Online Corrective Feedback and Self-Regulated Writing: Exploring Student Perceptions and Challenges in Higher Education

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Abstract

This study investigates the influence of teachers' online written corrective feedback (WCF) on the self-regulated writing abilities of university students, with a particular focus on varying levels of English proficiency. Conducted during the COVID-19 pandemic, the qualitative study involved ten second-year students from a private university in Bangladesh enrolled in a mandatory online writing course. Participants received personalized WCF through platforms such as Google Docs. Data derived from semi-structured interviews revealed that online WCF substantially enhanced students' self-regulation in writing, with the impact most pronounced among those with moderate and lower levels of English proficiency. The findings underscore the role of tailored feedback in improving students' writing skills while fostering essential self-regulatory practices such as goal setting, self-monitoring, and independent learning. These results highlight the transformative potential of online WCF in addressing students' individualized needs and improving their academic writing performance. Implications for curriculum designers and policymakers emphasize the integration of effective online feedback strategies to support learners across diverse proficiency levels. However, the study acknowledges limitations, including its small, context-specific sample, which may limit generalizability to broader educational settings. Future research may examine the longitudinal impact of online WCF across varied contexts and language proficiency levels.

Keywords: online written corrective feedback, self-regulated learning, academic writing, English proficiency, higher education

1. Introduction

The shift to online education, significantly accelerated by the global COVID-19 pandemic, has fundamentally reshaped teaching and learning across disciplines (Banna et al., 2023; Kohnke & Moorhouse, 2022). This rapid transition has highlighted the critical need for learners to develop advanced self-regulated learning (SRL) skills, which are essential for navigating the complexities of online learning environments. SRL is defined as the process by which learners set goals, monitor progress, and reflect on their performance to achieve academic success (Zimmerman, 1989; Panadero, 2017). It is widely recognized as a cornerstone of effective learning. In the context of second language (L2) acquisition—particularly L2 writing—SRL assumes heightened importance, as learners must exercise autonomy, persistence, and strategic thinking to improve their writing proficiency (Yang et al., 2023; Teng & Zhang, 2022).

While the relationship between SRL and academic success is well documented (Broadbent & Poon, 2015; Xu et al., 2023), the specific role of written corrective feedback (WCF) in fostering SRL among L2 learners remains underexplored. Prior research emphasizes that SRL-oriented strategies—such as goal setting, self-monitoring, and effective feedback utilization—significantly enhance learners' ability to manage complex tasks like writing (Boekaerts & Corno, 2005; Teng & Zhang, 2018). Feedback, particularly in digital learning contexts, serves as an external scaffold that guides learners' self-regulatory processes by highlighting areas for improvement and supporting task performance (Song & Kim, 2021; Frazier et al., 2021). However, a notable gap exists in understanding how online WCF influences SRL in L2 writing, especially across diverse educational contexts and proficiency levels.

Online WCF, facilitated by digital tools such as Google Docs and Microsoft Word, has revolutionized feedback delivery in educational settings (Yang & Zhang, 2023). Teachers increasingly use features like track changes, comments, and highlights to provide synchronous or asynchronous feedback, enabling students to engage iteratively with their written work (Wang et al., 2024). This digital mode of feedback not only replicates traditional paper-based practices but also offers unique affordances for fostering deeper cognitive engagement and promoting self-regulation (Teng & Zhang, 2022). Despite these advancements, empirical evidence on learners' perceptions and utilization of online WCF to develop SRL strategies remains limited—particularly in contexts where disparities in digital

infrastructure and teacher preparedness persist.

In Bangladesh, the rapid adoption of online education during the pandemic has presented both opportunities and challenges, making the impact of online WCF on SRL in L2 writing a timely and pertinent area of inquiry. Although digital pedagogy has expanded access to education, the effective implementation of online feedback strategies remains under-investigated (Abdul Halim et al., 2025; Alam et al., 2024b; Banna et al., 2023; Milon & Ali, 2023). This study aims to address this gap by examining the relationship between online WCF and SRL among university students pursuing a BA (Hons) in English Language and Literature. Specifically, it investigates students' perceptions of online WCF, its influence on their self-regulated writing practices, and how varying levels of language proficiency shape these dynamics.

The findings of this study aim to contribute to the broader discourse on digital pedagogy, L2 writing, and SRL. By offering practical insights for educators, curriculum developers, and policymakers, this research seeks to inform strategies for fostering learners' self-regulated writing skills in diverse educational settings.

2. Literature Review

2.1 Association between Self-Regulation and L2 Learning

Self-regulation, or self-regulated learning (SRL), originates from social cognitive theory and is commonly conceptualized as a cyclical model comprising three interrelated phases: forethought, performance, and self-reflection (Zimmerman, 1989). Across these stages, learners implement strategies to attain their goals, with motivation and metacognition playing critical roles in sustaining active engagement. In the forethought phase, learners engage in task analysis, set goals, and formulate strategies to accomplish them. Intrinsic motivation is often the driving force that aligns their strategic behavior with desired outcomes (Chen & Bonner, 2020). During the performance phase, learners apply self-control strategies such as self-instruction, task-specific techniques, and help-seeking, while simultaneously monitoring progress through self-observation (Teng et al., 2022; Wang & Lajoie, 2023; Wei, 2023). Teacher feedback often serves as an external input, assisting learners in task monitoring and adjustment. In the self-reflection phase, learners evaluate their performance through self-judgment and attribution processes, which may lead to either adaptive or defensive inferences that shape future learning efforts (Zimmerman, 1989).

Although Zimmerman's (1989) model remains foundational in SRL discourse, alternative frameworks provide complementary insights. Pintrich (2002), for instance, expands Zimmerman's model by emphasizing the social and contextual dimensions of SRL. Efklides (2011) foregrounds the interaction between metacognitive knowledge and affective experiences during learning. Similarly, Hadwin et al. (2011) adopt a socio-cognitive lens, focusing on collaborative learning contexts. These diverse models underscore the dynamic, context-sensitive nature of SRL, positioning it as an evolving process influenced by both individual agency and environmental factors.

2.2 SRL Strategies and L2 Learning Outcomes

The application of SRL strategies has demonstrated considerable promise in enhancing L2 learning outcomes. Empirical studies have consistently shown positive correlations between SRL strategies and learners' writing performance, motivation, and self-efficacy (e.g., Teng & Zhang, 2018; Wilby, 2022). For example, Teng and Zhang (2018), drawing on data from 512 Chinese undergraduates, found that both cognitive and metacognitive strategies significantly contributed to improved English writing performance. In a larger-scale study involving 882 participants, Teng (2020) further established that metacognitive regulation—encompassing monitoring, evaluation, and planning—was a strong predictor of writing achievement. These findings highlight the essential role of learners' metacognitive capabilities in facilitating academic success.

Moreover, instructional approaches such as teacher feedback and self-assessment have been shown to support SRL development. Vasu et al. (2022), for instance, found that both self-assessment and indirect teacher feedback enhanced learners' self-regulation in writing tasks, with self-assessment proving particularly effective. These findings underscore the value of instructional designs that promote learner autonomy and reflective engagement, thereby facilitating improved L2 learning outcomes.

2.3 Relationship between Self-Regulation and Online Corrective Feedback

Self-regulation and online corrective feedback (OCF) are closely linked in digital language learning contexts, where learners' engagement with feedback shapes their SRL strategies. Research indicates that the effectiveness of feedback is mediated by factors such as its type, learners' motivational orientations, and their emotional reactions (Ekholm et al., 2015; Rahimi & Fathi, 2022; Xu, 2021). For instance, Ekholm et al. (2015) reported that learners' feedback orientation and confidence levels significantly influenced their capacity to self-regulate during writing tasks. Similarly, Xu (2021) found that feedback-seeking behavior among university students predicted the adoption of effective SRL strategies in online writing contexts. These results align with Waller and Papi (2017), who observed that feedback-seeking tendencies were positively associated with L2 writing motivation, suggesting that proactive engagement with feedback supports self-regulatory learning.

Interactive teacher-learner feedback plays a pivotal role in fostering engagement and reflective practices. Qiu and Lee (2020) demonstrated that OCF promoted learners' self-regulation by encouraging them to critically evaluate and revise their writing. Further supporting this view, Rastgou (2024) found that iterative engagement with written corrective feedback (WCF) helped L2 writers consolidate linguistic knowledge over time. His qualitative study highlighted how direct WCF enabled learners to (re)formulate language hypotheses and abstract grammatical rules—processes inherently aligned with self-regulation.

In addition, Wang and Xu (2024) developed and validated the Learner Engagement with Teacher Written Corrective Feedback Scale (LETWCFS), a tool designed to assess learners' affective, behavioral, and cognitive engagement with WCF. These dimensions are closely tied to self-regulated learning and provide a valuable framework for understanding how learners interact with feedback. Together, these studies emphasize the importance of developing online feedback systems that promote meaningful learner engagement, particularly across diverse instructional and cultural settings.

2.4 Relationship between Online Corrective Feedback and Academic Writing

The impact of online corrective feedback (OCF) on academic writing is well established, particularly with respect to its effects on accuracy, coherence, and organization. Benson and DeKeyser (2019) noted that the asynchronous format of OCF enables learners to engage deeply with feedback, resulting in notable improvements in academic writing. Shang (2022) similarly found that OCF not only enhanced writing accuracy but also cultivated reflective thinking, enabling learners to internalize and apply feedback constructively. These findings support the view that academic writing is an iterative process in which OCF plays a vital role in linking feedback with self-regulated learning.

Different types of OCF yield varying effects on learners' writing outcomes. For example, Tsao (2021) showed that indirect feedback, which encourages learners to identify and correct their own errors, significantly enhanced SRL and writing accuracy. Huang et al. (2020) emphasized the benefits of metalinguistic feedback, which provides detailed explanations of errors and strengthens learners' grammatical awareness, thereby improving the quality of academic writing. More recently, Tsao (2024) employed structural equation modeling to examine how learners' perceptions of classroom goal structures influence their engagement with WCF and writing proficiency. Cognitive engagement, in particular, emerged as a key predictor of self-reported writing proficiency, highlighting the central role of OCF engagement in academic writing development.

Complementing this, Mao et al. (2024) synthesized findings from 50 naturalistic classroom studies and reported consistent evidence that WCF enhances motivation, engagement, and emotional regulation across varied learning environments. In a forward-looking perspective, Lee (2024) called for integrative research frameworks that link classroom WCF practices with learner outcomes. He advocated for future studies to bridge the gap between theory and practice in academic writing pedagogy. Collectively, these studies provide a robust evidence base illustrating how OCF contributes to the development of academic writing and affirms the importance of learner-centered, context-sensitive feedback strategies.

2.5 Research Gap

Self-regulation is foundational to effective L2 learning, equipping learners with tools to manage motivation, cognitive resources, and engagement. While multiple SRL models offer rich insights into this process, the integration of instructional practices—particularly OCF—has emerged as a key factor in enhancing learners' academic writing. However, important gaps remain in understanding the nuanced relationship between learners' perceptions of OCF and their self-regulatory strategies.

This study seeks to address these gaps by examining how OCF influences learners' SRL and academic writing practices, thereby contributing to a more comprehensive understanding of effective instructional strategies in online learning contexts. Although recent research (e.g., Rastgou, 2024; Tsao, 2024; Wang & Xu, 2024) has begun to explore learner engagement with online WCF and its effects on writing outcomes, the connections between learners' perceptions of WCF, their modes of engagement (affective, cognitive, and behavioral), and the development of SRL remain insufficiently explored.

Specifically, limited research has investigated how learners interpret and utilize online WCF within their self-regulatory frameworks in real-world classroom environments. Moreover, many existing studies have focused on isolated aspects of feedback or relied on controlled experimental designs, thereby limiting insight into how feedback engagement unfolds in authentic learning contexts. This study aims to address these limitations by exploring the complex interplay between learners' perceptions of online WCF, their engagement patterns, and SRL practices within a naturalistic online writing setting.

3. Methodology

3.1 Research Design

This study adopts a qualitative phenomenological research design to explore the role of teachers' online written corrective feedback (WCF) in shaping second-year university students' self-regulated writing practices in Bangladesh. The phenomenological approach was selected as it prioritizes understanding the lived experiences of individuals, aligning well with the study's aim to examine students' perceptions of online WCF (Moustakas, 1994). This design enables an in-depth exploration of how students interpret, internalize, and respond to feedback, thereby shedding light on the development of their self-regulation strategies. In contrast to comparative studies that evaluate multiple feedback sources, this research specifically investigates teacher-provided WCF to determine its impact on students' self-regulated learning (SRL). The study's significance is further heightened by its focus on the online learning context introduced during the COVID-19 pandemic, which presents distinct challenges and affordances in the interplay between feedback and SRL (Creswell & Miller, 2000).

3.2 Participants and Sampling Criteria

The study involved ten second-year undergraduate students enrolled in the Bachelor of Arts (Hons) program in English Language and Literature at a private university in Bangladesh. A purposeful sampling strategy was employed to ensure diversity among participants in terms of gender, age, and writing proficiency. This sampling approach is well-suited to phenomenological research, which benefits

participants who can offer rich, reflective, and detailed accounts of their lived experiences (Patton, 2015).

Participants were selected based on their enrollment in a writing-intensive course in which teacher-provided online written corrective feedback (WCF) was an integral component of instruction. To ensure a broad representation of learner experiences, the sample was stratified according to students' English writing proficiency levels—categorized as high, mid, and low. These classifications were determined using a triangulated assessment that incorporated multiple academic indicators rather than relying on a single measure. Specifically, students' cumulative grade point averages (CGPA) in English-related coursework, institutional English proficiency test scores, and their performance on written assignments—evaluated by course instructors using standardized rubrics—were taken into account.

Students who consistently attained high grades (above 80%), scored well on institutional proficiency tests, and demonstrated advanced academic writing skills—such as effective argumentation, grammatical accuracy, coherence, and appropriate vocabulary use—were classified as high-proficiency learners. Those in the mid-proficiency group had average academic performance (between 60% and 79%) and exhibited moderate levels of competence in writing, often requiring some degree of support with organization and linguistic accuracy. In contrast, low-proficiency students had below-average academic performance (below 60%) and frequently needed considerable instructional support to address foundational issues in writing, such as sentence construction, cohesion, and lexical choice. The final cohort included three high-proficiency students, four mid-proficiency students, and three low-proficiency students. This composition allowed for a balanced representation of learners across different proficiency levels, thereby enhancing the study's ability to investigate the varied ways in which students engage with and respond to online WCF.

3.3 Context of the Study

The research was conducted within the academic environment of a private university in Bangladesh, which exclusively operated online during the COVID-19 pandemic. This context provided a unique opportunity to examine the role of online WCF in a fully digital educational setting. The university's BA (Hons) program in English Language and Literature includes a writing course where instructors regularly provide WCF as part of formative assessment practices. The feedback predominantly consisted of direct feedback, indirect feedback, and direct feedback with metalinguistic explanations, allowing for the examination of how different types of WCF influence students' self-regulation strategies (Ellis, 2009). The online medium added another layer of complexity, as students had to navigate digital platforms to access feedback, which represents a relatively underexplored dimension in self-regulated learning and WCF research.

3.4 Data Collection Techniques

Data for the study were collected through semi-structured interviews conducted via video conferencing platforms to align with the online learning context. This method was chosen for its flexibility, allowing participants to articulate their experiences and perspectives in depth (Bryman, 2016). The interview guide, carefully developed based on the research questions, included prompts such as: "How do you perceive the written corrective feedback provided by your teacher?" and "Can you describe how the feedback has influenced your approach to writing and self-regulation?" To ensure participants felt comfortable and could express themselves authentically, the interviews were conducted in Bengali, their first language. Each session lasted between 30 and 40 minutes, providing sufficient time for participants to share detailed insights into their experiences.

3.5 Data Analysis Techniques

The data were analyzed using thematic analysis, following Braun and Clarke's (2021) six-phase framework. The process began with data familiarization, where interview recordings were transcribed and repeatedly read to develop a comprehensive understanding of the content. Inductive coding was then employed to identify salient features relevant to the research questions. These initial codes were systematically grouped into preliminary themes, guided by both theoretical sensitivity and data-driven insights. The themes underwent a thorough review to ensure coherence and alignment with the data, and a thematic map was subsequently developed to encapsulate the key dimensions of participants' experiences. Finally, the themes were integrated into a cohesive narrative for the report. To enhance reliability and validity, multiple rounds of peer review were conducted, with colleagues providing feedback on the coding and thematic interpretations. Consensus on the final themes was achieved through collaborative discussions, ensuring rigor and trustworthiness in the analysis.

3.6 Ethical Considerations

This study adhered to stringent ethical guidelines to protect the rights and well-being of participants. Ethical approval was obtained from the university's research ethics committee, ensuring compliance with institutional and international standards for research involving human participants (Israel, 2014). Informed consent was secured from all participants, who were provided with detailed information about the study's objectives, procedures, and potential risks and benefits. Participants were assured of their anonymity and confidentiality, with all data anonymized and securely stored to prevent unauthorized access. The interviews were designed to be non-invasive, and participants retained the right to withdraw at any stage without penalty. Transparency was maintained throughout the research process, with the researchers disclosing their roles and affiliations to build trust and minimize power imbalances.

3.7 Validity, Reliability, and Trustworthiness

To enhance the validity and reliability of the study, several measures were implemented. Member checking was conducted by sharing preliminary findings with participants to verify the accuracy and resonance of the themes with their experiences (Lincoln & Guba, 1985).

Reflexivity was integral to the research process, with the researchers maintaining a reflexive journal to document their biases, assumptions, and reflections, thereby promoting critical self-awareness (Alvesson & Sköldberg, 2017). While the study relied on a single data source—semi-structured interviews—depth and richness were achieved through the systematic and rigorous application of thematic analysis. Detailed descriptions of the research context and methodology were provided to enhance transferability, allowing readers to assess the applicability of the findings to similar contexts. Peer debriefing with qualitative research experts further ensured the dependability and confirmability of the study.

4. Findings of the Study

4.1 Online Written Corrective Feedback and its Impact on Self-Regulated Writing

Participants consistently emphasized that online written corrective feedback (WCF) played a pivotal role in fostering self-regulation in their writing practices. They reported becoming more aware of their writing process and developing specific goals and strategies to improve their output. Participant P1 noted, "Getting feedback online made me more conscious of how I approach writing. I started setting specific goals and planning my writing steps more effectively." This underscores the connection between structured online feedback and heightened cognitive engagement, as described in Zimmerman's (2002) model of self-regulated learning, which identifies goal-setting as a key phase. The feedback prompted learners to focus on planning and strategy formulation, fostering a deeper engagement with the writing process.

The interactive and iterative nature of online WCF was particularly influential in encouraging self-monitoring and self-reflection. For instance, Participant P2 shared, "The online feedback felt like an ongoing conversation with my instructor. This motivated me to be more attentive to my writing and take charge of my learning progress." This comment highlights how the feedback mechanism established a dialogic learning space, enabling participants to evaluate their work critically and make informed adjustments. The sense of immediacy and interaction embedded in the feedback process mirrors findings in the literature suggesting that digital platforms can simulate collaborative learning environments, thus enhancing self-regulation (Ene & Upton, 2018).

4.2 Variations in Self-Regulation Strategies Across Proficiency Levels

An important dimension of the findings was the variation in self-regulation strategies among proficiency groups. High-proficiency participants demonstrated a propensity for using online WCF to refine advanced writing techniques. Participant P3 explained, "Online feedback pushed me to critically evaluate my writing choices. I often used the feedback to refine my writing and incorporate new strategies." This observation reflects how advanced learners leveraged feedback to address higher-order concerns such as style, coherence, and rhetorical effectiveness. The ability to translate feedback into sophisticated writing strategies aligns with the literature on advanced language learners, who are more likely to focus on nuanced textual features when provided with constructive feedback (Ferris, 2010).

Mid-proficiency participants highlighted the instructional value of online WCF in bridging knowledge gaps and fostering systematic approaches to writing. Participant P4 commented, "I started using online feedback to fill gaps in my understanding. It helped me become more methodical in my approach." The feedback's role as a scaffolding tool for these learners underscores its potential to enhance intermediate skills, such as structural organization and grammatical accuracy. In contrast, low-proficiency participants viewed online WCF as a foundational guide for addressing basic errors and developing fundamental writing skills. Participant P5 observed, "Online feedback was like a guide. I began to focus more on improving specific aspects pointed out by the feedback." This reflects the remedial function of WCF for novice learners, enabling them to build confidence and competence in essential areas of writing (Alam et al., 2021; Hasan et al., 2019). These differential responses highlight the adaptability of online WCF across proficiency levels, a finding consistent with studies emphasizing its versatility in catering to diverse learner needs (Bitchener & Storch, 2016).

4.3 Motivation and Engagement

Across all proficiency levels, participants identified a motivational boost as a key outcome of receiving online WCF. They expressed that the personalized and timely nature of feedback fostered a sense of accountability and connection with their instructors. Participant P6 remarked, "Receiving feedback online felt like a conversation with my instructor. It motivated me to actively work on my writing and take ownership of my progress." This sense of connectivity aligns with the principles of socio-cognitive interactionism, where meaningful interaction promotes learner motivation (Alam et al., 2024a; Vygotsky, 1978). Moreover, the instant accessibility and clarity of online feedback appeared to enhance engagement with the writing process. Participant P7 explained, "When I could see the feedback right after submitting my work, it made me want to go back and revise immediately." This immediacy resonates with findings in the literature that emphasize the role of timely feedback in promoting active learning and sustained engagement (Hyland & Hyland, 2019).

4.4 Evolution of Self-Regulation Strategies

A prominent theme was the gradual evolution of self-regulation strategies among participants, irrespective of their proficiency levels. Participants consistently reported transitioning from hurried writing practices to more deliberate, well-planned approaches. Participant P8 described, "Before, I used to rush through writing assignments. Now, I plan ahead and use the feedback to fine-tune my writing." This shift reflects the transformative impact of online WCF in fostering forethought and performance evaluation, aligning with the iterative nature of Zimmerman's self-regulation model. Additionally, participants noted how feedback encouraged them to engage in multiple drafting and revision cycles, fostering an iterative mindset crucial for effective writing. Participant P9 articulated, "I used to write just one draft, but now I revise several times after feedback. It helps me see my mistakes more clearly." This evolution highlights the role of feedback in embedding reflective practices, enabling students to internalize a process-oriented approach to writing.

4.5 Challenges in Utilizing Online WCF

While the findings largely underscored the positive impact of online WCF, participants also reported challenges in fully leveraging its potential. Some noted difficulties in interpreting feedback or aligning it with their personal writing objectives. For example, Participant P10 shared, "Sometimes the feedback was too general, and I wasn't sure how to apply it to my writing." This reflects a gap in feedback specificity, which, as the literature suggests, can impede its practical utility (Ellis, 2012). Participants also highlighted technical challenges, such as inconsistent access to digital platforms, which occasionally disrupted their engagement with the feedback process. These challenges underscore the need for institutions to ensure reliable infrastructure and provide training to help students navigate online feedback systems effectively.

5. Discussion

This study explored the impact of online written corrective feedback (WCF) on the self-regulation strategies of Bangladeshi university students, highlighting its differential influence across proficiency levels. The findings offer deeper insights into how online WCF facilitates self-regulated learning, fosters motivation, and promotes iterative improvements in academic writing.

5.1 Impact of Online WCF on Self-Regulation

The study reaffirmed that online WCF significantly enhances students' ability to self-regulate during the writing process. Participants described how feedback prompted self-monitoring, self-evaluation, and goal-setting, which are integral components of self-regulated learning as proposed by Zimmerman (2002). This finding aligns with Panadero and Jonsson's (2020) assertion that effective feedback mechanisms promote metacognitive engagement, enabling learners to assess and refine their approaches systematically. Moreover, the interactive nature of online WCF was particularly instrumental in driving sustained self-regulation. Participants consistently reported engaging in a feedback loop characterized by iterative revisions and reflective thinking. This observation parallels Nicol and Macfarlane-Dick's (2006) concept of feedback as a dialogic process, wherein learners use feedback to inform their ongoing learning and development. Recent research also corroborates these findings, highlighting the pivotal role of online WCF in enhancing learners' metacognitive awareness. For example, Hyland and Hyland (2019) emphasized how the immediacy and accessibility of digital feedback systems encourage students to engage actively with feedback and make strategic adjustments. Similarly, Han and Xu (2020) noted that online feedback fosters deeper cognitive engagement, as students repeatedly revisit their work to align it with the feedback received.

5.2 Variations in Self-Regulation Patterns Among Proficiency Levels

A notable aspect of the study was the variation in self-regulation strategies across different proficiency levels. High-proficiency participants demonstrated advanced skills in utilizing feedback for nuanced improvements, such as refining their writing style, coherence, and argumentation. This aligns with the findings of Wang et al. (2021), which suggest that proficient learners exhibit greater criticality in engaging with feedback and integrating it into their revisions. In contrast, mid-proficiency learners relied on online WCF as a scaffold for building foundational skills. These learners highlighted the instructional value of feedback in bridging their knowledge gaps, consistent with Teng and Zhang's (2018) findings that mid-level learners benefit from explicit and structured feedback to enhance their understanding of linguistic and rhetorical features. Low-proficiency learners, on the other hand, focused primarily on addressing basic grammatical errors and structural weaknesses. This finding echoes the work of Li et al. (2016) and Nassaji (2016), who emphasized the corrective role of feedback in guiding novice learners towards foundational competence. Furthermore, Sun and Wang (2020) demonstrated that low-proficiency learners often view feedback as an external source of guidance, helping them address their immediate deficiencies before advancing to higher-order concerns.

5.3 Motivational and Engagement-Enhancing Aspects

The motivational impact of online WCF emerged as a significant theme in this study. Participants across all proficiency levels described how feedback encouraged them to take ownership of their learning and remain engaged with their writing tasks. This finding aligns with Chong's (2019) work, which highlights how timely and personalized feedback fosters a sense of responsibility and intrinsic motivation among learners. Additionally, the dialogic and interactive nature of online feedback played a key role in sustaining engagement. Participants noted that the perceived immediacy of feedback created a sense of connection with their instructors, a phenomenon consistent with Adachi et al.'s (2018) assertion that digital feedback fosters a collaborative learning environment. This collaborative aspect resonates with the socio-cognitive perspective of Vygotsky (1978), which posits that learning occurs within a mediated and interactive framework.

5.4 Evolution of Self-Regulation Strategies

One of the most significant findings was the evolution of participants' self-regulation strategies over time. Initially, many students reported a tendency to submit hastily prepared drafts without much consideration for revision. However, exposure to online WCF gradually shifted their approach towards more deliberate and iterative writing practices. This transition aligns with Zimmerman's (2002) self-regulation model, particularly the performance and self-reflection phases, where learners refine their strategies based on feedback. Boekaerts and Corno (2005) similarly noted that learners who adopt self-regulation strategies show marked improvement in task performance, as they are better equipped to monitor and adjust their efforts. The present study's findings are further supported by Strobl et al. (2019) and Winstone et al. (2017), who observed that digital feedback systems encourage students to engage in multiple rounds of drafting and revision, fostering a process-oriented approach to writing. By incorporating feedback into their subsequent drafts, participants in this study demonstrated an iterative learning cycle that mirrored this process-oriented approach.

5.5 Challenges in Utilizing Online WCF

Despite its benefits, participants also reported certain challenges in effectively utilizing online WCF. For instance, some found it difficult to interpret generic or vague feedback, which limited their ability to translate suggestions into actionable improvements. This challenge aligns with the findings of Weaver (2006), who emphasized the importance of clarity and specificity in feedback to ensure its utility for learners. Technical challenges, such as inconsistent internet access and limited familiarity with digital tools, also posed barriers for some participants. These findings echo Martin et al.'s (2019) research, which highlighted the infrastructural challenges in implementing digital learning tools in resource-constrained contexts.

5.6 Theoretical and Practical Alignment

The findings of this study align with broader theoretical frameworks that emphasize the role of feedback in self-regulated learning. For example, Pintrich (2002) highlighted the interplay between metacognition, motivation, and self-regulation in academic contexts, all of which were evident in participants' responses. The study also reinforces the situated learning perspective of Lave and Wenger (1991), wherein learners' interactions with feedback are shaped by their contextual and experiential factors, such as proficiency level and digital literacy. In summary, this study illustrates the multifaceted ways in which online WCF influences self-regulation, motivation, and engagement among university students in Bangladesh. By facilitating iterative improvement and fostering learner autonomy, online WCF emerges as a powerful pedagogical tool that addresses the diverse needs of students across the proficiency spectrum.

6. Implications of the Study

6.1 Pedagogical Implications

This study highlights the importance of integrating self-regulation skill development into writing instruction. Educators can foster self-regulated learning by explicitly teaching strategies such as goal setting, self-monitoring, and reflective practices, enabling students to take a more strategic and autonomous approach to writing. Additionally, aligning feedback with learners' proficiency levels can enhance its effectiveness. For low-proficiency students, feedback could focus on foundational error correction, while for high-proficiency students, it could emphasize advanced writing techniques and stylistic refinements. Such differentiated feedback practices align with learner-centered pedagogy and support the diverse needs of students. Furthermore, the motivational benefits of online written corrective feedback (WCF) suggest that educators should create feedback environments that promote intrinsic motivation through timely, personalized, and constructive feedback, fostering student engagement and persistence in writing tasks.

6.2 Curricular and Policy Implications

To maximize the benefits of online WCF, institutions should consider embedding digital literacy training into the curriculum. This ensures that students can effectively navigate online feedback tools and use them to enhance their learning. Professional development programs for educators should also focus on equipping them with strategies to provide constructive and actionable online feedback that nurtures self-regulated learning. Such training would enable instructors to align their feedback practices with evolving pedagogical approaches in digital learning environments. Moreover, assessment strategies should be reimagined to accommodate students' self-regulatory skills, emphasizing reflective practices where learners articulate their writing process, set goals, and evaluate their progress. These strategies promote a holistic approach to assessing writing proficiency and self-regulated learning.

6.3 Implications for Technology-Enhanced Learning

The findings underscore the need for robust technology-enhanced learning environments that support real-time and interactive feedback (Alam et al., 2022b). Digital platforms can integrate tools that enable immediate feedback and foster ongoing interactions between instructors and students, promoting iterative self-monitoring and self-adjustment. Additionally, leveraging data analytics to personalize learning pathways can help address individual learners' needs by recommending targeted self-regulation strategies and writing resources. Adaptive learning technologies could further enhance this process by dynamically tailoring feedback and learning activities to match students' proficiency levels and self-regulation capabilities (Alam et al., 2022a). These technological innovations can create more inclusive and effective learning environments, ensuring that online WCF serves as a powerful catalyst for writing skill development and self-regulation.

7. Conclusion and Future Research Directions

This study explored the relationship between online written corrective feedback (WCF) and self-regulation among Bangladeshi university students, providing valuable insights into how online feedback influences self-regulated learning in academic writing. The findings suggest that online WCF plays a pivotal role in fostering self-regulation by encouraging iterative self-monitoring, strategic planning, and adaptive learning behaviors. This aligns with the principles of self-regulated learning theory (Zimmerman, 2000), where timely feedback triggers reflective practices and motivates students to take ownership of their writing processes. High-proficiency learners were found to engage proactively with feedback, using it to refine advanced writing skills, while mid- and low-proficiency learners utilized WCF primarily to bridge gaps in foundational skills. These variations emphasize the need for differentiated feedback strategies that cater to the distinct needs of learners at different proficiency levels.

However, several limitations of the study should be acknowledged. Firstly, the sample was limited to second-year BA (Hons) English Language and Literature students from a single private university in Dhaka, which may limit the broader applicability of the findings. The

institutional culture, technological infrastructure, and pedagogical approaches of private universities in urban Bangladesh may not reflect those of public universities or rural institutions, potentially affecting students' access to and interaction with online WCF. Future research could involve a more diverse range of participants from different institutions and disciplines to improve the generalizability of the results. Secondly, the study categorized participants based solely on their previous course grades, which may not fully capture the complexities of language proficiency. Incorporating a more nuanced proficiency assessment that considers a broader spectrum of language skills could provide deeper insights into how proficiency affects the use of online WCF. Moreover, relying on grades assumes consistency in instructors' marking standards, which may introduce bias due to subjective evaluation or inconsistencies in assessment criteria. Furthermore, while the study relied on qualitative data to explore students' experiences, a mixed-methods approach could offer a more comprehensive understanding by integrating quantitative data. This would allow for triangulation of findings, enhancing the validity of the conclusions. Additionally, the use of self-reported interviews may have introduced social desirability bias, where participants may have overstated their engagement with feedback to align with perceived expectations. More objective measures of engagement, such as trace data from learning management systems or feedback revision logs, could provide a fuller picture.

The study also highlighted potential variability in students' experiences due to the presence of multiple instructors. Variations in instructional practices and feedback styles could have influenced students' engagement with WCF. The lack of control over instructional uniformity and teacher feedback styles across classes poses a contextual constraint that may have introduced inconsistencies in how feedback was delivered and interpreted. Future research could explore how different teaching styles and instructor feedback delivery methods impact students' self-regulation and learning outcomes. Additionally, the limited duration of the study calls for longitudinal research to assess the long-term effects of online WCF on students' self-regulation development. Tracking students over a longer period could provide insights into the sustainability of the observed effects and how students' self-regulation skills evolve over time. Short-term qualitative insights, while valuable, may not fully capture the developmental nature of self-regulation, especially in relation to feedback adaptation and internalization processes.

Future research could also benefit from a cross-cultural approach, expanding the scope of the study to include diverse geographical regions and educational contexts. Comparative studies could examine how online WCF interacts with self-regulation in different cultural settings, providing a broader understanding of the generalizability of the findings. Another promising avenue is to explore different types of corrective feedback, such as peer feedback, teacher feedback, and automated feedback, to understand how each type influences students' self-regulation strategies. This comparative analysis could shed light on the most effective feedback methods for promoting self-regulated learning. Future research could also investigate the role of individual student characteristics, such as learning styles, motivation levels, and cognitive traits, in shaping students' responses to online WCF. Understanding these factors could lead to more personalized approaches to feedback and self-regulation. Additionally, exploring the integration of metacognitive instruction alongside online WCF could provide valuable insights into how teaching metacognitive strategies enhances self-regulation. This approach aligns with Zimmerman's (2000) conceptualization of self-regulated learning, where metacognitive strategies are central to the learning process.

In conclusion, this study provides important contributions to the understanding of how online written corrective feedback supports self-regulation in academic writing. By addressing the limitations and pursuing the proposed research directions, future studies can further refine our understanding of how to optimize feedback practices to foster self-regulated learning. As digital learning environments continue to evolve, the findings from this study and future research will be crucial in shaping effective pedagogical practices that promote students' autonomy, motivation, and engagement, ultimately enhancing their academic success.

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Authors contributions

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