



EXPLORING THE EFFECTS OF SYNCHRONOUS AND ASYNCHRONOUS COMPUTER-MEDIATED FEEDBACK ON ESL LEARNERS' WRITING SELF-EFFICACY

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Abstract: This study aimed to investigate the effect of synchronous versus asynchronous forms of computer-mediated feedback (CMF) on writing self-efficacy among ESL undergraduate students at the University of Mysore, India. A total of forty-one second-year students participated in a quasi-experimental study spanning two months. They were randomly assigned to two groups: one group received synchronous CMF (immediately while composing their essays), whereas the other received asynchronous CMF (two days after they had completed writing). Over the course of the study, participants engaged in six writing tasks, iterating through the process of (write, review, and revise). A self-efficacy for writing scale was administered before and after the experiment to gauge the impact of synchronous and asynchronous CMF modes on learners' writing self-efficacy. The findings indicated that both groups demonstrated improvements in writing self-efficacy levels before and after the intervention; nonetheless, the synchronous mode displayed notably higher efficacy.

Keywords: Computer-mediated Feedback, Synchronous, Asynchronous, L2 Writing, Writing Self-efficacy, ESL Learners.

I. INTRODUCTION

A large body of research has focused on the role of feedback (FB), in English as a second language (ESL) writing classrooms, which has been commonly considered as "the most powerful single moderator that enhances achievement" (Hattie, 1999). Widely acknowledged, feedback provision constitutes a crucial part of the process of teaching second language (L2) writing, as it indicates whether or not learning has occurred; it is the "cornerstone of all learning" (Colbran et al., 2016, p. 6). In the field of L2 writing, there exists a consensus among scholars that the learning process of writing does not occur in isolation; instead, it necessitates timely feedback, referred to as the "right feedback at the right frequency" (Panhoon & Wongwanich, 2014). Such feedback, in turn, plays a pivotal role in shaping the learning outcomes by minimizing errors, bridging gaps in learners' knowledge, enhancing their skills, and promoting skill acquisition (Tan et al., 2020).

Therefore, in recognition of its efficient and crucial role in enhancing learning, researchers have extensively explored the effects of feedback, provided by teachers, on ESL learners' writing performance and revision quality in traditional classrooms (Fathman and Whalley, 1990; Ferris, 1997; Bitchener, 2008; Ashwell, 2000). However, throughout the rapid technological advancements and the growing utilization of computer-mediated communication (CMC) tools by educators to enhance the learning process of L2 writing, scholarly attention has shifted towards investigating how such tools may impact the learning outcomes. Consequently, a substantial body of research has been devoted to examining the role, efficacy, and affordances of feedback delivered within computer-mediated environments (e.g. AbuSeileek & Abualsha'r, 2014; Al-Olimat & AbuSeileek, 2015; Bahari, 2021; Ebadi & Rahimi, 2019).

Over the past few decades, CMC has gained significant popularity and is now widely recognized as an effective alternative to face-to-face instruction. This technology allows educators to deliver feedback more swiftly and efficiently on their students' written assignments. CMC, in essence, encompasses various forms of communication facilitated by digital technologies. These include email, instant messaging, chat rooms, social media platforms, online forums, discussion boards and others. According to Herring (2018), CMC can be defined as "communication that occurs between individuals using networked digital devices". Researchers have extensively explored the nature and effectiveness of CMC, revealing its multifaceted advantages. For instance, CMC has been shown to facilitate collaborative learning activities (Meskil & Mossop, 2003) and encourage active participation among participants (Bikowski & Kessler, 2002). It empowers participants by granting them greater control over their learning (Bikowski & Kessler, 2002), and supports the negotiation of meaning (Blake, 2000; Toyoda & Harrison, 2002).

In the realm of ESL writing instruction, a significant application of CMC is computer-mediated feedback (CMF). CMF refers to the practice of providing valuable input and guidance to learners in a supportive digital environment, thereby enhancing the learning process. Research conducted by Warschauer and Grimes (2008) has highlighted several advantages of CMF over traditional face-to-face written feedback methods. One primary benefit of CMF is its capacity to offer highly personalized feedback to students. Unlike conventional written feedback, which may be limited in length and scope, CMF allows for detailed comments tailored to individual student needs. This personalized approach enables instructors to address specific areas of improvement, thereby enhancing the overall quality of feedback provided. Another notable advantage of CMF is its ability to leverage multimedia resources. Instructors can incorporate audio comments, video explanations, or annotated documents to provide a richer and more comprehensive feedback experience. Additionally, CMF excels in offering faster and more frequent responses. That is, in a dynamic digital environment, instructors can promptly review and comment on students' work, significantly reducing the wait time for feedback. This timely feedback loop supports ongoing learning and enables students to apply corrections to their subsequent writing tasks, thereby fostering continuous improvement in their writing skills.

CMF can be implemented in two distinct forms: synchronously and asynchronously. Synchronous computer-mediated feedback (SCMF) involves providing feedback in real-time or during interactive sessions between teachers and students, allowing for immediate clarification and discussion. In other words, SCMF brings the teacher and students together simultaneously in virtual spaces. SCMF can be implemented through different means, including chat rooms, video conferencing, and instant messaging. Several studies have focused on investigating the effectiveness of such tools in helping ESL students improve their writing skills (Hamp-Lyons & Condon, 2000; Leki & Carson, 1994). Many advantages of SCMF were reported in research, indicating that the immediate and interactive nature of teacher feedback on ESL learners' written assignments allowed for immediate clarification of doubts and resulted in enhanced revision and overall writing performance (Lee, I. 2013). Synchronous CMC tools add a sense of presence, spontaneity, and democracy to the L2 writing classroom (Blake & Zyzik, 2003; DiGiovanni & Nagaswami, 2001).

On the other hand, asynchronous computer-mediated feedback (ACMF) refers to feedback provided by teachers at a delayed or later time after students finish their writing. This form of feedback delivery has been widely used in ESL writing classrooms and gained much popularity among teachers, especially those responsible for classes with a large number of students where the mission to provide individual face-to-face feedback sounds unfeasible. ACMF can be facilitated through various digital tools and platforms such as email, Learning Management Systems (LMS) like (Moodle, Blackboard, and Canvas), Microsoft Word Comments, Google Docs, Voice Comments and Audio Feedback, Screen Recording tools, etc. ACMF has been argued to be effective in helping ESL students improve their writing skills (Bitchener & Knoch, 2010; Ferris, 1995), allowing personalized guidance, flexibility, reduced time pressure for teachers and learners and more learners' reflection time to process and incorporate feedback into their revisions, resulting in improved writing quality.

In the realm of second language writing, 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; Masche, 2013; Tsao, 2021). Writing self-efficacy which indicates a writer's beliefs in their capacity to write proficiently (Schunk & Swartz, 1993), in a language that is not their first, emerges as a pivotal determinant of writing achievement (Schunk & Zimmerman, 2007). 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).

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 (2018) found that Japanese university students receiving consistent guidance from their teacher exhibited more substantial improvement in confidence and belief 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.

Overall, the effectiveness of synchronous and asynchronous CMF in enhancing ESL writing skills has been a subject of continual investigation. Research has yielded diverse findings, shaping our understanding of their impact on language learning. Some studies have suggested that synchronous CMF can be more effective than its asynchronous counterpart in improving ESL writing skills (Hamp-Lyons & Condon, 2000; Lee, 2004). In contrast, several studies have reported the valuable benefits the use of asynchronous tools for providing CMF has yielded (e.g. Akbar, 2017, Martin-Beltrán & Chen 2013, Al-saleh, 2018). Despite the contrasting views on the effectiveness of synchronous and asynchronous CMF, both forms of interaction have continued to evolve and gain significance in the field of ESL writing. It is noteworthy, however, that while a considerable body of research has focused on the effect of either synchronous or asynchronous CMF and compared it with traditional face-to-face context or No feedback condition, research comparing the effects of both forms and how they may impact the L2 learners' writing self-efficacy is scarce. Hence, the main objective of this study is to explore whether the impact of synchronous versus asynchronous forms of CMF provision significantly differs in increasing the writing self-efficacy of ESL undergraduate learners.

II. HYPOTHESIS OF THE STUDY

H₁: "There is a significant difference in the impact of synchronous and asynchronous forms of computer-mediated feedback (CMF) provision in increasing the writing self-efficacy of ESL undergraduate learners".

H₀: "There is NO significant difference in the impact of synchronous and asynchronous forms of computer-mediated feedback (CMF) provision in increasing the writing self-efficacy of ESL undergraduate learners".

III. RESEARCH METHODOLOGY

The study employed a quasi-experimental design with a pretest-posttest approach. A total of 41 second-year undergraduate students from the University of Mysore voluntarily participated in the study. The participants were selected through non-random purposive sampling. Specifically, second-year students were chosen due to their prior exposure to English language courses in their preceding semesters, including English 1, English 2 (in the first and second semesters of the first year), and English 3 (in the first semester of the second year). The researcher deliberately excluded first-year freshmen and selected second-year students to take advantage of their familiarity with university requirements and academic routines, thus making them more inclined to participate in multiple rounds of data collection. Additionally, the participants' completion of English 1, 2, and 3 was expected to have provided them with a basic level of language proficiency, eliminating the need for prior pedagogical intervention. It is noteworthy that all participants were in their second and had (English 4) as a core subject, which aimed to enhance their English proficiency and writing competence.

The participants' ages ranged between nineteen to twenty-two years. Among them, forty-four were male and twenty were female, representing a diverse array of majors such as commerce, computer science, education, English, and business administration. The inclusion of participants from various academic disciplines aimed to encompass a wide spectrum of writing skills and experiences within the undergraduate population of ESL learners. To ensure sample homogeneity, only Indian nationals using English as a second language, were included. This decision aimed to maintain consistent language learning backgrounds, excluding foreign students who might have different language learning experiences. The majority of participants spoke Kannada as a mother-tongue, while the rest used Malayalam, Tamil, and Hindi as their first language. On the other hand, two English language teachers with nine and twelve higher education experience administered the writing tasks, provided CMF and assessed learner writing using a predetermined rubric.

The participants were randomly divided into two groups: synchronous CMF and asynchronous CMF. Over a two-month period, all participants were tasked with submitting six essays (descriptive/narrative) using Google Docs. In the Synchronous CMF group (n=20), students received immediate feedback from their instructor while working on their assignments in real-time interaction. Conversely, in the Asynchronous CMF group (n=21), students received feedback two days after completing their writing tasks. The feedback covered various writing aspects such as content, organization, grammar, vocabulary, and mechanics, based on a scoring rubric adapted from Brown (2007). Subsequently, participants were asked to revise and submit their final drafts accordingly.

In this study, an adapted version of the Self-efficacy for Writing Scale (SEWS) served as both a pre-test and post-test to investigate the impact of CMF on the writing self-efficacy of ESL undergraduate learners. The SEWS, rooted in Bandura's self-efficacy theory, encompasses three dimensions: ideation, conventions, and self-regulation. 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 first dimension, termed "ideation" centres on writers' beliefs regarding their capability to generate ideas. This dimension 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). The second dimension, labelled "conventions", pertains to language standards governing the expression of ideas in writing, including aspects such as spelling, punctuation, capitalization, and sentence structure. 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.

Before the study, Cronbach's alpha test was conducted and confirmed the internal consistency of the questionnaire, indicating its reliability and validity for analyzing research data and drawing meaningful conclusions.

IV. RESULTS AND DISCUSSION

The current research inquiry in this study aims to draw a comparison between the impact of two forms of CMF provision (synchronous and asynchronous) on the writing self-efficacy level among ESL undergraduate learners. In pursuit of this objective, inferential statistics were utilized as follows:

A-Paired Samples T-test (Within Groups)

The initial test investigates the alterations in writing self-efficacy levels before and after the treatment among learners within each of the Synchronous and Asynchronous CMF groups. A paired samples T-test was employed to analyze whether there exists a significant difference in the writing self-efficacy (dependent variable) among participants who received Synchronous and Asynchronous CMF feedback before and after the treatment (pre/post-test).

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

Table 1 presents the results of the Paired Samples T-test for pre/post-test scores in the Synchronous CMF group, as generated by SPSS software. Results show the mean score and standard deviation (M= 20.25, SD= 2.71) for the Synchronous feedback group. Furthermore, the test yields a significance value (P-value) of 0.001, which falls below the researcher's predetermined level of significance (0.05). This indicates a significant difference in the pre/post-test results of the dependent variable (writing self-efficacy) within the Synchronous CMF group. In other words, these findings suggest that the writing self-efficacy of the participants who received Synchronous CMF is significantly improved after receiving treatment.

Table 1

Paired Samples T-test for Synchronous CMF (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 Synchronous CMF	20.25	2.71	.47	18.00	22.50	32.31	19	.001

Source: Data analysis using SPSS software

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

The Paired Samples T-test table for pre/post-test scores in the Asynchronous CMF group, as generated by SPSS software, is presented in Table 2. It reveals the mean score and standard deviation ($M=28.65$, $SD=2.27$) for the Asynchronous CMF group. Additionally, it shows a significance value (P-value) of 0.003, which falls below the researcher's controlled level of significance (0.05). This implies a statistically significant difference in the pre-test and post-test results of the dependent variable (writing self-efficacy) within the Asynchronous CMF group. Therefore, these findings suggest that the writing self-efficacy of participants who received Asynchronous CMF is significantly improved after receiving treatment.

Table 2

Paired Samples T-test for Asynchronous CMF(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 Asynchronous CMF	7.99	2.27	.38	5.10	9.50	28.65	20	.003

Source: Data analysis using SPSS software

B- Independent Samples T-test (between groups)

To investigate whether there is a significant difference in the change of self-efficacy levels of participants (before and after treatment) between the Synchronous and Asynchronous CMF groups, the Independent Samples T-test is utilized as follows:

- Pre-test Writing Self-efficacy (Synchronous and Asynchronous CMF)

The Independent Samples T-test table for pre-test scores (Synchronous and Asynchronous CMF), as generated by SPSS software, is presented. Table 3 displays the mean score and standard deviation for both the Synchronous CMF group ($M=46.25$, $SD=15.70$) and the Asynchronous CMF group ($M=45.23$, $SD=14.69$).

While the mean score of the Synchronous CMF group ($M=46.25$) appears to be slightly higher than that of the Asynchronous CMF group ($M=45.23$), the Independent Sample T-test yields a significance value (P-value) of 0.07, which exceeds the researcher's controlled level of significance (0.05). This suggests that the difference in the pre-test results of the dependent variable (writing self-efficacy) between the two groups is not statistically significant. In other words, before the treatment, both groups demonstrated similar levels of writing self-efficacy.

Table 3

Independent Samples T-test for Synchronous and Asynchronous CMF(Pre-test)

Form of CMF	N	Mean	Std. Deviation	df	t	Sig
Synchronous	20	46.25	15.70	19	.882	.07
Asynchronous	21	45.23	14.69	20	.677	
Total	41	91.48	30.39	39		

Source: Data analysis using SPSS software

- Post-test Writing Self-efficacy (Synchronous and Asynchronous CMF)

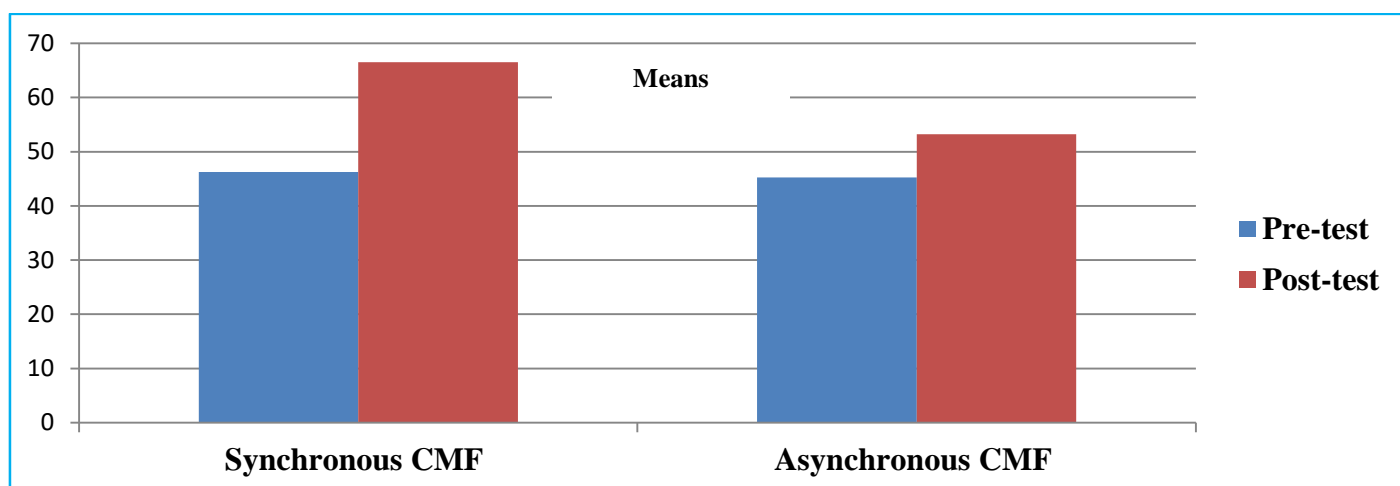
The Independent Samples T-test table for post-test scores (Synchronous and Asynchronous CMF), generated by SPSS software, is provided. Table 4 presents the mean score and standard deviation for both the Synchronous CMF group (M=66.50, SD=12.99) and the Asynchronous CMF group (M=53.22, SD=12.42), revealing that the mean score of the former is higher than the latter. Further, the Independent Sample T-test gives a significance value (P-value) of 0.006, which is below the researcher's controlled level of significance (0.05). This suggests that the difference in the post-test results of the dependent variable (writing self-efficacy) between the two groups is statistically significant. In sum, these findings indicate that the writing self-efficacy of participants who received Synchronous CMF is significantly enhanced compared to those who received Asynchronous CMF.

Table 4
Independent Samples T-test for Synchronous and Asynchronous CMF(Post-test)

Form of CMF	N	Mean	Std. Deviation	df	t	Sig
Synchronous	20	66.50	12.99	19	.652	.006
Asynchronous	21	53.22	12.42	20	.415	
Total	41	91.48	30.39	39		

The following Figure 1 illustrates the changes in self-efficacy levels of learners in writing across Synchronous and Asynchronous CMF groups before and after the treatment.

Figure 1
Writing Self-efficacy of Synchronous and Asynchronous CMF Groups (Pre/Post-test)



Source: Data analysis using SPSS software

Overall, data analyses reveal a significant shift in self-efficacy levels within both experimental groups from pre-test to post-test assessments. Nonetheless, when comparing the two groups, findings indicate that the Synchronous CMF group exhibited a significantly greater improvement in writing self-efficacy compared to the Asynchronous CMF group. Consequently, the null hypothesis is rejected and the alternative is confirmed.

The notable increase in writing self-efficacy observed within both experimental groups underscores the potential of CMF to positively influence learners' beliefs about their ability to excel in writing tasks. Through the provision of teacher feedback, whether synchronously or asynchronously via platforms such as Google Docs, learners were able to discern gaps in their knowledge, become aware of their errors, and received guidance towards correction. This iterative experience over the course of the study may serve as a plausible explanation for the enhancement of the learners' confidence and development into more self-efficacious writers. These findings are consistent with prior research suggesting that timely and targeted feedback can bolster learners' confidence in their abilities and their capacity to attain desired outcomes (Bandura, 1997). Similarly, Li (2023) found that online collaborative writing instruction, facilitated through Tencent Docs, contributed to an improvement in L2 writing self-efficacy among participants in an EFL context.

Further, based on the study outcomes, the notably greater increase in self-efficacy within the Synchronous CMF group compared to the Asynchronous counterpart suggests that the form of teacher-student interaction in a computer-mediated environment plays a crucial role in shaping learners' perceptions of their writing abilities. This indicates that the immediacy and directness of interaction characteristic of synchronous communication contribute to a stronger sense of support and encouragement from teachers, fostering a more supportive environment that boosts writing self-efficacy development (Karim & Nassaji, 2020). The delayed and less interactive nature of asynchronous communication, in contrast, is believed to lead to reduced levels of perceived support and guidance, potentially limiting the extent to which learners' self-efficacy is bolstered by feedback.

Moreover, it is essential to note that the collaborative nature of interaction between teacher-student that exists in a synchronous environment can be a possible reason for making its impact superior. The features offered by Google Docs, including real-time interaction, document sharing and simultaneous editing by teachers to address errors, create an environment conducive to learners' competence development. This platform enables learners to receive instant clarification of doubts and ask questions as

they write, which could contribute to their development as self-efficacious writers. These suggestions are in line with a study by Rahimi and Fathi (2022) which indicates that the online collaborative learning environment may provide opportunities for real-time collaboration, revision, and feedback, which can increase the confidence and competence of EFL learners in writing. Lee and Evans (2019) also found that feedback and comments on tasks provided by Tencent Office might have enhanced the writing self-efficacy of the participants in their study. Hence, by providing learners with real-time, simultaneous interaction and personalized support, synchronous CMF sessions may instill a greater sense of confidence and competence in writing tasks. This, in turn, can have positive implications for learners' engagement, persistence, and overall writing performance (Zhang, 2021).

V. CONCLUSION

To address the scarcity of research regarding the comparative effectiveness of synchronous and asynchronous feedback provision forms in a computer-mediated setting, this study aimed to explore their differential impact on ESL learners' self-efficacy, an essential aspect of their affective filter. The results of this quasi-experimental research yielded valuable insights into the effectiveness of both forms of CMF provision in enhancing the writing self-efficacy of ESL undergraduate learners, with a more pronounced role observed for the synchronous form.

The findings of this study offer pedagogical implications for university-level ESL educators on the advantages of integrating online tools into their instruction. This integration fosters a supportive learning environment where effective feedback plays a crucial role in boosting learners' confidence in their writing skills, thereby enhancing their overall proficiency. By utilizing platforms such as Google Docs for feedback provision, instructors can provide detailed and timely guidance, creating a more engaging and dynamic learning experience for ESL students. This approach not only facilitates the development of writing abilities but also encourages self-regulation and reflective learning. Moreover, the incorporation of online tools promotes accessibility and accommodates diverse learning preferences.

In the pursuit of reaching a better understanding of the efficacy of synchronous and asynchronous CMF in enhancing the writing self-efficacy of L2 learners, it is imperative to identify avenues for future research that address existing limitations and contribute to more comprehensive outcomes. First, the current study focused on the impact of synchronous and asynchronous CMF within an English as a Second Language (ESL) context; future investigations, however, could extend their scope to encompass other language learning contexts where English serves as a foreign language or within ESL settings characterized by different cultural backgrounds. Such expansion would facilitate the assessment of the generalizability of findings and shed light on potential contextual variations in the effectiveness of CMF. Moreover, the present study predominantly relied on written corrective feedback delivered in synchronous and asynchronous environments. Alternative modalities of feedback provision, such as auditory or visual modalities, may influence learners' psychological engagement with the writing-learning process differently. Hence, further research is warranted to explore the effects of diverse modalities of synchronous and asynchronous CMF on L2 learners' self-efficacy.

Finally, while this study primarily focused on the influence of CMF on one psychological aspect, namely self-efficacy, among ESL undergraduate learners, it is crucial to recognize the multifaceted nature of the writing process. The dynamics of learner interaction and engagement before and after receiving teacher feedback may intertwine with various affective variables such as motivation and anxiety. These factors may be influenced by different forms of interaction within synchronous and asynchronous environments. Therefore, future research endeavors should aim to delve deeper into elucidating the complex interplay between self-efficacy and other affective dimensions while learners develop their writing skills in synchronous and asynchronous CMF environments.

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