

The Impact of Error Correction Methods on Second Language Learners' English Writing: Reviewing the Balance of Technology and Teacher Roles

Yutian Zheng*

College of Chemistry and Materials Science, Guizhou Normal University, Guiyang, 550081, China

Abstract. Error-correction in second language writing is a central focus in contemporary pedagogical research. The recent publications have reported tremendous progress in generative AI assistance in writing. However, there is still no agreement on how technology intervention promoted profound language acquisition and how to obtain an effective balance between technology and the role of a teacher. Thus, this article integrates literature and comparatively analyses the theoretical basis, effectiveness processes and constraints of traditional teacher correction, pure technical correction and human-machine collaborative correction. These findings indicate that teacher feedback is better than emotional interaction and logical instruction whereas technological tools are best in terms of immediacy. The human-machine collaborative model, through complementary strengths, reduces writing anxiety while enhancing learners' autonomous revision capabilities. This research offers a conceptual appeal towards the transformation of the teaching functions during smart era. It implies that teachers can utilize AI to correct the top-level mistakes and, in this way, focus their teaching methods on developing learning skills that learners can work on independently.

1 Introduction

In second language writing instruction, error correction is one of the fundamental pedagogical interventions because it helps learners to detect and correct language errors and improve the quality of their writing. In recent years, as breakthroughs in digital technology and, more specifically, the progress in natural language processing(NLP) and generative artificial intelligence(Generative AI)tools writing correction tools have gone through a radical transformation. They have gone beyond primitive rudimentary spell-check and grammar programs to the present-day intelligent writing aids (like ChatGPT). Technology is currently profoundly interfering with the process of revision in the writing of the learners in the form of automated cues, alternative expression suggestions, and structural reorganization. This change also brought a range of issues that warrant further exploration: whilst enhancing surface-level writing accuracy, do automated tools foster deeper language acquisition? More

* Corresponding author: 251108050038@gznu.edu.cn

importantly, how should teachers redefine their professional roles amidst increasingly sophisticated technology? Therefore, investigating how technology and teachers can find good balance and mutual agreement to form a new paradigm of human-machine collaboration error correction to a new model of the second language writing pedagogy has become an active topic of the present studies concerning the topic. This review aims to integrate existing literature and focus on the balance between technology and teacher roles around the core of ‘the impact of error correction methods on the accuracy and learning motivation of second language learners’ English writing. Particular objectives involve: (1) describing the theoretical basis and categorization of the error correction methods; (2) analyzing the effectiveness, process, and constraint of traditional teacher directed correction and pure technological directed correction; (3) examining the potential forms, benefits, and challenges of human-machine collaborative error correction; (4) To offer recommendations to the teaching practice and future research pathways based on the literature synthesis. The article is of great significance for optimizing second language writing instruction in the intelligent era

2 Literature review

2.1 Definition

It is possible to think of error correction as a mental feedback system that should facilitate knowledge acquisition and perfection of the language by learners based on detection and rectification of their language mistakes. This definition emphasizes the educative role of error correction, suggesting that timely feedback helps learners become aware of their mistakes, thereby enhancing their language awareness and writing proficiency. Error correction may also be defined as a tool for fostering self-regulated learning. This view holds that the feedback provided by teachers inspires the learners to correct their mistakes on their part, thus creating their learning and self-monitoring skills that continue to operate independently. In this definition, the learners take center stage and the interactivity exhibited by the learners and the agents as being pedagogical by teachers with the view that the correction of the errors by the teacher is not only a pedagogical task of the teacher but the learners are also actively involved in the reflective processes of the writing process and their errors and how to correct these errors and monitor the process.

2.2 Core theories

The current practice of error correction primarily relies upon two interrelated theoretical hypotheses. The first is Krashen's “Input Hypothesis,” which emphasizes that comprehensible language input plays a crucial role in language acquisition. Effective corrective feedback may be regarded as a kind of modulated input, characterized by its adaptation to learners' current proficiency levels and enhancement of comprehensibility. The second is the Output Hypothesis of Swain according to which dependence on input will not be sufficient to attain fluent and correct usage of languages. Learners have to engage in meaningful language output, and in this process, the learner needs to understand that he or she makes mistakes and in the process, the error corrective feedback encourages the learner to be aware of the differences between his or her production and the target language. This process facilitates reflection and revision, thereby promoting the ongoing development of the learner's interlanguage system. The combination of the two theories proves that an error correction strategy does not only offer appropriate language forms but also stimulates learners to engage in active cognitive coordination between language understanding and

meaningful implementation of the writing practice, thus fostering the overall process of language competence development.

2.3 Error types, manifestations and causes

Types of errors used in writing a second language can be divided into three main categories:

a. Grammatical errors: These include tense confusion, subject-verb agreement errors, overuse of prepositions and articles, and incorrect verb forms. Causes include negative transfer from the first language (e.g., Chinese does not have the tense distinction) and the inadequate exposure to the target language.

b. Lexical Errors: These errors typically manifest as inappropriate collocations, word form misuse (e.g., affect/effect), and semantic deviations; caused by insufficient deep lexical knowledge, overreliance on literal translation strategies, and insufficient accumulation of language chunks.

c. Logical errors: The weaknesses that are noted in these reports include things like the misuse of connectives, disconnect between claims and evidence, etc. Due to discourse competence being laid behind that of language competence and lack of knowledge in how to structure an essay.

d. Technical errors: These errors are primarily manifested as spelling, capitalization, and punctuation misuse. The reasons are poor phonetic-spelling correspondence and lack of mastery of rules.

3 Methods

3.1 The impact of teacher correction: roles, strategies and effects

Direct and indirect corrections are the two most popular strategies in teacher written feedback, which vary in their ability to provide clear and relevant information and the level of engagement of the learner. However, recent scholarly discussion has shifted from merely measuring the immediate accuracy of these methods to exploring their underlying mechanisms across diverse learner groups and task environments. Jamalinesari et al. demonstrated through comparative experiments that the format of teacher feedback significantly influences the development of writing proficiency [1]. According to their research, direct feedback seems to be useful in giving clear models of what is correct whereas indirect feedback is better in stimulating cognitive activity. Indirect feedback helps internalize lingual knowledge by leading the students to independently find out and correct their mistakes. According to this line of thinking, feedback serves as an activity that teaches the end product to be right as well as an activity that triggers significant thoughts.

Furthermore, the effectiveness of the corrective feedback depends on different factors, such as the age of the learner, the psychological development, language level, and the learning strategies. Recent empirical evidence from Roothoof et al. regarding young English learners suggests that direct correction and the provision of model texts are closely linked to task motivation [2]. In case of direct feedback, the information should be explicit and encouraging to learners of early language development, to decrease the cognitive burden, which preserves the motivation of writing and enhances the linguistic accuracy.

Nonetheless, in spite of positive effects of corrective feedback, other scholars, the most prominent Truscott, claim that Written Corrective Feedback (WCF) tends to have few outcomes. This is explained by the fact that teachers can hardly ensure the organizational and rational consistency of the corrective process, and the lack of cognitive power or desire to deeply process the feedback of learners may be their obstacle [3]. This means that no single

approach to feedback design could be useful, it must consider the interactional of the situation, the characteristics of the target linguistic attributes, and the delicate mental and emotional transactions of the learner.

In summary, the effectiveness of teacher correction is not absolute but depends on the clarity, relevance, and timing of the feedback, as well as its alignment with the learner's needs and readiness. The overdependence on teacher feedback that is given in one way only could create dependency, which will negate the autonomy of a learner and the trust he/she has in correcting the faults in their own work. Recent studies also warn that teacher-dominated correction may restrict opportunities for autonomous language exploration and inhibit self-correction skills. Consequently, a practitioner must adopt a versatile repertoire of feedback strategies in the effort to be realistic yet supportive of acquisition of learner autonomy.

3.2 The impact of automated correction: tool attributes and efficacy

In the pedagogy of L2 writing, the development of automated writing evaluation (AWE) instruments has done not only promote efficiency in grading, but also transformed the aspects of interaction that learners exhibit with their texts. Technical tools have transformed into both very simplistic "filtering of errors using set rules" to complex intelligent assistant systems that are driven by Generative AI.

3.2.1 Technical evolution

The initial correction algorithms were based on grammar rule collections and simple algorithms. These static logic-based systems usually demonstrated weakness in processing context-sensitive subtleties and gave repeated false identifications. Although the former spell-check and simplistic grammar programs were good in detecting surface-level problems, they could not examine high-level problems like logical structure or rhetorical formulations. In order to solve these gaps, researchers introduced more dynamic detection mechanisms. Zhu et al. showed that machine learning-based approaches, trained on large-scale corpora, can more accurately identify deep linguistic errors, moving beyond the mechanical limitations of traditional rule-based systems [4]. This development of the shift was the dawn of the tools that have statistical learning flexibility and are more appropriate to particular writing situations. Additionally, hybrid frameworks—such as the one proposed by Verma and Sharma—have emerged to combine the rigor of linguistic rules with the flexibility of data-driven models [5]. This dual mechanism has a tremendous effect on error localization and grammatical judgment, which becomes more accurate.

3.2.2 Efficacy and limitations

As NLP has developed, so to has the application of these tools in the form of cursory corrections to full scale perfecting of writing skills. Modern AWE systems now give a multi-dimensional feedback of discourse, logical coherence and academic conventions. According to a statement by Alapati et al., NLP-based systems assist learners in defining their shift between passive reception and active revision through various types of feedbacks [6]. The success of these tools depends on the immediacy and personalization of the feedback, as well as the learner's level of cognitive investment. Hou found that the effect of metalinguistic feedback was closely tied to learner engagement; the long-term construction of knowledge can only be realized when the learners internalize the underlying rules in an active way[7]. However, limitations remain. While current tools can "clean" mechanical errors, they may not always promote the deep restructuring of linguistic rules. The other danger is the potential

over-reliance of the learners on technology to the extent of their judgment and involvement in more unfamiliar rhetoric and logical exercises.

3.2.3 Cognitive heuristics

Due to the development of Large Language Models (LLMs), there has been a conversational aspect to automated feedback. With the current writing assistants, it is now possible to have them act as intelligent agents that approximate the heuristic questioning by teachers. This interactive feedback gives a more in-depth cognitive processes and reduces the tool to a grader rather than an interlocutor. However, in the face of such innovations, there are still problems like the credibility of the feedback, the bias of the algorithms, and the possibility to suppress the independent thought. Finally, the effectiveness of these tools is determined by the digital literacy level of the learner and their capacity to control their level of involvement in the technology.

3.3 Human-AI collaborative correction

As AI continues to permeate education, the focus of L2 writing feedback has shifted from technology replacement to human-AI collaboration. This collaborative paradigm will be reversed with the popularity of Generative AI [8]. Su et al. have shown that GenAI was capable of intervening in different phases of writing to help with linguistic and structural revisions [9]. For teachers, these tools reduce the workload of creating feedback content. This model integrates the computational power of machines with the professional expertise of teachers to create a complementary feedback ecosystem. According to previous studies, AI-based personalized feedback makes a great differentiator in terms of developing writing skills and acquiring self-correction abilities. An immediate remedy comes in to reduce anxiety in writing as well as, diminish the psychological load on learners. By providing low-stakes suggestions and instant validation, these tools bolster learner confidence and encourage linguistic experimentation. Furthermore, a complementary relationship exists: machines excel at processing surface-level linguistic features, while teachers provide insights into high-level skills such as argumentation depth, logical flow, and pragmatic appropriateness. Such division of labor makes sure that both simple norms and more complicated strategies of rhetoric are covered by the feedback.

As collaboration moves from static to dynamic models, researchers emphasize the need to consider the actual implementers in the classroom—the teachers and students—an area that requires further investigation [10]. Finally, the goal of human-AI collaboration is not merely to come up with an ideal text, rather the one that is more likely to enhance the cognitive skills of the learner. The evaluative standards may be internalized through learners in a multi-dimensional intervention in form, structure and strategy and learners may adopt more reflective and autonomous writing.

4 Conclusion

This review demonstrates that there is no corrective approach that can be effective in responding to all the range of pedagogical issues in L2 writing. Although teacher feedback may not be done away with in encouraging emotional response and the discussion of profound textual reasoning, automated correction systems offer high efficiency because of their timeliness and objectivity. Research suggests that the choice of feedback modality must be strategically aligned with learners' proficiency levels and specific instructional goals. Human-AI collaboration has emerged not only become an important technological trend but

exists as a crucial direction towards breaking the existing bottlenecks in the effectiveness of feedback. Therefore, the research directions that are becoming more in the future are still not finding a replacement but an integration and a balance. Future research would go further to examine the longitudinal impacts of various feedback types, particularly the human-AI collaboration—on learners' writing development, motivation, and autonomy. Furthermore, the formation of AI tools should be focused on the interpretability of the responses where the more detection of errors is substituted by disclosing the logic behind linguistic rules. Technology is also expected to facilitate collaborative learning and should be used as a mediator for teacher-student and peer-to-peer interactions, instead of being a separate automated maker. The future of L2 writing feedback is ultimately in the development of human intelligence and artificial intelligence, which interconnects extensively to build a learner-agnostic system. Such a system will assist learners in developing into more independent and skillful writers by connecting computer algorithms accuracy with human emotional intuition.

References

1. A. Jamalinesari, F. Rahimi, H. Gowhary, A. Azizifar, The effects of teacher-written direct vs indirect feedback on students' writing. *Procedia-Soc. Behav. Sci.* **192**, 116-123 (2015)
2. H. Roothoof, A. Lázaro Ibarrola, B. Bulté, Task repetition and corrective feedback via models and direct corrections among young EFL writers: Draft quality and task motivation. *Lang. Teach. Res.* **29**, 3 (2025).
3. J. Truscott, The case against grammar correction in L2 writing classes. *Lang. Learn.* **46**, 2, 327–369 (1996).
4. J. Zhu, X. Shi, S. Zhang, Machine learning-based grammar error detection method in English composition. *Sci. Program.* **2021**, 1, 4213791 (2021).
5. V. Verma, S. Sharma, Critical analysis of existing Punjabi grammar checker and a proposed hybrid framework involving machine learning and rule-base criteria. *ACM Trans. Asian Low-Resour. Lang. Inf. Process.* **21**, 5, 1–27 (2022).
6. P.R. Alapati, A. Swathi, J.N. Madhuri, V.K. Burugari, B. Pagidipati, Y.A.B. El Ebiary, et al., Improving English writing skills through NLP-driven error detection and correction systems. *Int. J. Adv. Comput. Sci. Appl.* **16**, 2 (2025).
7. J.D. Hou, J. The effects of metalinguistic written corrective feedback and their correlation with learners' engagement. *Zhejiang Int. Stud. Univ.* (**02**), 31-40 (2023).
8. J. Robert, N. Muscanell, M. McCormack, K. Pelletier, K. Arnold, N. Arbino, K. Young, J. Reeves, 2025 EDUCAUSE horizon report: Teaching and learning edition. *EDUCAUSE Publ.* (2025).
9. Y. Su, Y. Lin, C. Lai, Collaborating with ChatGPT in argumentative writing classrooms. *Assess. Writ.* **57**, 100752 (2023).
10. I. Celik, M. Dindar, H. Muukkonen, S. Järvelä, The promises and challenges of artificial intelligence for teachers: A systematic review of research. *TechTrends* **66**, 4, 616–630 (2022)