



The Effect of Computer-mediated Feedback on ESL Undergraduate Students' Writing Self-efficacy

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doi: 10.33329/ijelr.11.1.105



Article information

Article Received:04/2/2024
Article Accepted:13/03/2024
Published online:18/03/2024

ABSTRACT

While numerous studies have explored the efficacy of computer-mediated feedback (CMF) in L2 writing instruction, with a focus on its impact on learners' writing achievement and acquisition of grammatical structures, there remains a gap in research concerning its effects on learners' psychological aspects. This study aimed to investigate the impact of CMF on the writing self-efficacy of ESL undergraduate learners at the University of Mysore, India. Sixty-four second-year undergraduate students participated in a quasi-experimental study spanning two months. They were randomly assigned to three groups: two experimental groups receiving synchronous (immediate) and asynchronous (delayed) CMF, and one control group receiving no feedback. Over the course of the study, participants engaged in six writing tasks, iterating through the process of writing, reviewing, and revising. Self-efficacy for writing scale was administered before and after the experiment to measure changes in learners' self-efficacy levels. The findings revealed that participants who received CMF exhibited significantly higher levels of writing self-efficacy compared to those who did not receive feedback. The results suggest that CMF plays a crucial role in positively bolstering ESL learners' self-efficacy beliefs in their writing abilities.

Keywords: computer-mediated feedback, L2 writing, writing self-efficacy, ESL learners

1. Introduction

In the context of higher education, second language (L2) writing is viewed as an indispensable skill where it holds the key to academic success and enhanced career opportunities. Teacher feedback stands out as a potent instrument for cultivating proficiency in L2 writing (Hattie & Timperley, 2007). This acknowledgment underscores the pivotal role that teachers attribute to feedback, perceiving it as a valuable source of guidance for students' writing endeavors (Guénette, 2007; Bitchener and Ferris, 2012). Studies, such as those by Ellis

(2009) and Ferris (1999), further underscore the essential role of corrective feedback for both educators and learners, as it supports and improves writing skills. Corrective feedback serves as a tool for learners to refine their language mastery (Bitchener and Knoch 2009; Taras 2003) by bringing attention to erroneous linguistic structures within their writing (Suzuki, 2004). Furthermore, feedback offers valuable insights to both teachers and learners regarding the disparity between desired goals and actual performance levels (Dinnen and Collopy, 2009).

However, ESL educators in the higher education context, face challenges in delivering feedback, on their students' writing performance, within the constraints of overcrowded classrooms where they grapple with time limitations. Due to these challenges, students often receive insufficient feedback which leads to persistent errors, diminished writing quality and a decline in their motivation to write effectively. However, with the advancement of technology, several tools have emerged as a promising solution to the persistent conundrum of providing effective feedback (Dawson et al., 2018), particularly in higher education settings where ESL teachers, as observed in the context of this study at the University of Mysore, often rely on traditional instructional methods, and who have often been claimed to face challenges in providing comprehensive feedback and assigning appropriate grades for their students' written assignments. Computer-mediated feedback (CMF) tools, encompass both synchronous and asynchronous mechanisms, not only enable teachers to offer timely and adaptable guidance for the development of their learners' L2 writing skills but also play a role in enriching the cognitive processes linked to language acquisition and influencing the affective factors that mold the learning experience for students (Mahdi, 2014).

L2 writing skill development is widely considered a multidimensional process and the most intricate and challenging skill to learn. To progress and move along the continuum of proficiency in written communication, learners need to incorporate several elements since writing requires not only a solid grasp of grammar, vocabulary, and sentence structure but also the ability to organize thoughts coherently and convey ideas effectively in written form. Further, Anastasiou & Michail (2013) argue that mastering writing skills extends beyond language proficiency; it encompasses the development of higher mental order abilities and psychological elements such as critical thinking, self-regulation, self-efficacy and motivation. Self-efficacy indicates a writer's beliefs in their capacity to write proficiently (Schunk & Swartz, 1993). With this in mind, learners require constructive assessment by expert writers or teachers to be guided as how to revise their drafts, engage in a cognitively active learning process and acquire strategies. This feedback serves as a crucial support mechanism, assisting learners in identifying errors, understanding language rules, improving cognitive strategies and consequently increasing their sense of self-efficacy as writers.

Researchers assert the significance of L2 writing self-efficacy as a crucial component reflecting an individual's confidence in successfully executing writing tasks in a second language (Mitchell et al., 2019; Masclé, 2013; Tsao, 2021). Grounded in Bandura's (1986) social cognitive framework and the model of triadic reciprocity, which posits that learning is shaped by reciprocal interactions among cognitive processes, behaviours, and environmental factors, writing self-efficacy beliefs play a central role in influencing learners' perseverance and overall performance (Mitchell et al., 2019; Pajares et al., 2006). Within this theoretical framework, social and contextual factors, such as feedback mechanisms and instructional conditions, play a pivotal role in shaping students' beliefs regarding their writing efficacy (Bruning & Kauffman, 2016; Mitchell et al., 2019; Schunk & Swartz, 1993). Additionally, self-efficacy is seen as a key influencer of learners' interaction with written feedback, with higher levels of L2 writing self-efficacy correlating positively with active engagement and benefiting from provided feedback (Masclé, 2013; Tsao, 2021).

Previous research has demonstrated a positive correlation between writing efficacy and various aspects of learners' engagement and performance (Pajares, 2003; Pajares & Johnson, 1994; Schunk, 2003). Some studies have explored the impact of teacher feedback on L2 writing learners' self-efficacy, comparing it with peer feedback within collaborative environments. For instance, Ruegg (2014) found that Japanese university students receiving consistent guidance from their teacher exhibited more substantial improvement in confidence and beliefs in their writing abilities compared to those engaged in peer feedback. Sherfati and Mahmoudi (2023)

investigated the implementation of computer-based feedback in writing classes, revealing significant improvements in the experimental group's writing test scores, self-regulation skills, and self-efficacy beliefs.

However, despite extensive research in the SLA literature establishing self-efficacy as a predictor of success and a motivator for persistence (Mills, 2014), it remains relatively unexplored within the domain of L2 writing, (Almutlaq & Etherington, 2018). Moreover, while some studies examined the impact of teacher feedback provided in face-to-face contexts on ESL learners' writing self-efficacy, there is a notable lack of research exploring how such feedback provided in a computer-mediated environment may influence the learners' self-efficacy levels. Hence, the present study addresses this gap by investigating whether there is a significant change in the level of writing self-efficacy among ESL undergraduate learners who receive CMF on their written assignments compared to those who do not receive feedback, before and after the treatment.

2. Hypothesis of the Study

H1: "There is a significant change in the level of writing self-efficacy of ESL undergraduate learners who receive computer-mediated feedback on their written assignments compared to those who do not receive feedback".

H0: "There is NO significant change in the level of writing self-efficacy of ESL undergraduate learners who receive computer-mediated feedback on their written assignments compared to those who do not receive feedback".

3. Research Methodology

The current study adopted a quasi-experimental research with a pretest-posttest design. Second-year undergraduate students (n=64) at the University of Mysore volunteered to participate in this study. Participants recruited in this study were chosen on a non-random purposive sampling basis. Specifically, first-year freshmen were excluded, and only second-year undergraduate students were selected for two primary reasons. Firstly, it was anticipated that these participants, having settled into their academic routines, would be more acclimated to university requirements, thus fostering a greater willingness to engage in multiple rounds of data collection. Secondly, the foundational language proficiency presumed to have been cultivated through the completion of English courses (1, 2, and 3 in previous semesters) was expected to facilitate their participation without necessitating prior pedagogical intervention. It is worth noting that all participants were concurrently enrolled in English 4 during the study period. This course, designated as a core subject within the second semester curriculum, was primarily designed to enhance their English proficiency and writing competence.

These undergraduates varied in age, ranging from nineteen to twenty-two years old. Of the participants, forty-four were male and twenty were female. They represented various majors, including commerce (n=16), computer science (n=16), education (n=11), English (n=10), and business administration (n=11). The inclusion of participants from diverse disciplines aimed to capture a broad range of writing skills and experiences within the undergraduate population of ESL learners. To maintain sample homogeneity, all participants were Indian nationals and used English as a second language (ESL) in their context. This decision was made to ensure a consistent language learning background, as foreign students studying at the university might have different language learning experiences where English might be learned as a foreign language; thus, other nationalities were excluded. Nevertheless, considering the multilingual background in India, these participants belonged to different native tongues with the majority speaking Kannada while the rest spoke Malayalam, Tamil and Hindi. On the other hand, three English language teachers, including the researcher, who possessed varied experiences in English language instruction at the level of higher education, were engaged in the administration of writing tasks, provision of CMF and the assignment of scores on the written products of the participating learners, utilizing a predetermined adapted scoring rubric based on Brown's (2007) framework.

The participants were randomly assigned to three groups: two experimental groups (Synchronous CMF n=20, and Asynchronous CMF n=21) and a control group (No Feedback group n=23). Over a period of two months, all participants were tasked with submitting six essays (descriptive/narrative), one essay every week, through the utilization of Google Docs. Participants in the Synchronous CMF group received immediate teacher

feedback while fulfilling their assignment in real-time interaction with their instructor, while those in the Asynchronous counterpart received delayed teacher feedback, two days after they had finished their writing. The feedback provided addressed various writing aspects including content, organization, grammar, vocabulary, and mechanics based on the predetermined scoring rubric. The learners were then requested to review the feedback provided and rewrite their final drafts accordingly. However, participants in the control group submitted their tasks via email but did not receive any feedback.

In this study, an adapted version of the Self-efficacy for Writing Scale (SEWS) was employed as both a pre-test and post-test to examine the impact of CMF on the writing self-efficacy of ESL undergraduate learners. This scale is a multi-factor scale derived from Bandura's (1977) self-efficacy construct and incorporates three dimensions of writing identified through educational research (Bruning et al., 2013). Participants were required to respond to 14 statements gauging their confidence in various aspects of writing, using a scale ranging from 0 (no confidence) to 100 (complete confidence). The SEWS evaluates students' confidence in writing across three dimensions, as identified in prior research by Bruning et al. (2013), Pajares et al., (2007), Shell, Colvin, & Bruning (1995), Zimmerman & Bandura (1994), and Zimmerman & Kitsantas (2002). The first dimension, termed "ideation" centres on writers' beliefs regarding their capability to generate ideas. This dimension draws inspiration from Flower & Hayes' (1984) writing process model and encompasses semantic knowledge, as well as the learners' ability to "generate the content and ordering of their thoughts" (Bruning et al., 2013, p. 28; Cruse, 2004; Evans & Green, 2006). Examples of ideation statements include assertions like, "When writing in English, I can think of many ideas" or "When writing in English, I can put my ideas into writing."

The second dimension, labeled "conventions", pertains to language standards governing the expression of ideas in writing, including aspects such as spelling, punctuation, capitalization, and sentence structure. Recognizing that self-efficacy for writing conventions may vary due to the degree of automatization or conscious effort involved in the writing process (Bruning et al., 2013), examples of conventions statements encompass assertions like, "When writing in English, I can punctuate my sentences correctly" or "When writing in English, I can write complete sentences". The third dimension, denoted as "self-regulation", reflects a writer's self-efficacy in guiding themselves through various facets and tasks of the writing process. In accordance with the perspectives of Zimmerman & Bandura (1994) and Zimmerman & Kitsantas (2002), Bruning et al. (2013) argue that self-regulation is crucial for writers to generate productivity, manage anxieties during the writing process, and possess "ideas to write about and command of writing conventions" (p. 29). Examples of self-regulation statements within this scale include affirmations like, "I can control my frustration when I write in English" or "I can think of my writing goals before I write in English".

Before commencing the study, a Cronbach's alpha test was administered to assess the internal consistency of the questionnaire. The results confirmed its reliability and validity, thereby affirming its suitability for analyzing research data and drawing meaningful conclusions.

4. Results and Discussion

The current research aims at investigating the effect of CMF on ESL undergraduate learners' self-efficacy as compared to those who do not receive feedback. Statistical analysis was conducted using SPSS software to assess the influence of the independent variable (CMF Provision) on the dependent variable (writing self-efficacy) both pre- and post-treatment. Both the Independent Samples T-test and Paired Samples T-test were utilized in this study to evaluate changes in participants' writing self-efficacy before and after treatment, both within groups and between groups.

4.1 Independent Samples T-test (Between Groups)

The Independent Samples T-test was employed to compare the writing self-efficacy of the two groups: the CMF and No Feedback groups, before and after treatment (Pre-test and Post-test). Writing self-efficacy (dependent variable) is considered scale data whereas the feedback provision (independent variable) is nominal data.

- Pre-test Writing Self-efficacy (CMF & No Feedback)

Table 1 provides the Independent Samples T-test for pre-test scores (CMF & No Feedback). The CMF group yielded a mean score (M= 45.74) with a standard deviation (SD= 15.20), while the No Feedback group had a mean score (M= 41.68) with standard deviation (SD= 15.43).

Table 1: Independent Samples T-test for CMF & No Feedback (Pre-test)

Types of Feedback	N	Mean	Std. Deviation	df	t	Sig
CMF	41	45.74	15.20	40	18.48	.09
No Feedback	23	41.68	15.43	22	18.71	
Total	64	87.42	30.63	62		

Source: Data analysis using SPSS software

A comparison of the mean scores reveals that the CMF group (M= 45.74) outperforms the No Feedback group (M= 41.68) in terms of writing self-efficacy. However, statistical analysis using the Independent Sample T-test yields a significance value (P-value) of 0.09, which exceeds the predetermined significance level of 0.05 set by the researcher. This indicates that the observed difference in the pre-test results of the dependent variable (writing self-efficacy) between the two groups is not statistically significant. In essence, the findings suggest that there is no statistically significant distinction in writing self-efficacy between the CMF and No Feedback groups before the treatment.

- Post-test Writing Self-efficacy (CMF & No Feedback)

The following table displays the Independent Samples T-test table for post-test scores (CMF & No Feedback). It reveals the mean score (M= 59.86) and standard deviation (SD= 12.85) for the CMF group, while the No Feedback group demonstrates a mean score (M= 43.67) with a standard deviation (SD= 16.98).

Table 2: Independent Samples T-test for CMF & No Feedback (Post-test)

Types of Feedbacks	N	Mean	Std. Deviation	df	t	Sig
CMF	41	59.86	12.85	40	19.62	.006
No Feedback	23	43.67	16.98	22	14.37	
Total	64	103.53	29.83	62		

Source: Data analysis using SPSS software

Given that the mean score of the CMF group (M= 59.86) surpasses that of the No feedback group (M= 43.67), it indicates a superiority in the writing self-efficacy of the CMF group over the No feedback group. Moreover, the Independent Sample T-test produces a significance value (P-value) of 0.006, which is below the predetermined significance level of 0.05 controlled by the researcher. This suggests that the observed difference in the post-test results of the dependent variable (writing self-efficacy) between the two groups is statistically significant. In simpler terms, participants who received CMF exhibited significantly improved writing self-efficacy beliefs compared to those who received no feedback.

4.2 Paired Samples T-test (Within Groups)

The Paired Samples T-test is utilized to assess whether there exists a significant difference in the writing self-efficacy of participants within each group (CMF and No Feedback) before and after treatment (Pre/Post-test). Notably, the writing self-efficacy, serving as the dependent variable, is represented in scale data, whereas the feedback provision, acting as the independent variable, is categorized as nominal data.

- Pre/Post-test Writing Self-efficacy (CMF)

The following is the Paired Samples T-test table for pre/post-test scores (Computer-Mediated feedback group) generated by SPSS software:

Table 3: Paired Samples T-test for Computer-Mediated Feedback (Pre/Post-test)

	Paired Differences					t.	df.	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence interval of the Difference				
				Lower	Upper			
Pre/Post- test Computer-mediated Feedback	52.8	14.02	.62	49.25	55.36	24.35	40	.002

Source: Data analysis using SPSS software

The provided data in Table 3 outlines the mean score (M= 52.8) and standard deviation (SD= 14.02) for the CMF group. Furthermore, employing the Paired Samples T-test reveals a significance value (P-value) of 0.002, which falls below the predetermined significance level of 0.05 controlled by the researcher. This suggests that the observed difference in the pre-test and post-test results of the dependent variable (writing self-efficacy) within the CMF group is statistically significant. In other words, the writing self-efficacy of participants who received computer-mediated feedback exhibits a statistically significant improvement after the treatment.

- Pre/Post-test Writing Self-efficacy (No Feedback)

The following is the Paired Samples T-test table for pre/post-test scores (No feedback group) generated by SPSS software:

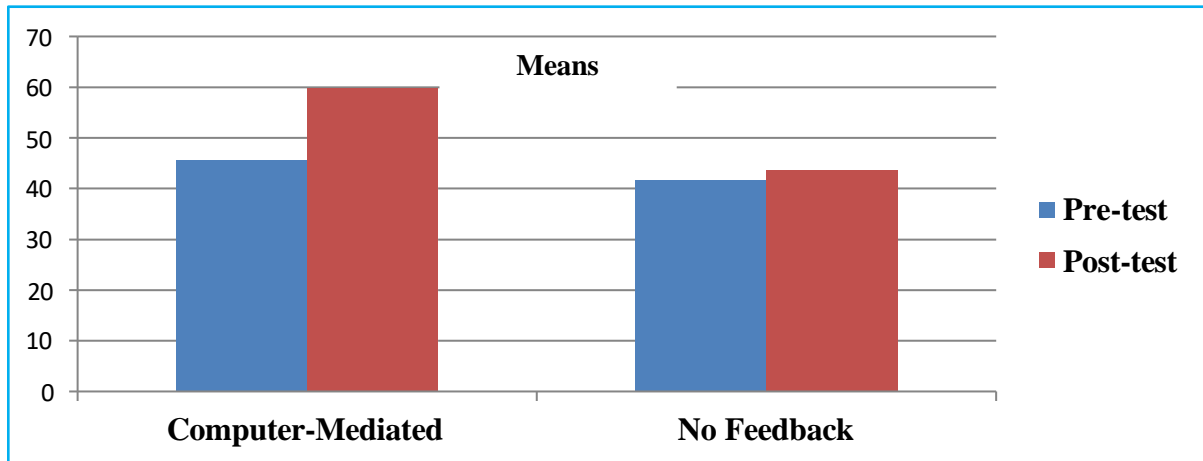
Table 4: Paired Samples T-test for No Feedback (Pre/Post-test)

	Paired Differences					t.	df.	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence interval of the Difference				
				Lower	Upper			
Pre/Post- test No Feedback	42.68	16.20	.54	46.38	39.25	29.86	22	.08

Source: Data analysis using SPSS software

According to the data provided in Table 4, it is clear that the mean score and standard deviation for the No Feedback group are M= 42.68 and SD= 16.20, respectively. Furthermore, the application of the Paired Samples T test yields a significance value (P-value) of 0.08, surpassing the predetermined significance level of 0.05 controlled by the researcher. This indicates that the observed difference in the pre-test and post-test results of the dependent variable (writing self- efficacy) within the No Feedback group is not statistically significant. In other words, there is no statistically significant improvement in the writing self-efficacy of participants who did not receive feedback, as observed from the pretest to the post-test.

Figure 1: Writing Self-efficacy for Computer-mediated Feedback & No Feedback (Pre/Post-test)



Source: Data analysis using SPSS software

Overall, based on data analyses used to test the research hypothesis and to explore the effect of computer-mediated feedback on writing self-efficacy of ESL undergraduate learners in comparison to those who do not receive feedback, results of the initial analysis (between groups) revealed that there is no significant difference in the level of writing self-efficacy between the two groups before the treatment (pre-test), indicating a comparable baseline. However, upon completion of the treatment, participants who received CMF exhibited a substantially higher level of self-efficacy in writing on their post-test compared to those who did not receive feedback. This post-treatment disparity suggests a positive influence of CMF on enhancing ESL undergraduate learners' writing self-efficacy and confidence in their writing abilities.

Further scrutiny of the pre-test and post-test results within the CMF group revealed a statistically significant improvement in writing efficacy after participants received this specific type of feedback. Conversely, the group that did not receive feedback did not show a statistically significant enhancement in writing self-efficacy between the pre-test and post-test assessments. These results suggest the rejection of the null hypothesis and the acceptance of the alternative one, indicating that there exists a significant change in the level of writing self-efficacy of ESL undergraduate learners who receive CMF compared to those who do not receive feedback.

The study findings emphasize the effectiveness of CMF in bolstering ESL undergraduate learners' self-efficacy in their L2 writing skills. The noticeable improvement in writing self-efficacy levels among participants in the experimental groups underscores the pivotal role of feedback provision, provided via Google Docs, in shaping the learners' beliefs and confidence regarding their writing abilities (ideation, conventions and self-regulation). This observation is in line with prior research suggesting that feedback components contribute to enhancing students' self-efficacy and academic performance (Donche et al., 2012; Chandler, 2003; Oluwatayo & Fatoba, 2010). Also, this finding is consistent with Bandura's social cognitive theory, which asserts that individuals' self-efficacy beliefs are shaped by various factors, including mastery experiences, social persuasion, vicarious experiences and physiological arousal (Bandura, 1977). In the context of the study, the receipt of CMF on one's writing performance can be interpreted as a form of mastery experience, offering learners concrete evidence of their progress and competence. According to Bandura (1989), successful task completion enhances individuals' confidence in their abilities, thereby reinforcing their self-efficacy beliefs. Furthermore, the supportive and comprehensive nature of feedback provided by teachers can function as a persuasive factor, strengthening learners' confidence in their writing capabilities. This assertion aligns with the notion that individuals' self-efficacy beliefs are influenced by increased verbal persuasions, with feedback serving as a form of verbal persuasion (Pajares, 2003; Schunk & Swartz, 1993).

Furthermore, the findings can be rationalized by considering the significant impact of technology utilization in the present study, represented by the use of a web-tool (namely Google Docs) for feedback

provision, on the increased writing self-efficacy levels of ESL learners (Jan, Soomro, & Ahmad, 2017). Previous research has consistently demonstrated a correlation between anxiety and self-efficacy, whereby increased levels of writing self-efficacy coincide with lower levels of anxiety, while diminished L2 writing self-efficacy often stems from heightened anxiety levels (Öztürk & Saydam, 2014; Salem & Al Diyar, 2014). According to Bandura (1977), individuals are more likely to anticipate success when they experience lower levels of anxiety and stress. Young (2003) posited that computer-mediated communication enhances the social interaction aspect of learning English and diminishes students' affective filters. Similarly, Freiermuth (2001) suggested that students find online chat environments more comfortable, experiencing less anxiety about potential language shortcomings compared to face-to-face interactions. Hence, one justification of the study's findings could be attributed to the computer-mediated communication (CMC) environment which is believed to reduce affective filters (such as anxiety), and in turn positively influence other psychological factors (writing self-efficacy). Put differently, considering the potential characteristics of the CMC environment, including the anonymity feature that learners experience, particularly in written communication, it is plausible that ESL undergraduate learners in the current study who received CMF experienced reduced levels of anxiety and subsequently showed higher levels of self-efficacy, as indicated by the results of their responses on the SEWS scale.

5. Conclusion

The findings of the current study demonstrate the significant impact of computer-mediated feedback on enhancing ESL undergraduate learners' self-efficacy beliefs about their L2 writing skills. Through the provision of timely and personalized CMF via Google Docs, participants experienced notable improvements in their confidence regarding their abilities in L2 writing. These findings align with Bandura's social cognitive theory and underscore the crucial role of feedback in shaping the learners' beliefs and performance. Moreover, the study highlights the potential of technology, particularly computer-mediated communication environments, in alleviating anxiety and facilitating higher levels of self-efficacy among learners.

As a pedagogical implication for ESL educators, the integration of CMF and technology within L2 writing instruction presents a promising solution to the challenges posed by large classroom sizes and time constraints in higher education contexts. This study advocates for the incorporation of CMF tools, such as Google Docs, into writing instruction to provide timely and constructive feedback, thereby fostering students' self-efficacy beliefs while students engage in iterative processes of receiving feedback and making revisions, and consequently witnessing experience improvements in their writing skills over time. This approach also nurtures a growth mindset, encouraging students to view challenges as opportunities for growth rather than setbacks. Additionally, engaging with CMF fosters the development of metacognitive skills, such as self-reflection and self-regulation, which are essential for effective writing and long-term learning.

In considering avenues for future research to address the identified limitations and for a further contribution to a better understanding of the effectiveness of CMF in enhancing the writing self-efficacy of L2 learners, several directions merit exploration. Firstly, while the present study concentrated on the influence of CMF within an ESL context, future research could broaden its scope to encompass other contexts where English functions as a foreign language or within ESL settings of different cultural backgrounds. This extension would enable the assessment of the generalizability of findings and the exploration of contextual variations in the efficacy of CMF. Secondly, while the current study primarily employed quantitative methods, which constitutes another limitation, there is a need to incorporate qualitative research approaches. Such approaches would offer valuable insights into learners' attitudes and perceptions regarding the impact of CMF on their confidence progression and how such impact correlates with their writing performance. Qualitative investigations have the potential to uncover nuanced aspects of the CMF process that may not be fully captured through quantitative analyses alone, thereby providing a more comprehensive understanding of its impact. Thirdly, the study primarily explored the impact of computer-mediated feedback on one psychological aspect of ESL undergraduate learners, specifically self-efficacy. However, recognizing that writing is a multifaceted cognitive process, it is plausible that learners' self-efficacy beliefs are likely to interact with other affective variables,

including motivation and anxiety. Therefore, there is a need for further research to delve deeper into the intricate relationship between self-efficacy and other affective variables in the context of CMF provision.

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