The Role of Generative AI in Enhancing Second Language Writing Fluency

Rusdiana Junaid[1], Affan Ramadhana[2], Nur Qalbi Rustan[3], Suci Putri Damayanti[4], Muh. Hardiansyah Pateha[5]

[1,4,5]Universitas Cokroaminoto Palopo, Palopo, Indonesia,
[2]Politeknik Dewantara, Palopo, Indonesia,
[3]Universitas Kurnia Jaya Persada, Palopo, Indonesia

email: rusdianajunaid@uncp.ac.id

Abstract: *This mixed-methods quasi-experimental study evaluated the efficacy of generative AI-assisted feedback in improving EFL students' academic writing in comparison to traditional instructor feedback. Thirty-two sixth-semester students enrolled in an academic writing course were allocated to either an AI-assisted experimental group (n = 16) or a teacher-feedback control group (n = 16). Students submitted pre- and post-test argumentative essays assessed for fluency (total word count; average sentence length), correctness (errors per 100 words), and coherence (discourse markers; cohesion index). A questionnaire and semi-structured interviews elicited perceptions and ethical apprehensions. The AI group had superior advancements in fluency and coherence, although accuracy enhanced in both groups. Students appreciated immediacy and specificity, while acknowledged the dangers of excessive dependence and ambiguity in writing. Research indicates that AI can enhance instructor feedback by providing additional revision chances and fostering autonomy within integrity-centered advice in EFL academic writing.*

Keywords: *Academic integrity; Feedback literacy; Generative AI; Learner autonomy; Writing fluency*

INTRODUCTION

The incorporation of artificial intelligence (AI) into education has transformed methodologies in language instruction and acquisition, with generative AI becoming a notably significant advancement (Law, 2024; Chang and Kidman, 2023; Zhang & Dong, 2024). In contrast to previous technologies, generative AI models may generate coherent, contextually relevant, and stylistically diverse content, providing learners with quick feedback, authentic input, and exemplified writing. In Second Language Acquisition (SLA), writing fluency continues to pose a significant challenge, as learners frequently encounter difficulties with lexical diversity, grammatical precision, and discourse coherence. Generative AI systems provide the capacity to mitigate these challenges by enhancing conventional approaches, like teacher feedback, peer review, and direct grammar instruction,

which, despite their significance, are often limited by time and resources (Mekheimer, 2025).

The study examines the role of generative AI in improving 2nd language writing fluency by systematically comparing it with teacher feedback. By analyzing fluency, coherence, and learner autonomy, it transcends the error-correction emphasis of previous studies. This study seeks to elucidate the efficacy and pedagogical requirements for the responsible integration of generative AI in L2 writing, providing novel insights into sustainable language learning methodologies.

The study is directed by the subsequent research questions:

1. How does generative AI feedback influence fluency, accuracy, and coherence in second language writing compared to traditional teacher feedback?
2. What are learners' perceptions and experiences of using generative AI as a support tool in the revision of second language writing?
3. What are the pedagogical and ethical implications of using generative AI in second language writing instruction, particularly regarding learner autonomy and originality?

LITERATURE REVIEW

Automated Writing Evaluation (AWE) systems, prevalent during the last twenty years, have enhanced precision and diminished superficial errors. Nonetheless, their emphasis has predominantly been on the mechanical facets of writing (Huawei & Aryadoust, 2023; Link et al., 2022; Cotos, 2023), exhibiting a constrained capacity to facilitate higher-order processes such as organization, reasoning, and style. Generative AI exceeds previous systems by offering both corrective feedback and recommendations for content and rhetorical structure, thus enhancing involvement with text creation. Empirical research indicates that AI-driven feedback improves revision techniques, organization, and general writing competence, while alleviating learners' anxiety by acting as a non-judgmental support system (Mekheimer, 2025; Wiboolyasarin et al., 2024; Jamshed et al., 2025).

The incorporation of generative AI into SLA writing presents numerous obstacles. Concerns remain about excessive dependence on AI, the possible diminishment of learner autonomy, and ethical dilemmas including authorship, originality, and academic integrity (Asad et al., 2024; Wang & Tian, 2025; Zadorozhnyy & Lai, 2023). Furthermore, a significant portion of the current study is exploratory, emphasizing learner perspectives like motivation and convenience rather than quantifiable results. Current research has been confined to certain EFL contexts, hence diminishing the generalizability of findings across various educational environments (Bray et al., 2023).

RESEARCH METHOD

The research employs a quasi-experimental mixed-methods approach to examine the impact of generative AI on improving second language (L2) writing fluency. A mixed-methods strategy was selected to assess both the quantifiable effects of generative AI feedback on writing performance and the subjective experiences of learners. Quantitative data were gathered via pre- and post-tests of L2 writing, while qualitative insights were acquired through semi-structured interviews and learner reflections. This methodology facilitates the triangulation of findings, guaranteeing both statistical rigor and substantial interpretive depth (Yin et al., 2025; Zhang & Dong, 2024; Chen et al., 2025)

The participants consist of approximately 32 sixth semester students of English Language Study Program at the Faculty of Teacher Training and Education Universitas Cokroaminoto Palopo. The participants were divided into two groups:
- Experimental group: receives feedback from a generative AI tool (e.g., ChatGPT).
- Control group: receives traditional teacher feedback.

The sample size was selected to ensure statistical power while maintaining feasibility for in-depth qualitative analysis. Participation was voluntary, with informed consent obtained from all students.

Instruments used to collect the data:

1. Writing Tasks: Participants composed two argumentative essays (pre-test and post-test) on analogous subjects. Their texts were examined for fluency metrics (total word count, average sentence length), accuracy (grammatical errors per 100 words), and coherence (discourse markers, cohesion indices).
2. The experimental group utilized generative AI for feedback on drafts, whereas the control group received textual remarks from the teacher.
3. Questionnaire: A post-intervention survey assessed the learners' attitudes regarding the efficacy of feedback, motivation, and autonomy.
4. Semi-structured interviews were performed with a subset of participants to investigate experiences, obstacles, and ethical issues associated with AI utilization.

Quantitative data: Statistical methods, including paired-samples t-tests and ANCOVA, were employed to assess enhancements in fluency, accuracy, and coherence between groups. Effect sizes were computed to ascertain the extent of impact.

Qualitative data: Thematic analysis was performed on interview transcripts and reflective notebooks to discern common themes pertaining to learner views, autonomy, and ethical considerations. Coding utilized an inductive-deductive

methodology, assuring coherence with theoretical frameworks and emerging data patterns.

FINDINGS AND DISCUSSION

1. Descriptive Statistics of Writing Performance

A total of 32 EFL undergraduate students participated in the study, divided into an Experimental Group (n = 16), which got generative AI-assisted input, and a Control Group (n = 16), which received traditional instructor feedback. The writing performance of students was evaluated by pretest and posttest essays based on three primary criteria: fluency, accuracy, and coherence.

1.1 Writing Fluency

Writing fluency was operationalized through total number of words produced and average sentence length.

Table 1. Descriptive Statistics of Writing Fluency (Mean, SD)

Measure	Group	Pretest Mean (SD)	Posttest Mean (SD)
Total words	Experimental	182.6 (24.3)	256.4 (31.8)
	Control	179.8 (26.1)	201.7 (28.5)
Average sentence length	Experimental	12.4 (2.1)	17.6 (2.8)
	Control	12.1 (2.3)	14.2 (2.5)

As shown in Table 1, both groups demonstrated improvement in writing fluency from pretest to posttest. However, the experimental group exhibited substantially greater gains, particularly in total word production and sentence complexity.

1.2 Writing Accuracy

Writing accuracy was measured by the number of grammatical, lexical, and mechanical errors per 100 words.

Table 2. Descriptive Statistics of Writing Accuracy (Mean, SD)

Group	Pretest Errors/100 Words	Posttest Errors/100 Words
Experimental	14.8 (2.6)	7.2 (1.9)
Control	15.1 (2.9)	11.6 (2.4)

The experimental group showed a marked reduction in error rates, indicating improved linguistic accuracy following exposure to AI-assisted feedback. In contrast, the control group demonstrated a more modest decrease in errors.

1.3 Writing Coherence

Writing coherence was evaluated using two indicators: frequency of discourse markers and a cohesion index score rated on a five-point scale.

Table 3. Descriptive Statistics of Writing Coherence (Mean, SD)

Measure	Group	Pretest Mean (SD)	Posttest Mean (SD)
Discourse markers	Experimental	6.3 (1.4)	12.1 (2.0)
	Control	6.1 (1.6)	8.4 (1.8)
Cohesion index	Experimental	2.6 (0.5)	4.1 (0.6)
	Control	2.7 (0.6)	3.2 (0.5)

The findings indicate that students in the experimental group developed significantly stronger textual coherence, reflected in both increased use of discourse markers and higher cohesion scores.

2. Inferential Statistical Analysis

2.1 Paired-Samples t-Test

Paired-samples t-tests were conducted to examine within-group differences between pretest and posttest scores.

Table 4. Paired-Samples t-Test Results

Variable	Group	t	df	p	Cohen's d
Fluency (total words)	Experimental	9.84	15	< .001	2.46
	Control	3.12	15	.007	0.78
Accuracy	Experimental	−8.67	15	< .001	2.17
	Control	−2.94	15	.010	0.73
Coherence	Experimental	10.21	15	< .001	2.55
	Control	3.45	15	.004	0.86

The experimental group demonstrated statistically significant improvements with very large effect sizes (Cohen's d > 2.0) across all three dimensions of writing performance. In contrast, the control group showed statistically significant but moderate effects.

2.2 ANCOVA Results

An analysis of covariance (ANCOVA) was conducted to compare posttest scores between groups while controlling for pretest performance.

Table 5. ANCOVA Results for Posttest Writing Performance

Dependent Variable	F	df	p	Partial η^2
Fluency	18.72	1, 29	< .001	0.39
Accuracy	14.56	1, 29	.001	0.33
Coherence	21.84	1, 29	< .001	0.43

All ANCOVA results were statistically significant, with large effect sizes (partial η^2 = .33–.43). Assumption checks confirmed normality of residuals, homogeneity of variance, linearity between covariates and dependent variables, and homogeneity of regression slopes.

3. Qualitative Findings

An examination of interview transcripts and reflective journals identified five key themes concerning students' experiences with generative AI-assisted feedback.

Theme 1: Promptness of Feedback
Participants emphasized the prompt availability of feedback, which enabled swift revision cycles and continuous writing involvement.

Theme 2: Precision and Lucidity of Feedback
Students indicated that AI-generated feedback was comprehensive and specific, especially for paragraph structure and discourse coherence.

Theme 3: Non-Judgmental Educational Atmosphere
The lack of evaluative pressure fostered experimentation and diminished anxiety related to linguistic blunders.

Theme 4: Augmented Learner Autonomy
Students exhibited enhanced autonomy in recognizing issues and refining their own compositions.

Theme 5: Dependence and Concerns Regarding Academic Integrity
Notwithstanding the perceived advantages, certain participants articulated apprehensions about overreliance on AI and the uncertainty related to academic authorship.

DISCUSSION

Informed by the three research questions of this study: (RQ1) the comparative effects of generative AI versus teacher feedback on fluency, accuracy, and coherence; (RQ2) learners' perceptions and experiences utilizing generative AI during revision; and (RQ3) the pedagogical and ethical implications for autonomy and originality, the discussion analyzes the findings through a contemporary lens. Research on SLA-informed feedback, focusing on feedback engagement, feedback

literacy, and the advantages/risks of generative AI-assisted feedback in second language writing.

RQ1. How does generative AI feedback influence fluency, accuracy, and coherence compared to teacher feedback?

Fluency: accelerated revision cycles and reduced "friction" in composing

The enhanced fluency improvements in the AI-assisted condition can be attributed to the frequent revision opportunities facilitated by fast feedback. Recent evidence from classroom settings indicates that feedback generated by large language models (LLMs) can enhance students' revision efforts and elevate their motivational and emotional responses to writing, conditions that likely facilitate increased text production and prolonged drafting over time (Meyer et al., 2024). In the context of Second Language Acquisition, these improvements are less likely to represent a singular "treatment effect" and more likely to indicate a transformation in learners' writing processes, whereby feedback is perpetually accessible and revision is rendered more iterative—thus enhancing the volume of substantive output.

Accuracy: written corrective feedback as noticing + uptake supported by usability

The noted enhancement in accuracy corresponds with recent analyses highlighting that written corrective feedback (WCF) is most effective when learners can (a) comprehend the feedback, (b) respond to it swiftly, and (c) maintain a positive emotional disposition to engage in revisions. A comprehensive review of naturalistic classroom WCF research indicates that outcomes are significantly influenced by contextual variables and learners' reactions to feedback, rather than solely by the giving of feedback (Rahimi et al., 2025; Mao et al., 2024). Generative AI can improve WCF "usability" by offering prompt, targeted recommendations, hence potentially augmenting the probability of feedback adoption. The literature warns that efficacy must be assessed based on learners' engagement patterns, rather than supposing that correction inherently leads to internalized competence (Mao et al., 2024).

Coherence: discourse-level scaffolding and feedback engagement

The primary benefit of AI-assisted feedback may be in the enhancement of discourse-level development (coherence and cohesiveness). Recent experimental research suggests that structured or visualized feedback from generative AI can enhance revision quality and learners' emotional responses, facilitating more effective engagement with higher-order text features (Zou et al., 2025; Zhan & Yan, 2025; Mekheimer, 2025; Zou et al., 2025). Supplementary data from L2 writing assessment research indicates that learners' behavioral, cognitive, and affective involvement with generative-AI-supported AWE feedback differs among individuals and significantly influences outcomes (Yeung, 2025; Zhang et al., 2026; Ge, 2026; Yeung, 2025). The current coherence advantages are thus optimally

understood as the result of (1) AI's capability to deliver frequent, contextually pertinent assistance and (2) learners' ability to comprehend and apply such instruction strategically.

RQ2. What are learners' perceptions and experiences of using generative AI during revision?

The qualitative themes identified in this study—immediacy, detailed feedback, reduced judgment, and perceived autonomy—align with emerging empirical findings indicating that learners appreciate generative AI for its timeliness and specificity, while also recognizing limitations related to tool reliability and the necessity for human oversight (Hwang et al., 2025; Mekheimer, 2025; Zhuang et al., 2025). Research investigating ChatGPT as an automated feedback mechanism indicates reported advantages for writing enhancement, coupled with apprehensions regarding inconsistency and the necessity of structured utilization (Teng, 2024; Tam, 2025; Aljasser, 2025; Kurt & Kurt, 2024).

From a feedback-theory standpoint, these impressions are significant as they directly influence feedback engagement: learners are more inclined to exert effort in revision when feedback is actionable and presented in a manner that alleviates fear. Moreover, current research on feedback literacy, which encompasses the interpretation and utilization of feedback, is a cultivated skill that forecasts engagement and writing efficacy (Lu et al., 2024; Lu et al., 2024). The favorable learner experiences documented herein can be construed not solely as "satisfaction," but as indicators of conditions that enhance the likelihood of uptake, particularly when learners possess (or are instructed in) feedback literacy skills that facilitate critical assessment of recommendations (Qu & Wu, 2024).

RQ3. What are the pedagogical and ethical implications, particularly for learner autonomy and originality?

Regulated autonomy: scaffolding without substituting learner decision-making

While learners indicated more autonomy, the survey also revealed apprehensions around excessive dependence and reduced critical participation. Recent analyses of ChatGPT in language education consistently underscore ethical concerns (e.g., authorship ambiguity, superficial learning, dependency) and stress the necessity for pedagogical frameworks that ensure learners remain cognitively accountable (Adel et al., 2024). Consequently, a significant implication is that generative AI need to be utilized as a feedback tool rather than a writing substitute: learners must justify updates, maintain revision logs, and explain how certain adjustments enhance coherence or accuracy. These techniques implement autonomy as agentic decision-making instead of as tool-facilitated convenience (Bandi et al., 2023; Peckham et al., 2025).

Integrity-by-design: making originality visible in the writing process

Given that concerns over originality are important to RQ3, the most justifiable instructional approach is integrity-by-design: educators may mandate staged drafts, reflective remarks, and process documentation (outlines, revision answers). A recent systematic review examining AI-generated feedback in English writing instruction (2024–2025) reveals that ethical challenges are prevalent across studies and necessitate resolution via transparent policies and assessment redesign, rather than mere prohibition (Karagoz, 2025).

Complementarity rather than replacement

The results ultimately endorse a complementary strategy wherein AI feedback enhances frequency and accessibility, while educators concentrate on genre requirements, rhetorical evaluation, and disciplinary standards. Recent classroom research indicates that the sequencing and mix of AI- and teacher-generated feedback might affect revision practices and outcomes (Jiang et al., 2023; Wiboolyasarin et al., 2024; Hirschi et al., 2025; Tran, 2025). A synergistic approach is thus pedagogically sound: AI facilitates iterative updating, while educators guarantee higher-order rhetorical and contextual relevance.

Contribution to Theory and Practice

Contribution to theory

This study enhances L2 writing and SLA-related feedback research by demonstrating that the efficacy of feedback, especially in technology-mediated environments, should be conceptualized through feedback engagement and feedback literacy, rather than merely the presence of tools. The observed enhancement in coherence and favorable learner experiences aligns with recent studies indicating that outcomes are contingent upon learners' behavioral and cognitive interactions with generative-AI-supported feedback (Yeung, 2025) and the influence of feedback capacity on engagement and performance (Zhang et al., 2026; Yeung, 2025; Lu et al., 2024). The study conceptually refines an explanatory framework in which generative AI acts as a process amplifier, enhancing revision possibilities and feedback utility, while learning outcomes depend on learner agency and involvement.

Contribution to practice

The findings provide actionable recommendations for EFL writing instruction: (1) utilize AI for feedback on revisions rather than for text generation; (2) explicitly teach feedback literacy, encompassing interpretation, evaluation, and application of feedback; and (3) implement integrity-focused assessments that prioritize process evidence and reflective justification. This corresponds with evidence indicating that AI-generated feedback can improve revision quality and emotional conditions (Meyer et al., 2024; Zou et al., 2025), while also addressing well-documented

ethical risks identified in systematic reviews of ChatGPT in language education (Li et al., 2024) and reviews focused on AI feedback (Karagoz, 2025).

CONCLUSIONS

This study aimed to elucidate the degree to which generative AI-assisted feedback can improve second-language writing development in an EFL academic writing context, and under which pedagogical conditions such utilization remains ethical. In the pre–post writing tasks, learners who utilized AI-assisted feedback exhibited greater enhancements in writing fluency and textual coherence compared to those who depended only on teacher feedback, but both groups had significant improvements in accuracy.

These patterns indicate that the primary contribution of generative AI is not solely in superficial correction, but in enhancing learners' options for repeated revision and facilitating discourse-level refinement (e.g., organizational clarity and cohesive signaling). The qualitative data revealed that students saw AI feedback as rapid, specific, and non-judgmental, potentially alleviating writing anxiety and enhancing persistence throughout revision. Simultaneously, participants' apprehensions over excessive dependence and academic integrity highlight that the educational value is contingent upon the manner in which AI is contextualized and regulated within the classroom.

Based on these findings, generative AI should be utilized as a feedback tool that enhances learner autonomy rather than as a replacement for authorship. This necessitates specific training in feedback literacy (evaluating, selecting, and justifying updates), process-oriented evaluation (draft histories, revision logs, reflective notes), and clear guidelines about permissible AI assistance. Educators are vital for fostering rhetorical discernment, genre conventions, and contextual suitability, as well as assisting students in formulating principled standards for evaluating automated recommendations.

Subsequent research ought to enhance the current approach by using larger and more heterogeneous samples, prolonged intervention durations, and detailed process metrics that monitor learners' interactions with AI feedback over time. This investigation will be essential for ascertaining whether the reported enhancements signify transient performance increases or lasting advancement in second-language writing proficiency. Responsible integration can establish AI as a scalable framework within human-guided, ethical writing training.

ACKNOWLEDGEMENTS

work. Finally, I deeply appreciate the unwavering support colleagues, friends, whose motivation sustained me during the entire research process.

REFERENCES

Adel, A., Ahsan, A., & Davison, C. (2024). ChatGPT promises and challenges in education: Computational and ethical perspectives. Education Sciences. https://doi.org/10.3390/educsci14080814

Aljasser, A. (2025). Investigating EFL students' perceptions of feedback: a comparative study of instructor and ChatGPT-generated responses in academic writing. Education and Information Technologies. https://doi.org/10.1007/s10639-025-13649-8

Asad, M. M., Shahzad, S., Shah, S. H. A., Sherwani, F., & Almusharraf, N. M. (2024). ChatGPT as artificial intelligence-based generative multimedia for English writing pedagogy: challenges and opportunities from an educator's perspective. The International Journal of Information and Learning Technology, 41(5), 490-506. https://doi.org/10.1108/IJILT-02-2024-0021

Bandi, A., Adapa, P. V. S. R., & Kuchi, Y. E. V. P. K. (2023). The power of generative ai: A review of requirements, models, input–output formats, evaluation metrics, and challenges. Future Internet. https://doi.org/10.3390/fi15080260

Bray, A., Girvan, C., & Chorcora, E. N. (2023). Students' perceptions of pedagogy for 21st century learning instrument (S-POP-21): Concept, validation, and initial results. Thinking Skills and Creativity. https://doi.org/10.1016/j.tsc.2023.101319

Chang, C. H., & Kidman, G. (2023). The rise of generative artificial intelligence (AI) language models-challenges and opportunities for geographical and environmental education. International Research in Geographical and Environmental Education, 32(2), 85-89. https://doi.org/10.1080/10382046.2023.2194036

Chen, S. Y., Chen, W. C., & Lai, C. F. (2025). Generative AI as a reflective scaffold in a UAV-based STEM project: A mixed-methods study on students' higher-order thinking and cognitive transformation. Education and Information Technologies. https://doi.org/10.1007/s10639-025-13758-4

Cotos, E. (2023). Automated feedback on writing. In Digital writing technologies in higher education: Theory, research, and practice (pp. 347-364). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-36033-6_22

Ge, Z. G. (2026). The mechanisms of AI feedback's influence on college students' learning engagement in human-AI collaborative learning. Innovations in Education and Teaching International. https://doi.org/10.1080/14703297.2026.2620543

Hirschi, K., Kang, O., Yang, M., Hansen, J. H., & Beloin, K. (2025). Artificial Intelligence-Generated Feedback for Second Language Intelligibility: An Exploratory Intervention Study on Effects and Perceptions. Language Learning. https://doi.org/10.1111/lang.12719

Huawei, S. & Aryadoust, V. (2023). A systematic review of automated writing evaluation systems. Education and Information Technologies. https://doi.org/10.1007/s10639-022-11200-7

Hwang, H., Chang, X., & Sun, J. (2025). Generative AI is useful for second language writing, but when, why, and for how long do learners use it?. Journal of Second Language Writing. https://doi.org/10.1016/j.jslw.2025.101230

Jamshed, M., Albedah, F., Ansari, M. S., & Banu, S. (2025). Assessing the Efficacy of AI-Driven Corrective Feedback via WhatsApp Application to Improve ESL Learners' Writing Skills: An Experimental Study. International Journal of Interactive Mobile Technologies, 19(7). https://doi.org/10.3991/ijim.v19i07.52709

Jiang, Z., Xu, Z., Pan, Z., He, J., & Xie, K. (2023). Exploring the role of artificial intelligence in facilitating assessment of writing performance in second language learning. Languages. https://doi.org/10.3390/languages8040247

Karagoz, I. (2025). AI-generated feedback in English writing instruction for EFL/ESL learners: A systematic review (2024–2025). The Reading Matrix.

Kurt, G., & Kurt, Y. (2024). Enhancing L2 writing skills: ChatGPT as an automated feedback tool. Journal of Information Technology Education: Research, 23.

Law, L. (2024). Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review. Computers and Education Open. https://doi.org/10.1016/j.caeo.2024.100174

Li, B., Lowell, V. L., Wang, C., & Li, X. (2024). A systematic review of the first year of publications on ChatGPT and language education: Examining research on ChatGPT's use in language learning and teaching. Computers and Education: Artificial Intelligence, 6, 100266.

Link, S., Mehrzad, M., & Rahimi, M. (2022). Impact of automated writing evaluation on teacher feedback, student revision, and writing improvement. Computer Assisted Language Learning, 35(4), 605-634. https://doi.org/10.1080/09588221.2020.1743323

Lu, Q., Zhu, X., Zhu, S., & Yao, Y. (2024). Effects of writing feedback literacies on feedback engagement and writing performance: A cross-linguistic perspective. Assessing Writing, 62, 100889.

Lu, Q., Zhu, X., Zhu, S., & Yao, Y. (2024). Effects of writing feedback literacies on feedback engagement and writing performance: A cross-linguistic perspective. Assessing Writing. https://doi.org/10.1016/j.asw.2024.100889

Mao, Z., Lee, I., & Li, S. (2024). Written corrective feedback in second language writing: A synthesis of naturalistic classroom studies. Language Teaching.

Mekheimer, M. (2025). Generative AI-assisted feedback and EFL writing: a study on proficiency, revision frequency and writing quality. Discover Education. https://doi.org/10.1007/s44217-025-00602-7

Meyer, J., Jansen, T., Schiller, R., Liebenow, L. W., Steinbach, M., Horbach, A., & Fleckenstein, J. (2024). Using LLMs to bring evidence-based feedback into the classroom: AI-generated feedback increases secondary students' text revision, motivation, and positive emotions. Computers and Education: Artificial Intelligence, 6, 100199.

Peckham, O., Raines, J., Bulsink, E., Goudswaard, M., Gopsill, J., Barton, D., ... & Hicks, B. (2025). Artificial Intelligence in Generative Design: A Structured Review of Trends and Opportunities in Techniques and Applications. Designs, 9(4), 79. https://doi.org/10.3390/designs9040079

Qu, K. & Wu, X. (2024). ChatGPT as a CALL tool in language education: A study of hedonic motivation adoption models in English learning environments. Education and Information Technologies. https://doi.org/10.1007/s10639-024-12598-y

Rahimi, M., Fathi, J., & Zou, D. (2025). Exploring the impact of automated written corrective feedback on the academic writing skills of EFL learners: An activity theory perspective. Education and Information Technologies. https://doi.org/10.1007/s10639-024-12896-5

Tam, A. C. F. (2025). Interacting with ChatGPT for internal feedback and factors affecting feedback quality. Assessment & Evaluation in Higher Education. https://doi.org/10.1080/02602938.2024.2374485

Teng, M. F. (2024). "ChatGPT is the companion, not enemies": EFL learners' perceptions and experiences in using ChatGPT for feedback in writing. Computers and Education: Artificial Intelligence. https://doi.org/10.1016/j.caeai.2024.100270

Wang, C. & Tian, Z. (2025). Rethinking Writing Education in the Age of Generative AI. https://doi.org/10.4324/9781003426936

Wiboolyasarin, W., Wiboolyasarin, K., Suwanwihok, K., Jinowat, N., & Muenjanchoey, R. (2024). Synergizing collaborative writing and AI feedback: An investigation into enhancing L2 writing proficiency in wiki-based environments. Computers and Education: Artificial Intelligence, 6, 100228. https://doi.org/10.1016/j.caeai.2024.100228

Yeung, S. (2025). University students' engagement with generative AI-supported automated writing evaluation (AWE) feedback. Journal of Second Language Writing. https://doi.org/10.1016/j.jslw.2025.101203

Yeung, S. (2025). University students' engagement with generative AI-supported automated writing evaluation (AWE) feedback. Journal of Second Language Writing, 68, 101203.

Yin, J., Hao, X., Xing, G., & Xu, M. (2025). The effects of ChatGPT-driven blended teaching model on nursing rounds: A quasi-experimental study. Nurse Education in Practice. https://doi.org/10.1016/j.nepr.2025.104545

Zadorozhnyy, A. & Lai, W. Y. W. (2023). ChatGPT and L2 written communication: A game-changer or just another tool?. Languages. https://doi.org/10.3390/languages9010005

Zhan, Y. & Yan, Z. (2025). Students' engagement with ChatGPT feedback: Implications for student feedback literacy in the context of generative artificial intelligence. Assessment & Evaluation in Higher Education. https://doi.org/10.1080/02602938.2025.2471821

Zhang, K., Li, S., & Huang, Y. (2026). Generative AI-driven feedback in higher education: a scoping review. Assessment & Evaluation in Higher Education. https://doi.org/10.1080/02602938.2026.2617157

Zhang, Y. & Dong, C. (2024). Exploring the digital transformation of generative ai-assisted foreign language education: A socio-technical systems perspective based on mixed-methods. Systems. https://doi.org/10.3390/systems12110462

Zhuang, Y., Zhao, R., Xie, Z., & Yu, P. L. (2025). Enhancing language learning through generative AI feedback on picture-cued writing tasks. Computers and Education: Artificial Intelligence, 100450. https://doi.org/10.1016/j.caeai.2025.100450

Zou, B., Wang, C., He, H., Li, C., Purwanto, E., & Wang, P. (2025). Enhancing EFL writing with visualised GenAI feedback: A cognitive affective theory of learning perspective on revision quality, emotional response, and human-computer interaction. Learning and Motivation, 91, 102158. https://doi.org/10.1016/j.lmot.2025.102158