



Written Corrective Feedback in EFL Writing: A Human-Machine Comparison

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ABSTRACT

Keywords:

Human written corrective feedback;
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Written corrective feedback
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Abstract: Human-written corrective feedback (HWCF) and automated written corrective feedback (AWCF) are trusted to benefit students' writing in English as a Foreign Language (EFL) course in higher education. This study analyzed the different impacts offered by both types of feedback on students' EFL writing. A systematic literature review with a PSALSAR framework was employed, involving 11 articles with the following inclusion criteria: the articles are taken from the Scopus database; the focus is on the EFL courses in higher education institutions setting; published between 2020-2025, and can be openly accessed. The findings reveal that both types have a positive and negative impact on students' writing. Positively, HWCF mostly impacts students' writing accuracy on revising their composition, including grammar mastery, learning engagement, and conditional metacognitive awareness. However, students' engagement on HWCF depends on their individual proficiency and the types of feedback delivered (direct or indirect). AWCF is positively beneficial due to its influence on students' writing accuracy and time efficiency. Nevertheless, AWCF does not have any significant impact on students' writing quality, and it offers decontextualized feedback. To conclude this research, practical implications for lecturers, university management, and future research are presented.

Kata Kunci:

Umpan balik korektif tertulis manusia;
Umpan balik korektif tertulis otomatis;
Umpan balik tertulis korektif
Penulisan mahasiswa EFL.

Abstrak: Umpan balik korektif yang ditulis oleh manusia (HWCF) dan umpan balik korektif yang ditulis secara otomatis (AWCF) dipercaya dapat memberikan manfaat bagi penulisan siswa dalam kursus Bahasa Inggris sebagai Bahasa Asing (EFL) di perguruan tinggi. Penelitian ini menganalisis dampak yang berbeda yang ditawarkan oleh kedua jenis umpan balik tersebut terhadap penulisan EFL siswa. Sebuah tinjauan literatur sistematis dengan kerangka PSALSAR digunakan dalam penelitian ini, dengan melibatkan 11 artikel yang memenuhi kriteria berikut: artikel diambil dari database Scopus; fokus pada kursus EFL di lingkungan pendidikan tinggi; diterbitkan antara tahun 2020-2025, dan dapat diakses secara terbuka. Temuan menunjukkan bahwa kedua tipe tersebut memiliki dampak positif dan negatif terhadap tulisan siswa. Secara positif, HWCF sebagian besar berdampak pada ketepatan siswa dalam merevisi komposisi mereka, termasuk penguasaan tata bahasa, keterlibatan belajar, dan kesadaran metakognitif bersyarat. Namun, keterlibatan siswa dalam HWCF bergantung pada kemampuan individu dan jenis umpan balik yang disampaikan (langsung atau tidak langsung). AWCF bermanfaat secara positif karena pengaruhnya terhadap akurasi penulisan dan efisiensi waktu siswa. Namun demikian, AWCF tidak memiliki dampak yang signifikan terhadap kualitas tulisan siswa, dan memberikan umpan balik yang tidak kontekstual. Sebagai kesimpulan dari penelitian ini, disajikan implikasi praktis untuk dosen, manajemen universitas dan penelitian selanjutnya.

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A. INTRODUCTION

Producing a well-crafted text is pivotal for English as a Foreign Language (EFL) students in the 21st century, where effective communication is crucial. As one of the essential skills in the 21st century, writing plays a critical role in enabling students to convey their ideas and foster critical thinking (Taye & Mengesha, 2024). By composing effective written text, critically selecting and

presenting information in this modern era, students are envisioned to succeed in their academic life and manifestly in the professional field when they enter the workforce.

To strengthen students' writing skills, students can benefit from written corrective feedback (WCF) provided by their lecturers. This is human-written corrective feedback (henceforth HWCF), which is conceptualized as written comments or signs made by instructors to their students' writing, either on grammar, content, or text organization, to boost their writing competence (Crosthwaite et al., 2022). HWCF is generally trusted to impact students' learning of writing skills (Mujtaba et al., 2021). Specifically, it is demonstrated to engage students in a dynamic, contextualized, and more personal learning (Shen & Chong, 2023). Through HWCF, students receive targeted feedback on content, language, and writing structure, which encourages writing effectiveness (Almanea, 2025). Given its central significance in the writing classroom, HWCF continues to represent one of the most vigorous and dynamic areas for scholarly concerns (Lee, 2024), specifically in second language (L2) instruction (Mao et al., 2024).

However, lecturers may not always be able to provide timely and accurate feedback to their students (Woodworth & Barkaoui, 2020). Lecturers giving HWCF on students' writing is a time- and energy-consuming task, and research suggests that lecturers often view it as a tedious and detrimental duty (Yu, 2021). Lecturers also frequently struggle to provide immediate and meaningful feedback due to organizational factors and heavy administrative workloads (Yu et al., 2021). Some studies also reckon that this feedback might be confusing, inconsistent, and demotivating for students (Falhasiri, 2021). In light of these challenges, HWCF is a vital pedagogical strategy in which teachers evaluate student writing to tackle imperfections and further develop language skills (Lin & Crosthwaite, 2024).

In the current era, WCF is not only delivered manually by teachers but also by learning machines, known as automated written corrective feedback (henceforth AWCF). AWCF is commonly provided by automated writing evaluation (AWE) systems (Shi & Aryadoust, 2024). Created by the existing algorithms, AWCF is capable of producing more comprehensible feedback with greater accuracy than human instructors (Dai et al., 2024). This feedback can deliver personalized metalinguistic explanations and engage students in self-directed learning (Barrot, 2023). Other studies verify that machine-generated adaptive feedback considerably increased the quality of reasoning in the students' writing (Bauer et al., 2025; Kinder et al., 2025).

Nevertheless, AWCF has limitations as well. Although AWCF has been extensively utilized for boosting students' editing strategies (Al-Inbari & Al-Wasy, 2023), it is still a paramount debate since AWCF does not cover language and content-balanced feedback. AWCF solely generates feedback for writing mechanics, grammar, and lexical aspects. Moreover, relying on AWCF can reduce lecturer-student interaction, making it challenging for lecturers to provide revision guidance throughout the writing process (Escalante et al., 2023). While existing studies have explored the impacts of HWCF and AWCF separately, few studies have directly compared the impacts on EFL students' writing. The present study addresses this issue by investigating the comparative effects of HWCF and AWCF. By this means, it aims to provide insights for balanced feedback strategies that leverage the strengths of both approaches.

Building on the objective, the current study will investigate the following question: What impacts do human and automated-written corrective feedback have on EFL students' writing? By answering the question, the findings of this study are expected to theoretically affirm the evidence for each sort of feedback's influence on students' writing. Practically, the findings are envisioned to help lecturers manage their writing class learning time, including when to offer HWCF and rely on AWCF. By establishing fair use of these two sorts of feedback, lecturers retain the ability to empower their students without being supplanted by machine learning.

B. RESEARCH METHODOLOGY

The present study employed a qualitative approach with a systematic literature review (SLR), applying the PSALSAR framework as suggested Mengist et al. (2020). This framework is preferable due to its explicitness, adaptability, and technical consistency for conducting systematic reviews, and is applicable for both qualitative and quantitative studies (Yeboah, 2023). In this context, the researchers applied the PSALSAR framework to provide a comprehensive analysis of how HWCF and AWCF impact students' learning, highlighting the strengths and limitations of each feedback type. The researchers adopted all steps as listed in the PSALSAR procedures, including the steps of protocol, search, appraisal, synthesis, analysis, and report. The summary is presented in Table 1, followed by an explanation afterwards.

Table 1. The Adopted PSALSAR Steps

Step	Description
Protocol	Determining the study scope: the impact of HWCF and AWCF on students' learning, and formulating the research question
Search	Scopus database
Appraisal	Applying the inclusion/exclusion criteria
Synthesis	Categorizing the data of HWCF and AWCF based on the research question
Analysis	Coding the data into relevant themes
	Displaying data in the form of tables and narration
	Interpreting the data and justifying it to the current relevant research
	Drawing conclusions and recommendations
Report	Writing the research article for disseminating results

In the protocol step, the researchers determined the study scope, encompassing the impact of written corrective feedback delivered by humans and machines on students' learning. The research question was also formulated in the protocol step. For the step of search, Scopus database was chosen as the resource for this SLR. In the third step, appraisal, the researchers identified and included relevant studies in this step. The inclusion criteria applied in this research comprise the following aspects:

1. The database used is Scopus
This database was chosen regarding the notion that it accommodates more coverage in the humanities and social studies, compared to WOS (Canadian Institute for Knowledge Development, 2020).
2. The scope of research is EFL courses in higher education institutions
The selection of EFL courses in a higher education setting was due to WCF's significance in building students' competency to face proficiency exams and promoting written communication skills to enter higher education level, and readiness for the workforce after students finish university.
3. The year of publication is between 2020 and 2025
This range was selected as the trend of machine feedback developed exponentially following the invention of artificial intelligence (AI) (Shi & Aryadoust, 2024).
4. Open-access research articles
Such articles were preferred due to the need for comprehensive content (Quaia et al., 2024), context, and to avoid bias and errors in interpreting the findings.

During the article identification, the researchers identified 30 articles being searched with the main keywords "human-written corrective feedback," "teacher-written corrective feedback," "automated written corrective feedback," "automated written evaluation," "impacts on writing," "EFL learning," and "university." Then, they were screened, resulting in 18 articles being excluded as they were not open access. Then only 11 articles were considered eligible, as 1 of them did not fit the

research question formulated by the researchers. For the final analysis, 11 articles were included to be analyzed. Following the synthesis step, 11 articles meeting the inclusion criteria were selected for further analysis. These articles were categorized into HWCF and AWCF regarding the formulation of the research question. The results of this categorization are presented in Table 2.

Table 2. The Articles Included

WCF type	Title	Author(s)
Human-written corrective feedback	The effects of direct written corrective feedback and comparator texts on the complexity and accuracy of revisions and new pieces of writing	Hamano-Bunce (2022)
	A comparative study of the engagement with written corrective feedback of Chinese private college students	Pan et al., (2023)
	The effectiveness of corrective feedback in enhancing EFL learner writing performance	Li et al. (2023)
	Understanding the significance of EFL Students' perceptions and preferences of written corrective feedback	Rasool et al., (2024)
	Effectiveness of teachers' direct and indirect written corrective feedback provision strategies on enhancing students' writing achievement: Ethiopian university entrants in focus	Wondim et al., (2024)
Automated written corrective feedback	Investigating synchronous and asynchronous written corrective feedback in a computer-assisted environment: EFL learners' linguistic performance and perspectives	Cheng and Zhang (2024)
	AI-generated feedback on writing: insights into efficacy and ENL student preference	Escalante et al. (2023)
	Exploring the impact of automated written corrective feedback on the academic writing skills of EFL learners: An activity theory perspective	Rahimi et al. (2025)
	How effectively can EFL students use automated written corrective feedback (AWCF) in research writing?	Guo et al. (2022)
	Exploring the effects of automated written corrective feedback on EFL students' writing quality: A mixed-methods study	(Fan, 2023)
	Learner interaction with, and response to, AI-programmed automated writing evaluation feedback in EFL writing: An exploratory study	Yang et al. (2024)

The data analysis involved a thematic analysis approach adapted from Kiger and Varpio (2020). First, the data from the 11 articles were segmented according to the two research questions. Next, the results were labelled and coded to identify patterns and connections, generating similar codes. The codes were then categorized into broader themes, initially described in short phrases. These themes were reviewed multiple times to ensure clarity and avoid overlaps among the reviewed articles. After verifying that all data were accounted for, the themes were named succinctly and finalized for reporting purposes. Finally, the findings were interpreted and justified with current relevant research on WCF, providing a comprehensive understanding of the topic. The researchers then drew conclusions and recommendations based on the discussion presented in the data analysis. Future potential research and practical recommendations for educators and university management were forwarded in this part. As part of the reporting stage, the researchers processed and templated the findings and analysis into a research article. This involved organizing the results in a clear and structured format. Thereby, the study aims to disseminate its findings widely, as emphasized by Mengist et al. (2020).

C. RESULTS AND DISCUSSION

1. Impacts of HWCF on Students' Writing

5 articles were analysed to see the impact of HWCF on students' writing. The results are presented in Table 3.

Table 3. Impacts of HWCF on Students' Writing

Author(s)	Impact	Code	Theme
Hamano-Bunce (2022)	WCF had a major impact on the accuracy of revisions, as well as a significant increase in the use of subordination in revisions.	Revision accuracy	Writing accuracy
Wondim et al. (2024)	WCF has an impact on pupils' writing abilities, both directly and indirectly. Direct WCF is considered to be more effective because learners who received direct WCF, paired with metalinguistic explanations.	WCF types determining writing ability	
Li et al. (2023)	WCF had a significant effect on the accuracy of students' grammar mastery.	Grammar accuracy	
Pan et al. (2023)	WCF has an impact on engagement, although the level of engagement ranges across students with high and low language proficiency.	Engagement is determined by the level of proficiency	Engagement
Rasool et al. (2024)	WCF informs students what mistakes to avoid and how to write a good composition.	Awareness of not making mistakes and adjustments to writing	Conditional metacognitive awareness

From Table 3, it is identified that WCF has an impact on several aspects of students' writing. Hamano-Bunce (2022) reports that WCF impacts students' revision accuracy. Li et al. (2023) prove that WCF affects students' accuracy of grammar mastery. Furthermore, Wondim et al. (2024) discuss the types of WCF that influence students' writing ability, suggesting that direct WCF is more effective for students' writing performance. Pan et al. (2023) notice another factor that HWCF affects, namely, engagement. The last study, conducted by Rasool et al. (2024), discover that WCF allows students to avoid making errors and try their best efforts to make effective compositions. From those listed studies, the researchers draw the following impacts that HWCF could provide for students' learning: writing or revision accuracy, grammar mastery, engagement, and conditional metacognitive awareness.

a. Writing accuracy

The study of Hamano-Bunce (2022) signifies that human WCF has a moderate influence on the accuracy of students' writing revision. Wondim et al. (2024) suggest similar findings that HWCF assists students in promoting their writing ability. This research discovery serves the intention of WCF to comment on errors and advance students' composition (Crosthwaite et al., 2022). Lecturers correcting what students write will direct students' attention that they make mistakes in their draft. And when they agree to revise, their text will become more readable. While revising, students are forced to find the correct language structure. This enables students to retain previously learned concepts and potentially acquire new knowledge, thereby deepening their understanding of language use and its application in writing (Yaseen et al., 2024). Studies indicated that WCF provided by lecturers is positively correlated with students' writing performance (Gutierrez et al., 2024). Not only correlated, but some studies claim that WCF also promotes writing skills (Soleimani & Modirghamene, 2020; Yunus, 2020).

As a part of writing accuracy, HWCF is also reported by Li et al. (2023) to have a moderate influence of human WCF on students' grammatical accuracy. They viewed that this process of correcting could facilitate students' production of texts with greater grammatical accuracy

and structural coherence. Building on this, the study concluded that teachers' corrective feedback could enhance the students' grammar acquisition. This finding is associated with a study reported by Chingchit (2024) and Escalante et al. (2023), suggesting HWCF's effectiveness in facilitating students' linguistic development.

Nevertheless, this result indicates a conflict with several studies, as they are fundamentally against the idea that WCF could enhance grammar accuracy. In some studies, it is mentioned that WCF does not affect the long-term retention of grammar in students' memory (Ekanayaka & Ellis, 2020). Even for short-term memory, WCF does not last long (Ghoorchaei et al., 2022). Consequently, a researcher even reports that delivering WCF should be diminished (Mohebbi, 2021). Gebremariam (2024) additionally, mentions that WCF is not sufficient to be used as a tool to promote grammar mastery. However, particular settings of teaching, students' internal factors, and how teachers' teaching style might engage their students during writing practice, can be determining aspects of effective human WCF for students' writing improvement.

b. Engagement

Pan et al. (2023) underline that human WCF could engage students in learning, although the variety of student proficiency determines the level of engagement. They prove that individual elements such as proficiency, self-efficacy in writing, learning belief, and learning context, such as students' relationships with their teachers, might define the level of engagement. This level of engagement also deals with the types of WCF offered by lecturers. Supiani et al. (2023) disclose that students show better engagement when they receive direct feedback. On the contrary, the students researched are less engaged, and even show negative engagement when lecturers provide indirect feedback. Shen & Chong (2023) correspond to this idea, approving that many aspects determining students' engagement with the human WC, specifically contextual and individual. To prevent or reduce this negative engagement, lecturers should find a favorable solution for delivering their WCF. Starting to deliver the WCF with appreciative comments might encourage students to work on the human WCF (Alhumaid, 2023).

c. Conditional metacognitive awareness

Based on Rasool et al. (2024), another impact of teacher WCF on students' writing is that students will avoid making mistakes and try to adjust to good composition. This further implies that students being aware of making mistakes during the process of writing. This awareness can be categorized as conditional metacognitive awareness, in which students have the capacity to assess a writing assignment, identify its objective and intended readership, recognize the circumstances required for creating proficient writing, and are aware how to select, utilize and examine the success of particular writing techniques and abilities with the goal to develop excellent pieces of writing (Mejia, 2024). In this case, human WCF has enabled students to be mindful when crafting an acceptable composition. Furthermore, this awareness allows students to boost and apply self-directed writing strategies (Yang et al., 2023), suggesting that students might be able to manage their writing tasks and control their own progress on the tasks.

2. Impacts of AWCF on students' writing

6 articles were studied to investigate the impacts of AWCF on students' writing. The findings are displayed in Table 4.

Table 4. Impacts of AWCF on Students' Writing

Author(s)	Platform used	Impact on students' writing	Code	Theme
Cheng and Zhang (2024)	Not specifically mentioned	Synchronous WCF was more effective than asynchronous in enhancing writing accuracy	AWCF effectiveness in enhancing writing accuracy	Writing accuracy
Guo et al. (2022)	Grammarly	AWCF provided by Grammarly was effective in reducing students' writing mistakes	AWCF effectiveness in enhancing writing accuracy	
Rahimi et al. (2025)	Grammarly	Students who utilized AWCF show better grammatical accuracy	AWCF improving grammatical accuracy	Time efficiency
Escalante et al. (2023)	AI	AI-generated WCF offers time optimization	AWCF impacting time efficiency	
Fan (2023)	Grammarly	AWCF offered by Grammarly did not significantly impact syntactic and lexical complexity, accuracy, and fluency (CAF).	No significant effect on syntactic and lexical CAF	Not affecting writing quality
Yang et al. (2024)	Pigai	AWCF generated by Pigai offered rich linguistic resources, but without examples and contextual information.	AWCF enriching students' linguistic resources without examples and contextual information	Decontextualized feedback

Table 4 indicates the impact of AWCF on several aspects. Cheng and Zhang (2024) identify that AWCF promotes students' writing accuracy. Guo et al. (2022) view that AWCF was effective in helping students reduce errors in their writing drafts. Rahimi et al. (2025) figure out that AWCF generated by Grammarly influences grammatical aspects of writing. Additionally, Escalante et al. (2023) confirm that AI-generated WCF assists students with time efficiency. While in the contrary, Fan (2023) does not agree, and mentions that Grammarly does not significantly affect students' syntactic and lexical complexity, accuracy, and fluency (CAF), as part of writing quality. Yang et al. (2024) also testify AWCF's negative effect, that is, decontextualized feedback, in which students receive feedback without any contextual information and specific examples. The discussion of each finding is presented in the following section.

a. Writing accuracy

The research of Cheng & Zhang (2024), Guo et al. (2022), and Rahimi et al. (2025) center on similar things about students' writing accuracy affected by AWCF. Cheng and Zhang (2024) do not specifically mention the AWE tools, while Guo et al. (2022) and Rahimi et al. (2025) utilize Grammarly. Writing accuracy, they claim, is the effect of AWCF and has to do with grammar, punctuation, spelling, and lexical accuracy. This is reasonable, given that tools like Grammarly offer corrections to enhance these aspects. These findings align with research suggesting that AWCF improves grammatical accuracy (Lalira et al., 2024). Spelling and grammar feedback provided by AWCF, such as the Writing Pal application, has assisted students in building acceptable composition, although the contribution of these aspects is not considered great (McCarthy et al., 2022).

b. Time efficiency

The research reported by Escalante et al. (2023) attest that AWCF has an influence on students' time efficiency. Not only students, lecturers will be very much assisted by the time efficiency provided by AWCF. It is consistent with expectations that machine learning can deliver feedback rapidly, leveraging powerful cloud-based computers to process vast amounts of text. This accords with the amount of affordances of machine-generated feedback, that is, practicality, interactivity, and adaptability (Kurt & Kurt, 2024).

c. Not affecting writing quality

The study conducted by Fan (2023) proclaims that AWCF provided by Grammarly does not significantly impact syntactic and lexical complexity, accuracy, and fluency (CAF). This could be interpreted that AWCF does not affect students' writing quality. The finding is consistent with the limited scope of AWCF, which typically focuses on spelling, punctuation, capitalization, and grammar (Link et al., 2022). Such corrective feedback was claimed by Hoang (2024) and Link et al. (2022) as a revision at the basic level, which is further known to have a limited long-term impact on students' writing retention. However, although AWCF is perceived to assist students at the basic level, it supports students' self-directed learning, which can be a helping hand for teachers in delivering HWCF (Wei et al., 2023).

d. Decontextualized feedback

Yang et al. (2024) unveil that AWCF, generated by Pigai, concentrates on error-corrective feedback. By interacting with such feedback, the student participants are exposed to various linguistic resources. However, context and specific examples of the feedback are not present. This study regards this condition as decontextualized information. This limitation is inherent in AWCF. Besides, AWCF applications can fail in detecting errors, as mentioned in the research of Moon (2021), that such applications, for example Grammarly, have a 35% failing possibility of detecting errors in one's writing. This report implies that lecturers cannot fully rely on AWCF to evaluate students' writing.

By analysing the results from HWCF and AWCF impacts on students' writing, the researchers come to the conclusion that HWCF and AWCF might complement each other. The combination of both types can be a promising practice for upgrading students' writing. AWCF can handle basic-level errors, such as spelling, punctuation, and grammar, while HWCF can tackle a greater level of writing, including writing context. This combination is trusted to strengthen writing performance (Sari & Han, 2024; Thi & Nikolov, 2022), benefit teachers and learners collectively (Woodworth & Barkaoui, 2020), promote writing self-efficacy (Sari & Han, 2024), and very helpful in large-sized EFL classes (Mahapatra, 2024).

D. CONCLUSIONS AND RECOMMENDATIONS

This study highlights the distinct strengths of human-written corrective feedback (HWCF) and automated written corrective feedback (AWCF) in promoting language development among students. The findings denote that HWCF excels in enhancing students' writing accuracy, engagement, and conditional metacognitive awareness, although student engagement varies depending on the type of feedback (direct or indirect). AWCF, on the other hand, improves writing accuracy and offers time efficiency for text revision, but falls short in improving writing quality and contextualizing feedback for long-term linguistic knowledge retention.

The study's findings suggest a potential approach for lecturers to adopt a blended feedback model, combining the strengths of both HWCF and AWCF. By leveraging the personalized nature of HWCF and the efficiency of AWCF, lecturers can provide comprehensive feedback that addresses students' unique needs. University management can support this approach by offering professional development training for lecturers to maximize the benefits of HWCF and master AWCF platforms.

This study suggests several avenues for future research. Given its qualitative nature, a mixed-methods study investigating the statistical and long-term effects of HWCF and AWCF on student language development is strongly recommended. Likewise, examining lecturers' experience in delivering HWCF and incorporating AWCF into their teaching techniques would be a captivating research area.

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