed feedback and control groups on posttest measures. However, Henderson (2021) challenged this general superiority of immediate feedback, finding no significant differences between immediate and delayed feedback in terms of vocabulary acquisition. This suggests that the effectiveness of feedback timing may depend on the type of linguistic feature being targeted, with certain features (e.g., grammar versus vocabulary) responding differently to immediate versus delayed feedback.

Despite the overall trend favoring immediate feedback, several limitations of these studies need to be addressed. A significant number of studies, especially those focusing on written feedback, have been conducted in laboratory or controlled settings, raising concerns about ecological validity. For example, in Shintani and Aubrey's (2016) study, the "delayed feedback" condition involved only a 10-minute interval, which is far shorter than the typical delays learners experience in authentic classroom environments. Liu and Brown (2015) pointed out that in real classrooms, students often wait over a week to receive feedback on their writing, making it challenging to generalize findings from controlled experiments to naturalistic settings.

Moreover, while immediate feedback has shown stronger effects in controlled environments, its practical implementation in real-world classrooms presents significant challenges. Providing real-time corrective feedback to each learner during writing tasks can be logistically demanding and time-consuming, particularly in larger classrooms. This highlights the potential of using immediate WCF in collaborative writing tasks, where learners work in pairs or small groups. By reducing the number of individual texts that require feedback, teachers may be able to provide timely and effective corrections while still reaping the pedagogical benefits of immediate feedback.

Understanding Learner Processing of Corrective Feedback in Collaborative Writing

Despite the growing popularity of collaborative writing, research on how learners process CF within this context, particularly in relation to feedback timing—whether immediate or delayed—remains somewhat limited. Existing studies have explored the effects of both immediate and delayed CF, revealing distinct impacts on learner engagement and the occurrence of LREs.

For example, Storch and Wigglesworth (2010) found that delayed indirect CF, such as error codes, prompted more extensive LREs compared to direct CF, such as providing correct reformulations. This suggests that indirect feedback encourages deeper reflection and cognitive engagement, as learners in delayed CF conditions took more time to collaboratively discuss errors. Interestingly, despite these longer discussions, the uptake—the extent to which feedback was successfully incorporated—was similar across both

feedback types, indicating that the depth of LREs did not necessarily translate into higher uptake in delayed CF conditions.

More recent studies by Cho et al. (2021) and Kim and Emel'yanova (2021) further enrich our understanding of how learners process WCF in both collaborative and individual writing settings. Cho et al. (2021) investigated the effects of immediate WCF during collaborative writing tasks and found that learners working in pairs resolved linguistic errors more effectively than those working individually, especially in lexical areas. The collaborative groups not only showed higher accuracy in resolving errors, but also engaged in more elaborate discussions of language forms, producing more frequent and in-depth LREs. This highlights the role of social interaction in enhancing learners' ability to process feedback, as peer collaboration seems to promote a deeper cognitive engagement with linguistic forms. Interestingly, despite the enhanced error resolution in collaborative groups, the overall number of LREs was similar between collaborative and individual learners, suggesting that collaboration led to more efficient and effective use of LREs, rather than simply increasing their frequency.

On the other hand, Kim and Emel'yanova (2021) explored the effects of delayed WCF in both collaborative and individual settings. Their findings echoed the advantages of collaboration, as groups outperformed individuals in correcting a higher percentage of errors, whether lexical or grammatical. This confirms the critical role that peer interaction plays in the revision process, allowing learners to benefit from collective knowledge and peer scaffolding. Moreover, whether feedback was immediate or delayed, collaboration consistently led to greater accuracy in error resolution, reinforcing the idea that collaboration fosters deeper linguistic reflection and promotes more effective revision strategies.

Taken together, these studies emphasize the importance of collaboration in the uptake of WCF, regardless of whether the feedback is immediate or delayed. While timing may influence the depth and nature of engagement with feedback, both studies underscore that collaborative revision supports more effective linguistic reflection and error correction over time. This suggests that the collaborative writing process itself, combined with feedback, plays a pivotal role in improving learners' writing accuracy, fostering an environment conducive to both cognitive engagement and practical error resolution.

The Current Study

Research on WCF has increasingly emphasized its importance in improving L2 learners' writing accuracy. Much of the existing research has focused on the types of feedback, such as direct and indirect, and the amount of feedback required to maximize its impact. However, the timing of WCF, whether provided immediately during the writing process or delayed until after task completion, has received less attention. Immediate WCF has gained prominence due to advancements in technology, such as Google Docs, allowing teachers to offer real-time feedback during collaborative writing tasks.

Despite growing interest in immediate WCF, there is limited empirical evidence on how it affects learner engagement with linguistic discussions, particularly in collaborative writing contexts, and how it promotes language development. This study seeks to fill part of this gap by examining how timing of writing corrective feedback influences learners' discussion about forms during collaborative writing and how it transfers to learning gains in

new pieces of writing. The current study attempts to answer the following research questions:

1. How does the timing of written corrective feedback (immediate vs. delayed) influence learners' engagement with form-related discussion, as measured by the frequency and the resolution of language-related episodes during collaborative writing tasks?
2. To what extent does the use of immediate written corrective feedback during collaborative writing affect learners' overall writing accuracy in subsequent writing tasks, compared to delayed feedback?

Method

Participants

Forty-eight university students from three different intact groups participated in the study, 32 women and 16 men, distributed in 24 participant pairs. Their mean age was 20.8 years ($SD = 2.1$), and they had been learning French for a mean of 4.3 years ($SD = 1.3$). They were enrolled in a credit French as a second language (FSL) course at the B1 level of the Common European Framework of Reference for Languages (lower intermediate) with two 1.5-hour classes per week for 26 weeks. The French course focused on the four skills (speaking, listening, writing, reading) and followed a task-based approach. The tasks involved responding to and commenting on current affairs such as proposing solutions to the problem of plastic in the ocean. Two teachers participated in the study. Both teachers were French-speaking women in their early 30s with master's degrees in FSL. They had five to seven years of FSL teaching experience. One teacher was responsible for two groups, the other teacher for one group.

Procedure

We recruited two instructors from the French Department at a large university in Quebec, Canada, who agreed to participate in the study. Ethical approval was obtained prior to the study, and all participants (students and teachers) provided informed consent and participated voluntarily.

To assess individual learning gains, both the pretest and posttests were administered individually, while the intervention task—the collaborative writing task—was completed in dyads for all groups. The independent variable in this study was the timing of WCF. The immediate feedback group received WCF in real time during the collaborative task, while the delayed and control groups did not receive any WCF during the task itself. The delayed group received feedback one week later and had 10 minutes to respond to their teacher's comments, while the control group received no feedback at any point.

The study was conducted over three sessions across a four-week period during regular class hours. In the first session, all participants completed the pretest, and the delayed feedback group began the collaborative writing task. In the second session, the immediate and control groups completed the collaborative task, while the delayed feedback group was given time to review and discuss the feedback for 10 minutes. All groups then

completed the immediate posttest. In the third and final session, held two weeks later, all participants took the delayed posttest. Table 1 presents the full research schedule.

Table 1
Schedule for Research Tasks

Feedback group	Day 1	Day 8	Day 25
Immediate	Pretest (individual writing)	Collaborative writing (dyads) Immediate posttest (individual writing)	Delayed posttest (individual writing)
Delayed	Pretest (individual writing) Collaborative writing (dyads)	Correction (dyads) 10 min Immediate posttest (individual writing)	Delayed posttest (individual writing)
Comparison	Pretest (individual writing)	Collaborative writing (dyads) Immediate posttest	Delayed posttest (individual writing)

Collaborative Writing Task

The participants were in a computer lab working in teams of two, sitting next to each other. Each participant had their own laptop computer and worked collaboratively on the same shared Google Docs. Google Docs was chosen because it is the software that is usually used by the students in these courses. For the collaborative task, participants first watched a five-minute video on a social issue (dumpster diving). They were asked to write a text in which they would explain what dumpster diving is and propose solutions for this issue. This writing task is part of the regular class curriculum, requiring students to watch a video on a social issue and share their opinions on it. After watching the video, they had 5 minutes to plan the structure of the text according to the teacher's practice. Then they had to start writing. Participants were instructed to work collaboratively on the writing task using Google Docs, with specific instructions to discuss and jointly make decisions about language use (form and meaning) during the task. They were also advised not to divide the task into parts but to work together on each section of the text. For the feedback conditions, the immediate feedback group was instructed to respond to teacher-provided comments during the writing process, while the delayed feedback group received their feedback after one week and had 10 minutes to discuss and correct their errors. Even though the control group did not receive corrective feedback during the study, they received it after the completion of the delayed posttest.

Corrective Feedback

As part of their regular pedagogical practices, the teachers provided indirect corrective feedback. While numerous studies have examined the effectiveness of both

direct and indirect corrective feedback, showing that their impact can vary depending on the context (Brown et al., 2023), this research does not focus on that specific issue. When the teachers saw an error, they used the comment feature of Google Docs to give the participants a clue about the nature of the error. The immediate group received corrective feedback while they worked together during the collaborative writing task. The delayed group received written corrective feedback a week later. The participants in the delayed feedback group reopened the Google Docs document containing the teacher's corrections and were given 10 minutes to discuss the feedback and correct their errors. Both experimental groups were advised to discuss the feedback that they received and to try to correct their errors. The only difference was that the immediate feedback group did this while they were composing but the delayed feedback group did this one week later. The control group simply completed the collaborative writing task without any feedback.

The teachers also followed their usual classroom practice of providing extensive, untargeted corrective feedback. To ensure equal treatment of the experimental groups, we asked the same teacher to provide similar amounts and types of feedback to both groups. We categorized the corrective feedback provided to both groups to ensure that the participants received comparable treatment.

Data Collection Instruments

We audio-recorded the discussions that the participants had during the collaborative writing task, as we did for those discussions in which the participants in the delayed feedback group corrected their errors. We transcribed and coded the discussions for LREs using Storch and Wigglesworth's (2010) scheme of three categories: forms, lexis, and mechanics. Storch and Wigglesworth's coding scheme was used for its comprehensive categorization of LREs, aligning with the study's focus on feedback during collaborative writing. We also coded LREs as: (a) resolved if the participants reached an accurate solution to their problem or (b) unresolved if their solution was incorrect or they could not solve the problem. Conversations between participants occurred in both French and English. Original French passages are shown in italics, with English translations provided in brackets. We coded as *LRE-form* discussions about anything related to grammatical or syntactic errors. Excerpt 1 presents an example of LRE-forms where two participants discussed a form. They questioned the rule for using a hypothetical sentence. In French, a hypothetical clause beginning with *si* must be followed by the indicative mood and not the conditional mood. The learners asked each other about this rule, and one of them explained it to his teammate. Because the explanation was accurate, we categorized this LRE-form as resolved.

Excerpt 1

Participant 2: *Ahh. Mauvais temps de verbe* [Wrong verb tense] (*reading the teacher's comment*). Can you also click on the *mauvais temps de verbe* [wrong verb tense]? Oh, sorry, the second last one.]

Participant 1: /---/ *les personnes* [people].

Participant 2: *S'il aurait**...[If he had (conditional)]*

Participant 1: *Plus de...* [more...]

Participant 2: *Si imparfait* [if imperfect], *il aurait* [he would]. Ah... So with an "s"?

- Participant 1: *S'il avait* [if he had(imperfect)]. *S'il avait. Plus de. Plus DE. On peut pas, on va utiliser...* [We cannot, we are going to use...]
- Participant 2: *Oh, avait* [had(imperfect)]! Right, right.
- Participant 2: Wait, wait. So, *s'il y aurait* it's actually *s'il y avait*?
- Participant 1: *Il avait.*
- Participant 2: Ah, ok.
- Participant 1: And that doesn't make sense for me. Here, ok.
- Participant 2: Wait, isn't "*aurait*" for future?
- Participant 1: No, "*aurait*" is uh is *conditionnel*.
- Participant 2: Ah, ok.
- Participant 1: We have to use "si" *imparfait* comma *conditionnel*.

We coded as *LRE-lexis* discussions between participants about the meaning of a word. Excerpt 2 shows an occasion when two participants were wondering how to say "spend money." One of the participants suggested "*passer*," which is one possible translation of "spend" in a context like "spend time." However, in this context, "*dépenser*" would be the appropriate translation. Therefore, we categorized this *LRE-lexis* episode as unresolved.

Excerpt 2

- Participant 1: Ah, okay. Kathy, do you know what is the word for um "spend"? Like for spend money?
- Participant 2: Euh...
- Participant 1: *Passer d'argent** [Lend money(wrong determinant)] ?
- Participant 2: *Passer?* (*laughter*)
- Participant 1: I don't know!
- Participant 2: I think it's euh...
- Participant 1: /---/ [Laugh.]
- Participant 1: Yeah. (*laughter*)

We coded as *LRE mechanics* discussions about spelling or punctuation. In Excerpt 3, two participants wondered whether they should put a comma before "*y compris*" [including]. One of the participants stated that they should not use a comma because English does not need one. However, in this context, a comma is needed in French. We therefore categorized this *LRE-mechanics* episode as unresolved.

Excerpt 3

- Participant 1: (*Reading the sentence*) *Il y a toute sorte de choses dans la poubelle y compris la moisissure* [There are all sorts of things in the garbage can including mold.]
- Participant 2: Do you need a comma after "*y compris*" [including] ?
- Participant 1: I don't think so...because it's saying "including".]
- Participant 2: Yeah.

In addition to identifying the types of LREs and their resolutions, we also assessed the participants' level of engagement by coding the LREs as either limited or extensive (Storch, 2008; Storch & Alshuraidah, 2020). Limited engagement was characterized by

instances where only one participant contributed to the conversation, with little or no response or acknowledgment from the other participant. Excerpt 4 showcases an example of a limited LRE where one participant did not know how to say “weather” in French, and the other one provided the answer. The first participant simply acknowledged the answer.

Excerpt 4

Participant 1: *Endommager le contenu. La température est..* [Damage the contents. The temperature is...] What’s like weather? Like rain also?
 Participant 2: Euh... Le temps? [Weather]
 Participant 1: Le temps? Ok.

In contrast, LREs that we categorized as extensive engagement involved participants’ actively discussing language items, seeking and providing confirmation, explanations, and exploring alternative solutions, as outlined by Storch (2013). Extensive engagement is illustrated in Excerpt 1, where the two participants had a lengthy discussion about a grammatical rule. They exchanged a lot of information and came to the correct resolution when one participant explained the rule to the other.

Finally, for all three groups, we examined the LREs initiated by the participants themselves while they were working on the collaborative writing task. For the two experimental groups, we also considered the LREs in which the participants engaged in response to the feedback that they had received.

Pretest and Posttests

All three tests, pretest, immediate posttest and delayed posttest, were story retelling tasks (Yamashita, 2022). Learners watched three wordless videos telling a story about a relationship between two characters that evolves over time. Learners were asked to recount what they saw in the video.

Two of the authors scored the results from the tests. To calculate interrater reliability, both authors coded 20% of the participants’ texts. Their agreement rate was 96%. They discussed and resolved all discrepancies in their coding. For analysis, we used the error ratio per 100 words, that is, we divided the number of errors per text by the total number of words and multiplied the result by 100 (Ellis et al., 2019).

Analysis

Given the small sample size and the fact that some tests did not meet the necessary assumptions, we conducted non-parametric Kruskal-Wallis tests to compare the three groups and Mann-Whitney tests for comparisons between the two experimental groups. The analyses were performed using the JASP software (JASP Team, 2023).

Results

Table 2 presents the types of errors and the uptake rate—the percentage at which participants correctly incorporated the feedback they received—for each experimental group. Participants received between six and eight instances of corrective feedback, focusing on similar types of errors ($M = 7.00$, $SD = 1.00$ for both groups).

Table 2
Errors Targeted by Corrective Feedback

Errors	Immediate feedback ($n = 7$)		Delayed feedback ($n = 9$)	
	M	% of correct resolution	M	% of correct resolution
Morphosyntax	5.2	91	4.9	92
Lexis	1.8	96	1.4	94
Spelling	0.0	--	0.7	100
Total	7.0	92	7.0	93

Note. The n refers to the number of participant pairs.

Overall, the rate at which learners in the two experimental groups successfully resolved the WCF they received was very similar. Both groups managed to correctly address the vast majority of the feedback provided.

Effect of Timing on Learners' Engagement with Form-Related Discussion

To address the first research question about whether the timing of corrective feedback affects learners' discussion about language form, we analyzed the number and type of LREs in each group. Table 3 displays the LRE means for the three groups during the collaborative writing task.

Table 3
Language Related Episodes Initiated by the Participants

Episodes	Immediate ($n = 7$)		Delayed ($n = 9$)		Control ($n = 7$)	
	M (SD)	Resolved (%)	M (SD)	Resolved (%)	M (SD)	Resolved (%)
LRE-form	2.71 (2.14)	10	8.29 (5.40)	86	2.57 (5.06)	67
LRE-lexis	10.00 (5.07)	86	12.29 (4.31)	80	5.43 (4.39)	66
LRE-mechanics	1.00 (0.82)	71	3.29 (4.15)	74	0.14 (0.38)	100
Total	13.71		23.87		8.14	

Note. The n refers to the number of participant pairs. LRE = language related episodes.

Overall, the three groups exhibited a greater focus on lexical issues compared to the form and mechanic categories, with mechanical issues receiving the least attention. Interestingly, the delayed group had more LREs than the other groups and had more extensive discussions compared to those in the other two groups. The immediate group appeared to predominantly engage in LRE-Lexis. Notably, the control group had the fewest LREs across all categories. In terms of resolution, the immediate and delayed groups resolved a higher percentage of LREs than did the control group.

We conducted Kruskal-Wallis tests to examine the differences between the number and resolution rate of LREs. Table 4. shows that a significant difference was detected for all types of LREs, both for the total number and the percentage of LREs resolved.

Table 4

Results of One-Way Analysis of Variances Comparing Groups Within Episode Categories

Episodes	LREs total		LREs resolved	
	$\chi^2(2)$	<i>P</i>	$\chi^2(2)$	<i>P</i>
LRE-form	7.20	.03*	7.51	.02*
LRE-lexis	6.13	.05*	5.96	.05*
LRE-mechanics	8.11	.02*	6.38	.04*

Note. LRE = language related episode.

To locate the source of difference, we performed pairwise post hoc comparisons. Tables 5 and 6 provide, respectively, the results for LRE-F, LRE-L, and LRE-M analyses.

Table 5

Pairwise Mean Differences: Language Related Episodes

Group contrasts	LRE-F	LRE-F	LRE-L	LRE-L	LRE-M	LRE-M
	Total	resolved	total	resolved	total	resolved
	<i>z</i>	<i>z</i>	<i>z</i>	<i>z</i>	<i>Z</i>	<i>z</i>
Immediate vs. Delayed	-0.92	-0.76	-0.92	-0.78	-0.19	-0.78
Immediate vs. Control	1.88	1.66	1.88	1.69	2.01	-1.69
Delayed vs. Control	2.79*	2.42*	2.79*	2.47*	2.20	2.47*

Note: The *p* values were adjusted using the Holm correction. LRE = language related episode. F = form. L = lexis. M = mechanics. **p* < .05.

The only significant differences observed were between the delayed and control groups, with the delayed group consistently having more LREs, except for those related to mechanics. Additionally, the delayed group systematically arrived at the correct target after processing the feedback. No significant differences were found between the immediate and control groups.

For the two experimental groups that received feedback, we looked at the types of discussions in which the participants engaged after receiving a comment from their teacher. Table 7 shows the number and types of LREs that followed the feedback. The delayed group seemed to have more LREs related to forms than the immediate group. However, the resolution rate between the two groups seemed to be about the same.

Table 7*Language Related Episodes Initiated by Corrective Feedback*

Episodes	Immediate ($n = 7$)		Delayed ($n = 9$)	
	M (SD)	CR (%)	M (SD)	CR (%)
LRE-form	1.29 (1.38)	67	5.14 (2.34)	69
LRE-lexis	0.29 (0.49)	100	0.71 (0.76)	100
LRE-mechanics	0.29 (0.49)	100	0.14 (0.38)	100
Total	1.87		5.99	

Note. The n refers to the number of participant pairs. CR = correction rate. LRE = language related episodes.

A Mann-Whitney U test was conducted to determine whether there were differences between the delayed and the immediate groups in the number of total LREs and in the number of correctly resolved LREs. Two significant results were found in terms of the total number of LREs-F ($U = 46.00, p = .01, r = 0.88$) and the correctly resolved LREs-F ($U = 46.50, p = .01, r = 0.90$). Thus, the delayed group had a significantly higher proportion of discussions about forms and arrived in a higher proportion to the correct solution.

Effect of Timing on Accuracy

To answer the second research question, we examined the difference between the pretest and posttest scores. Table 8 shows the descriptive statistics for the three tests by condition. The trends that emerged from an inspection of Figure 1 showed that the immediate group experienced a slight but constant improvement in error rates over the three tests. The delayed group showed little change between the pretest and the immediate posttest, but a significant decrease in the number of errors in the delayed posttest. The control group also showed a slight increase on the immediate posttest and no change on the delayed posttest.

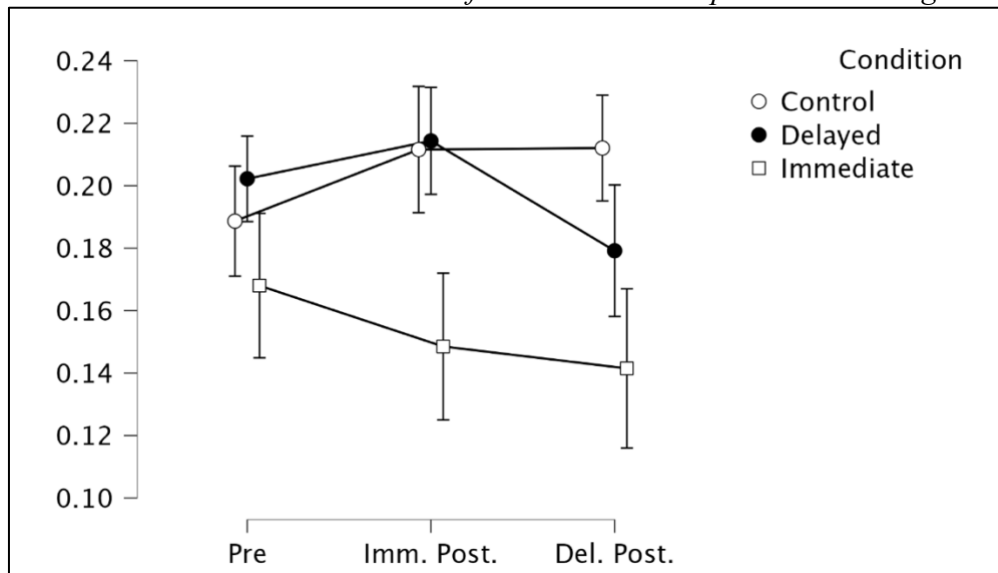
Table 8*Writing Task: Descriptive Statistics for Overall Learning Effects by Group*

Group	n	Pretest		Immediate posttest		Delayed posttest	
		M	SD	M	SD	M	SD
Immediate	15	0.17	0.07	0.15	0.08	0.14	0.06
Delayed	18	0.20	0.09	0.21	0.10	0.18	0.09
Control	15	0.19	0.08	0.21	0.09	0.21	0.09

Note. The n refers to the number of participants.

Figure 1

Pretest and Posttest Scores: Trends for the Three Groups Across Testing Sessions



Note. Pre = pretest; Imm. Post. = immediate posttest; Del. Post. = delayed posttest.

To establish whether there were significant differences among the groups, Kruskal-Wallis tests were conducted, and pretest scores were considered separately to account for baseline differences. The differences between the groups were significant at the immediate posttest, $\chi^2(2) = 6.30, p = .04$, as well as at the delayed posttest, $\chi^2(2) = 7.68, p = .02$. For posthoc comparisons using the Holm correction, only one significant difference was found between the immediate and the control group at the delayed posttest.

Discussion

This study aimed to investigate the role of the timing of written corrective feedback on learners' engagement with language-related episodes during collaborative writing tasks and its effect on their subsequent writing accuracy. By comparing immediate and delayed feedback conditions, the study sheds light on how timing influences learners' attention to language forms and their ability to improve writing performance.

Language-Related Episodes and Engagement with Language Forms

The results of this study indicate that delayed feedback leads to more discussions of language forms during collaborative writing, and to more correct resolution of errors particularly when compared to the control group. This is the first study comparing timing of WCF and the impact on form-related discussions and response to feedback. The results seem to go in line with previous studies that have shown that providing WCF in a collaborative writing task lead to form-related discussions (Storch & Wigglesworth, 2010). For example, studies have looked at different types of WCF, direct or indirect, and found that indirect feedback, which used editing symbols, led to more LREs, suggesting that learners engaged more deeply with the feedback during revision (Cho et al., 2021; Kim and Emel'yanova (2021); Storch & Wigglesworth, 2010). These studies suggest that feedback,

especially indirect types (Storch & Wigglesworth, 2010), allows learners to process errors at a deeper cognitive level, more so at the collective than the individual levels (Cho et al., 2021; Kim and Emeliyanova 2021), resulting in more opportunities for peer interaction and scaffolding (Donato, 1994).

In the current study, the delayed group's sustained attention to language form supports the notion that allowing learners time to reflect on feedback without the immediate pressure of task completion fosters more detailed and in-depth language processing. This pattern aligns with limited attention capacity (Skehan, 1998): delayed feedback creates conditions where learners are better able to attend to such forms because they are not simultaneously managing the demands of real-time writing.

In contrast, learners in the immediate feedback group showed lower patterns of engaging with LREs. Two reasons might be at play here. The first is the pressure of having to deal with writing and immediate WCF processing at the same time might lower the amount of time for LREs. The other might have to do with the fact that learners might rely more on the feedback provided by the teachers and hence not feel the need to discuss form-related matters. Immediate feedback may reduce peer-to-peer negotiation by providing an authoritative correction that learners tend to accept without further discussion.

Effect of Feedback Timing on Writing Accuracy

In terms of writing accuracy, the results reveal a different pattern. Learners who received immediate WCF showed greater improvements in accuracy on the delayed posttest, suggesting that real-time feedback might help better learners to internalize the feedback they receive. This finding is in line with previous research showing that immediate feedback has a higher effect on learning (Arroyo and Yilmaz, 2018; Fu and Li; 2022; Shintani & Aubrey, 2016). The results are also supported by Transfer-Appropriate Processing theory (Segalowitz & Lightbown, 1999), which posits that learning and retention are facilitated when the context of learning closely matches the context of use. Immediate feedback creates a condition where learners are corrected in the moment they are producing language, closely linking form with meaning. This immediate connection can ease the cognitive burden of language learning, making it easier for learners to retain and apply the feedback in their writing (Spada & Lightbown, 2008).

This delayed effect may be explained by learners' ability to engage in more reflective processing of the feedback when it is not provided simultaneously with writing. Also, according to Skill Acquisition Theory (DeKeyser, 2020), immediate written corrective feedback may be more effective because it allows learners to apply the feedback in real-time, reinforcing the correct forms while they are still engaged in the task. This timely reinvestment of feedback helps learners bridge the gap between declarative knowledge (knowing the rules) and procedural knowledge (using the rules automatically). By practicing the corrected forms immediately in a meaningful context, learners are more likely to proceduralize the knowledge, which is key to developing fluency and accuracy in language use.

Pedagogical Implications

The pedagogical implications of this study suggest that the timing of WCF plays a crucial role in shaping learners' engagement with language forms and their ability to

improve writing accuracy. Understanding the different benefits of immediate and delayed feedback can help teachers optimize their instructional strategies to meet specific learning objectives.

Each type of WCF—immediate or delayed—offers distinct benefits, making it essential to align the timing of feedback with specific learning goals. Delayed feedback allows learners to reflect on errors more thoroughly, leading to deeper engagement with LREs and more detailed peer discussions. Without the pressure to correct mistakes immediately, students have more cognitive space to process feedback, engage in peer scaffolding, and reflect on language forms. This makes delayed feedback particularly effective in tasks where the goal is to promote metalinguistic awareness and a deeper understanding of language structures.

In contrast, immediate feedback is more effective for enhancing writing accuracy. When feedback is provided during the task, learners can correct their errors in real time, reinforcing accurate language use while they are still focused on the content. This immediate correction helps transition learners from declarative knowledge (knowing the rules) to procedural knowledge (applying the rules automatically), supporting fluency and accuracy in language use.

A blended approach—combining immediate feedback for accuracy-focused tasks and delayed feedback for form-related discussions—can offer the best of both worlds. Immediate feedback aids real-time error correction and retention, while delayed feedback fosters deeper reflection and collaborative learning, maximizing overall language development.

Limitations and Future Research

While this study provides valuable insights into the effects of the timing of WCF on learners' engagement with LREs and writing accuracy, several limitations should be noted. First, the sample size was relatively small, limiting the generalizability of the findings to a broader population of learners. Future research with larger participant groups would allow for more robust conclusions and increase the external validity of the results. Second, the study focused on a single collaborative writing task, which may not fully capture the potential variability in learners' engagement with WCF over time or across different writing tasks. Conducting studies that involve multiple tasks or different task types would provide a more comprehensive understanding of how feedback timing influences engagement and accuracy in various writing contexts. Lastly, we did not have access to the participants' comments or reflections after the feedback process, which could have provided deeper insights into how learners processed the feedback and engaged with their peers. Future research could include qualitative data such as learner reflections, or group discussions to better understand the cognitive and social processes involved in responding to feedback. This additional layer of data would enhance our understanding of how feedback is internalized and acted upon in collaborative writing contexts.

Conclusion

This study provides important insights into the role of feedback timing in collaborative writing tasks. Both immediate and delayed WCF offer unique benefits: immediate feedback supports quick improvements in writing accuracy, while delayed

feedback encourages more reflective engagement with language forms, leading to sustained improvements over time. The findings suggest that teachers can strategically use both types of feedback depending on their instructional goals—immediate feedback for enhancing accuracy during writing tasks and delayed feedback for promoting deeper form-related discussions. By incorporating both approaches into their teaching practices, educators can better support learners' development in both accuracy and language processing skills, fostering long-term language growth.

Moreover, this study is the first to examine how feedback timing influences learners' engagement with form-related discussions during collaborative writing, highlighting an important area for future research. Future studies could explore larger sample sizes, multiple writing tasks, and gather qualitative data such as learners' reflections or discussions to further understand how different types of feedback affect second language acquisition across various contexts.

Correspondence should be addressed to: Gabriel Michaud
Email: gabriel.michaud@umontreal.ca

References

- Arroyo, D. C., & Yilmaz, Y. (2018). An open for replication study: The role of feedback timing in synchronous computer-mediated communication. *Language Learning*, 68(4), 942–972. <https://doi.org/10.1111/lang.12300>
- Aubrey, S., & Shintani, N. (2021). L2 writing and language learning in electronic environments. In R. M. Manchón, & C. Polio (Eds.), *The Routledge handbook of second language acquisition and writing* (pp. 282–296). Routledge. <https://doi.org/10.4324/9780429199691-29>
- Brown, D., Liu, Q., & Norouzian, R. (2023). Effectiveness of written corrective feedback in developing L2 accuracy: A Bayesian meta-analysis. *Language Teaching Research*. Advance online publication. <https://doi.org/10.1177/13621688221147374>
- Canals, L., Granena, G., Yilmaz, Y., & Malicka, A. (2021). The relative effectiveness of immediate and delayed corrective feedback in video-based computer-mediated communication. *Language Teaching Research*, 29(1), 242–268. <https://doi.org/10.1177/13621688211052793>
- Cho, H., Kim, Y. J., & Park, S. (2022). Comparing students' responses to synchronous written corrective feedback during individual and collaborative writing tasks. *Language Awareness*, 31(1), 1–20. <https://doi.org/10.1080/09658416.2021.1937194>
- DeKeyser, R. (2020). Skill acquisition theory. In B. VanPatten, G. D. Keating, & S. Wulff (Eds.), *Theories in second language acquisition* (pp. 83–104). Routledge. <https://doi.org/10.4324/9780429503986-5>
- Donato, R. (1994). Collective scaffolding in second language learning. In P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language research* (pp. 33–56). Ablex.
- Doughty, C. (2001). Cognitive underpinnings of focus on form. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 206–257). Cambridge University Press.
- Ellis, R., Li, S., & Zhu, Y. (2019). The effects of pre-task explicit instruction on the performance of a focused task. *System*, 80, 38–47. <https://doi.org/10.1016/j.system.2018.10.004>
- Fu, M., & Li, S. (2021). The associations between implicit and explicit language aptitude and the effects of the timing of corrective feedback. *Studies in Second Language Acquisition*, 43(3), 498–522. <https://doi.org/10.1017/S0272263121000012>
- Fu, M., & Li, S. (2022). The effects of immediate and delayed corrective feedback on L2 development. *Studies in Second Language Acquisition*, 44(1), 2–34. <https://doi.org/10.1017/S0272263120000388>
- Hayes, J. R., & Flower, L. S. (1980). Identifying the organization of writing processes. In L. W. Gregg, & E. R. Steinberg (Eds.), *Cognitive processes in writing* (pp. 3–30). Erlbaum.
- Henderson, C. (2021). The effect of feedback timing on L2 Spanish vocabulary acquisition in synchronous computer-mediated communication. *Language Teaching Research*, 25(2), 185–208. <https://doi.org/10.1177/1362168819832907>
- JASP Team (2023). *JASP* (Version 0.17.3) [Computer software]. <https://jasp-stats.org>

- Kang, E., & Han, Z. (2015). The efficacy of written corrective feedback in improving L2 written accuracy: A meta-analysis. *Modern Language Journal*, 99(1), 1–18. <https://doi.org/10.1111/modl.12189>
- Kellogg, R. T. (1996). A model of working memory in writing. In C. M. Levy, & S. Ransdell (Eds.), *The science of writing: Theories, methods, individual differences, and applications* (pp. 57–71). Erlbaum.
- Kim, Y., & Emel'yanova, L. (2021). The effects of written corrective feedback on the accuracy of L2 writing: Comparing collaborative and individual revision behavior. *Language Teaching Research*, 25(2), 234–255. <https://doi.org/10.1177/1362168819831406>
- Li, S., Zhu, Y., & Ellis, R. (2016). The effects of the timing of corrective feedback on the acquisition of a new linguistic structure. *The Modern Language Journal*, 100(1), 276–295. <https://doi.org/10.1111/MODL.12315>
- Liu, Q., & Brown, D. (2015). Methodological synthesis of research on the effectiveness of corrective feedback in L2 writing. *Journal of Second Language Writing*, 30, 66–81. <https://doi.org/10.1016/J.JSLW.2015.08.011>
- Long, M. H. (2007). *Problems in SLA*. Erlbaum.
- Quinn, P. (2014). *Delayed versus immediate corrective feedback on orally produced passive errors in English* [Unpublished doctoral dissertation]. University of Toronto.
- Segalowitz, N., & Lightbown, P. M. (1999). Psycholinguistic approaches to SLA. *Annual Review of Applied Linguistics*, 19, 43–63. <https://doi.org/10.1017/s0267190599190032>
- Shintani, N. (2016). The effects of computer-mediated synchronous and asynchronous direct corrective feedback on writing: A case study. *Computer Assisted Language Learning*, 29(3), 517–538. <https://doi.org/10.1080/09588221.2014.993400>
- Shintani, N., & Aubrey, S. (2016). The effectiveness of synchronous and asynchronous written corrective feedback on grammatical accuracy in a computer-mediated environment. *Modern Language Journal*, 100(1), 296–319. <https://doi.org/10.1111/modl.12317>
- Skehan, P. (1998). *A cognitive approach to language learning*. Oxford University Press.
- Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3–32). Cambridge University Press.
- Spada, N., & Lightbown, P. M. (2008). Form-focused instruction: Isolated or integrated? *TESOL Quarterly*, 42(2), 181–207. <https://doi.org/10.1002/j.1545-7249.2008.tb00115.x>
- Storch, N. (2008). Metatalk in a pair work activity: Level of engagement and implications for language development. *Language Awareness*, 17(2), 95–114. <https://doi.org/10.1080/09658410802146644>
- Storch, N. (2013). *Collaborative writing in L2 classrooms*. Multilingual Matters.
- Storch, N. (2021). Theoretical perspectives on L2 writing and language learning in collaborative writing and the collaborative processing of written corrective feedback. In R. M. Manchón, & C. Polio (Eds.), *The Routledge handbook of second language acquisition and writing* (pp. 22–34). Routledge.

- Storch, N., & Alshuraidah, A. (2020). Languaging when providing and processing peer feedback. In W. Suzuki, & N. Storch (Eds.), *Languaging in language learning and teaching: A collection of empirical studies* (pp. 112–128). John Benjamins.
- Storch, N., & Wigglesworth, G. (2010). Learners' processing, uptake, and retention of corrective feedback on writing: Case studies. *Studies in Second Language Acquisition*, 32(2), 303–334. <https://doi.org/10.1017/S0272263109990532>
- Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471–483). Routledge. <https://doi.org/10.4324/9781410612700-34>
- Swain, M., & Lapkin, S. (1998). Interaction and second language learning: Two adolescent French immersion students working together. *The Modern Language Journal*, 82(3), 320-337.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Yamashita, T. (2021). Corrective feedback in computer-mediated collaborative writing and revision contributions. *Language Learning & Technology*, 25(2), 75–93. <http://hdl.handle.net/10125/73434>
- Yamashita, T. (2022). Effectiveness and inclusiveness of locally adapted human-delivered synchronous written corrective feedback for English referential articles. *Computer Assisted Language Learning*, 37(5-6), 1074-1107. <https://doi.org/10.1080/09588221.2022.2068612>