



Evaluating Multimodal Feedback Systems in AI-Powered Writing Tools

Abdul Halim¹, Nadia Putri², Ade Ismail Ramadhan Hamid³

^{1,2,3}Pendidikan Bahasa Inggris, Universitas Muhammadiyah Kalimantan Timur

Article Info	Abstract
Accepted: 2025-12-31 Revised: 2026-01-21 Accepted: 2026-06-23 Keywords: <i>AI-powered writing tools, automated feedback, EFL writing, multimodal feedback, student perception.</i> DOI: 10.24256/ideas.v14i1.9176 Corresponding authors: Abdul Halim ah918@umkt.ac.id Pendidikan Bahasa Inggris, Universitas Muhammadiyah Kalimantan Timur	<i>Writing constitutes one of the most formidable abilities for EFL learners, necessitating proficiency in grammar, vocabulary, coherence, and organization. input is essential for writing development; unfortunately, instructor input is sometimes limited by time constraints and high-class sizes. As a result, Automated Writing Evaluation (AWE) systems like Grammarly and ChatGPT are extensively utilized to deliver prompt remedial comments. Although the majority of AI feedback is text-centric, multimodal AI feedback that incorporates text, audio, or visual elements may improve engagement and understanding; yet its efficacy in English as a Foreign Language context is still little investigated. This study studied the efficacy of multimodal AI feedback versus text-only AI feedback on the writing performance of EFL students, as well as students' perceptions and learning outcomes. A quasi-experimental mixed-methods approach was employed, involving 45 undergraduate EFL students enrolled in an academic writing course who completed pre- and post-test writing tasks, a perception questionnaire, and interviews. Paired-sample t-tests indicated a substantial enhancement in both groups, with the text-only group exhibiting a somewhat superior mean gain (2.652) compared to the multimodal group (2.591). Qualitative studies revealed that while students regarded multimodal AI feedback as more interesting, this choice did not result in improved writing ability. These data indicate pedagogical significance for EFL writing instruction.</i>

1. Introduction

Writing is a complex linguistic talent that necessitates proficiency in grammar, structure, and expression. Effective feedback is essential for fostering writing development; nevertheless, delivering timely and personalized feedback is particularly problematic in big classrooms (Venter et al., 2025). These limitations have expedited the adoption of AI-powered writing tools, such as Grammarly and ChatGPT, which provide instant corrective feedback on superficial elements, like grammar and mechanics (Dewi, 2022; Kusuma & Zuhri, 2025). Empirical research has indicated beneficial impacts of Automated Writing Evaluation (AWE) tools on writing precision, learner self-assurance, and engagement (Nazari et al., 2021; Quratulain et al., 2025).

Notwithstanding these advantages, current research predominantly centers on text-only AI feedback, prioritizing efficiency and accuracy over a more profound interaction with the feedback process. Recent research indicates that broadening input outside a singular textual medium may improve learning results. In this context, multimodal AI feedback denotes feedback provided via various channels, including text, audio narration, video screencasts, and visual indicators. Previous research demonstrates that multimodal feedback enhances clarity, depth of comprehension, and student engagement relative to single-channel input (Ebadi & Dadgar, 2024). Progress in AI technology has facilitated the extensive production of multimodal input, permitting more individualized and context-aware feedback in real time (Jürgensmeier & Skiera, 2025).

Nevertheless, empirical research investigating AI-driven multimodal feedback, especially in EFL/ESL environments, is still few. Two significant gaps can be discerned. Initially, there is an absence of thorough comparison study examining whether multimodal AI feedback results in superior enhancements in writing performance compared to traditional text-only AI feedback. Secondly, while students typically express favorable sentiments towards AI-assisted writing tools (Dewi, 2022; Zuhriah et al., 2024), there is less understanding of learners' unique perceptions of multimodal AI feedback and the correlation of these perceptions with quantifiable learning results.

Prior research on AWE tools, including Grammarly and ChatGPT, has predominantly focused on enhancements in grammar, vocabulary, and organization via text-based feedback (Dewi, 2022; Nazari et al., 2021; Quratulain, Maqbool, & Bilal, 2025; Miranty, Widiati, Cahyono, & Sharif, 2025; Fahmi & Cahyono, 2021). Despite the recent emergence of multimodal feedback—especially AI-generated integrations of text, audio, and visual components—as a promising research domain (Ebadi & Dadgar, 2024; Jürgensmeier & Skiera, 2025), its efficacy in EFL/ESL writing instruction remains insufficiently investigated.

Furthermore, prior studies have frequently investigated learner perceptions and performance in isolation, rather than exploring the correlation between these two aspects (Zuhriah, Fatoni, & Putri, 2024; Aruna & Sarosa, 2025).

Despite strong engagement benefits, little is known about whether multimodal AI feedback produces greater measurable writing improvement than text-only AI feedback in EFL contexts. Addressing this gap, the present study examines the use of AI-driven multimodal feedback in EFL writing by investigating:

1. To what extent does AI-powered multimodal feedback improve EFL students' writing performance compared to text-only AI feedback?
2. How do students perceive AI-powered multimodal feedback, and how do these perceptions relate to their learning outcomes?

2. Method

This research utilized a quasi-experimental mixed-methods approach to assess the efficacy of AI-driven multimodal feedback against text-only AI feedback in English as a Foreign Language writing. A mixed-methods approach was employed to quantitatively assess students' writing enhancement while concurrently investigating learners' perspectives using questionnaires and interviews.

Forty-five undergraduate EFL students (22 in the experimental group and 23 in the control group) participated in an academic writing course at Universitas Muhammadiyah Kalimantan Timur during the first semester of the 2025 academic year. All participants were first-semester students possessing intermediate English competence, aged between 18 and 22 years. Purposive sampling was employed, subsequently followed by random assignment to groups by a lottery approach.

The intervention spanned three days and comprised two writing sessions. Both groups executed similar argumentative writing assignments on common academic subjects, with a stipulated length of around 180 words. The experimental group was provided with AI-generated multimodal feedback, consisting of written comments and audio explanations produced by ChatGPT, whereas the control group received text-only feedback from the same tool. Pre-test and post-test assignments were formulated as parallel writing projects to guarantee comparability.

Three research instruments were employed. The pre-test and post-test writing activities were evaluated using an analytic scoring rubric that encompassed content, organization, vocabulary, language use, and mechanics. The rubric was modified from recognized ESL writing assessment frameworks and aligned with the course objectives. All writing examples were assessed by one trained evaluator; hence, inter-rater reliability was not determined. A student perception questionnaire including 15 Likert-scale items was administered after the session. Third, semi-structured interviews were carried out with five chosen participants via purposive sampling derived from questionnaire replies.

Quantitative data were analyzed by paired-sample t-tests to assess within-group enhancement, whilst questionnaire data were evaluated using descriptive statistics and independent-sample t-tests. Interview data were transcribed and

subjected to thematic analysis. Data triangulation was utilized to augment validity.

Ethical considerations were upheld by notifying participants of the study's objectives and methodologies, securing written informed consent, and guaranteeing voluntary participation, anonymity, and confidentiality. Participation exerted little influence on pupils' academic grades.

3. Results

Pre-Test and Post-Test Results

Both AI-driven multimodal feedback and text-only AI feedback significantly improved EFL students' writing proficiency, as demonstrated by statistically significant differences between pre-test and post-test scores in both the experimental and control groups. This section delineates the statistical study performed to investigate the degree to which AI-driven multimodal feedback enhances EFL students' writing performance in comparison to text-only AI feedback. The analysis compares pre-test and post-test outcomes from the control group, which received text-only feedback, and the experimental group, which received multimodal feedback, utilizing SPSS for evaluation.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Control_PreTest	23	12	17	14.22	1.278
Control_PostTest	23	14	19	16.87	1.290
Experiment_PreTest	22	10	17	13.55	1.845
Experiment_PostTest	22	14	18	16.14	1.246
Valid N (listwise)	22				

Table 1 displays the descriptive statistics of pre-test and post-test scores for both cohorts. The control group's mean score rose from 14.22 (SD = 1.28) to 16.87 (SD = 1.29), but the experimental group's mean score went from 13.55 (SD = 1.85) to 16.14 (SD = 1.25). The results demonstrate a general enhancement in writing performance in both groups after the intervention.

Table 2. Test of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Control_PreTest	.177	23	.058	.927	23	.092
Control_PostTest	.157	23	.145	.941	23	.192

Table 3. Test of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experiment_PreTest	.148	22	.200*	.966	22	.611
Experiment_PostTest	.180	22	.062	.917	22	.066

The Shapiro–Wilk approach for normality testing indicated that the pre-test and post-test scores for both the control and experimental groups followed a normal distribution ($p > 0.05$). Consequently, parametric statistical analyses were considered suitable.

Table 4. Paired Sample Test

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Control_PreTest - Control_PostTest	-2,652	1,335	,278	-3,230	-2,075	-9,527	22	,000

Table 5. Paired Sample Test

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Experiment_PreTest - Experiment_PostTest	-2,591	1,141	,243	-3,097	-2,085	-10,655	21	,000

Paired-sample t-tests were performed to assess intra-group enhancement from pre-test to post-test. The control group had a statistically significant enhancement in writing scores, $t(22) = -9.527$, $p < 0.001$, with a mean improvement of 2.652 points (95% CI [-3.230, -2.075]). The experimental group had a statistically significant enhancement, $t(21) = -10.655$, $p < 0.001$, with a mean increase of 2.591 points (95% CI [-3.097, -2.085]).

Table 6. Group Statistics

				Std.
				Error
Group		N	Mean	Deviation
Gain	1	23	2,78	1,085
	2	22	2,59	1,141
				,226
				,243

The group statistics indicate that both groups exhibited similar enhancement in writing performance. The control group (text-only AI feedback) achieved a mean gain score of 2.78 (SD = 1.085), whereas the experimental group (multimodal AI feedback) recorded a little lower mean gain score of 2.59 (SD = 1.141). Despite the control group exhibiting a somewhat greater average growth, the disparity between the two groups is negligible when assessed just through descriptive statistics.

Table 7. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
Gain	Equal variances assumed	,198	,659	,578	43	,566	,192	,332		-,477	,861
	Equal variances not assumed			,577	42,615	,567	,192	,332		-,478	,862

An independent samples t-test was performed to compare the gain scores of the control group, which received text-only AI feedback, with the experimental group, which received multimodal AI feedback. The findings revealed no statistically significant difference in writing enhancement between the two groups, $t(43) = 0.578$, $p = 0.566$. Despite the control group exhibiting a marginally superior mean gain score compared to the experimental group, this disparity lacked statistical significance. The data indicate that both text-only and multimodal AI

feedback were equally helpful in enhancing students' writing performance during the intervention period.

Questionnaire Results

Students predominantly regarded AI-driven multimodal feedback favorably, indicating that auditory explanations and visual indicators enhanced their comprehension of writing mistakes and feedback substance. Interview data indicated that multimodal feedback was perceived as more engaging and beneficial, especially for elucidating complicated input.

Nonetheless, these favorable perceptions did not directly translate into enhanced learning results, as students who received text-only AI feedback had marginally superior advancements in writing performance. This suggests that although multimodal feedback increased student engagement and perceived comprehension, text-only input would have been more direct and efficacious for practical revision and performance enhancement.

Table 8. Perceived Effectiveness of AI Feedback on Writing Improvement

No	Statement	Total Score (S)	Max Score (N)	Percentage
1	The AI feedback helped me understand my writing weaknesses.	140	188	74%
2	The multimodal feedback made it easier to understand my mistakes.	141	188	75%
3	The text-only feedback was clear and easy to follow.	138	188	73%
4	The AI feedback helped me improve my writing content and organization.	135	188	72%
5	I could apply the feedback effectively in revising my writing.	140	188	74%

The findings suggest that students predominantly regarded AI comments as beneficial for their writing advancement. The statement indicating that multimodal input facilitated the comprehension of mistakes received the greatest proportion (75%), implying that the integration of several feedback modalities improved clarity. Additional categories demonstrated similarly elevated percentages (72–74%), signifying that AI feedback facilitated students' comprehension of their writing deficiencies, enhanced substance and organization, and enabled efficient application of feedback during revision. These findings indicate a favorable assessment of AI feedback efficacy, with multimodal input regarded as especially beneficial in enhancing students' comprehension and revision activities.

Table 9. Usability and Engagement with AI Feedback Tools

No	Statement	Total Score (S)	Max Score (N)	Percentage
6	It was easy to use the AI writing tool during the feedback activity.	137	188	73%
7	I could easily find and understand the feedback provided by the AI.	136	188	72%
8	The multimodal feedback format was more engaging than text-only feedback.	131	188	70%
9	The interface of the AI tool was user-friendly.	142	188	76%
10	I felt more motivated to write after receiving AI feedback.	134	188	71%

The findings suggest that students regarded the AI feedback tools as predominantly functional and captivating. The user-friendly interface item received the highest percentage (76%), indicating that simplicity of navigation facilitated students' engagement with the product. Additional items demonstrated favorable replies (70–73%), suggesting that students perceived the AI tool as user-friendly, the feedback as easily accessible and comprehensible, and the multimodal format as more interesting than text-only input. The motivating factor (71%) indicates that AI comments enhanced writing motivation. These findings indicate that the usability and engagement attributes of the AI feedback tools significantly enhanced students' learning experience.

Table 10. Affective Response and Preference Toward AI Feedback

No	Statement	Total Score (S)	Max Score (N)	Percentage
11	The multimodal feedback made me more confident in my writing skills.	137	188	73%
12	The text-only feedback felt too limited for improving my writing.	138	188	73%
13	I enjoyed using AI feedback as part of the writing process.	140	188	74%
14	I prefer receiving multimodal feedback rather than text-only feedback.	137	188	73%
15	I would like to use AI feedback tools in future writing activities.	136	188	72%

The results indicate that students had favorable emotional responses and preferences regarding AI input. Significant percentages across items (72–74%) suggest that multimodal feedback enhanced students' confidence in writing, enjoyment of the writing process, and readiness to utilize AI feedback technologies in future endeavors. The preference item indicates that students preferred multimodal feedback to text-only input, while the view that text-only feedback was restrictive further supports this inclination. These results indicate that multimodal AI feedback enhances cognitive development while promoting good emotions, confidence, and enduring drive for writing.

Interview Results

Table 11. Question Number One

Questions	Theme	Feedback
Q1: How was your experience using the AI writing feedback tool?	Positive experience with AI feedback for identifying and improving writing errors	R1: Using AI-based feedback tools was helpful for me because it made it easier to find mistakes in my writing, especially errors that I didn't notice before.
		R2: Using AI was helpful in improving my grammar and vocabulary, but I still need to recheck the feedback because sometimes it doesn't fully match the context.
		R3: In my experience, AI feedback tools really helped my writing, especially in correcting grammar and sentence structure, and made my writing clearer.
		R4: Using AI-based feedback is helpful for me because it helps identify mistakes in my writing, such as punctuation, word choice, and sentence structure.
		R5: In my opinion, it is quite helpful, and the language of the

feedback provided by the AI is quite easy to understand.

The statements indicate that students found AI writing input beneficial for recognizing diverse writing faults, such as grammar, sentence structure, punctuation, and word choice, hence enhancing clarity in their writing. Students underscored the necessity of meticulously verifying the comments to ascertain its precision and contextual relevance.

Table 12. Question Number Two

Questions	Theme	Feedback
Q2: Which type of feedback (multimodal or text-only) did you find more helpful? Why?	Preference depends on task complexity	R1: I prefer text-only feedback because it is clearer and easier for me to understand, especially for grammar and writing concepts.
		R2: Text-only feedback is enough for simple questions, but multimodal feedback is more helpful for complex topics that need more explanation.
		R3: I prefer text-only feedback because it helps me directly identify grammar mistakes and improve my sentence structure more clearly.
		R4: I prefer text-only feedback for writing because it helps me check paragraph coherence and whether the language is appropriate for the reader.
		R5: Both are helpful, but multimodal feedback is easier to understand for academic questions.

According to the responses, students typically prefer text-only feedback since it is straightforward and easy to understand for fundamental writing requirements like grammar, sentence structure, and paragraph coherence. Multimodal feedback, however, is seen to be more beneficial for difficult or scholarly subjects that call for a more thorough explanation. In general, students consider both kinds to be beneficial; nevertheless, their efficacy varies according to the task's difficulty and goal.

Table 13. Question Number Three

Questions	Theme	Feedback
Q3: How did the feedback influence your motivation or confidence in writing?	Feedback as a source of motivation with awareness of dependency	R1: The feedback affects my motivation because it gives clear guidance. Knowing exactly where my mistakes are helps me improve my writing without guessing. R2: I wouldn't use AI all the time because it could make me too dependent and reduce my confidence in my own writing skills. R3: I feel motivated because the grammar corrections show me what is wrong, which encourages me to learn how to use grammar and sentence structure better. R4: This feedback motivates me because AI not only shows mistakes but also suggests better word choices, which makes me feel more confident and enthusiastic about my writing. R5: Multimodal feedback is clearer, especially with tables or numbers, and it makes writing easier and more motivating.

According to the responses, AI feedback often boosts students' confidence and motivation by offering clear instructions, grammatical corrections, and ideas for improvement that enable them to recognize errors and write with greater assurance. However, some students also voice worries about relying too much on AI, fearing that frequent use could make them less confident in their own writing abilities. This demonstrates that although AI feedback is inspiring, students are still wary of relying too much on it.

Table 14. Question Number Four

Questions	Theme	Feedback
Q4: Did you ever disagree with the AI's feedback? Can you share an example?	Concerns about AI accuracy and contextual mismatch	R1: I disagreed with AI feedback because some information it gave about a novel was different from what I found online.
		R2: Sometimes I agree with AI, but sometimes I don't because different AI tools can give different answers, which is confusing.
		R3: AI is not always accurate in fixing sentence structure, so I usually recheck the grammar myself.
		R4: I disagree with AI when it changes my words to formal ones that don't fit the context or my intended message.
		R5: Yes, sometimes the AI's answers to academic questions are unclear or don't match the context.

The statements indicate that students frequently disagreed with AI input, primarily owing to mistakes, inconsistencies among various AI tools, and recommendations that were unsuitable for the intended writing context. Consequently, pupils perceived the necessity to critically assess and verify AI comments instead of embracing it unconditionally

Table 15. Question Number Five

Questions	Theme	Feedback
Q5: Would you like to keep using AI feedback in your future writing? Why or why not?	Continued use of AI with cautious and selective reliance	R1: I will continue using AI feedback because it helps me check my writing, especially for essays and formal messages like contacting lecturers. R2: I'm neutral about using AI. I prefer using it for personal matters, but for academic work, I try not to depend on it too much. R3: I will keep using AI as a writing tool because it is helpful, but I still recheck and filter the results to avoid mistakes. R4: I will keep using AI as a writing assistant, but I won't depend on it and will always recheck the feedback. R5: Yes, because AI feedback gives a new perspective and helps my writing.

The statements suggest that the majority of students plan to persist in utilizing AI feedback as a writing aid, especially for reviewing essays and formal writing assignments. Students underscored the necessity of establishing boundaries by minimizing excessive reliance on AI and meticulously verifying comments to preserve their writing talents and self-assurance.

4. Discussion

This study enhances the body of research on AI-assisted feedback in EFL writing by contrasting text-only versus multimodal AI feedback within an identical instructional framework. Both modalities markedly enhanced students' writing proficiency, especially in grammar, sentence construction, and overall coherence (Dewi, 2022; Tambunan et al., 2022; Nazari et al., 2021), confirming the efficacy of Automated Writing Evaluation (AWE) tools as adjuncts to instructor feedback in time-limited educational settings.

A complex pattern arises when examining learners' perspectives. Although students shown greater involvement and desire for multimodal AI feedback, the text-only group attained marginally superior writing improvements. This disparity underscores that involvement does not inherently result in enhanced performance, building upon previous research that indicates favorable sentiments about AI tools without associating them with learning results (Zuhriah et al., 2024; Aruna & Sarosa, 2025).

From a cognitive processing standpoint, text-only feedback provides succinct, linear, and actionable information, hence alleviating cognitive burden during revision. Conversely, multimodal feedback necessitates the synthesis of aural, visual, and textual modalities, which can improve conceptual comprehension but may also inundate learners during task-oriented revision (Inayah & Apoko, 2024; Setiawan & Alkhowarizmi, 2025; Ebadi & Dadgar, 2024). Qualitative data corroborate this: students favored text-only feedback for grammar and coherence, whereas multimodal input facilitated difficult or abstract academic answers, illustrating task-dependent efficacy (Jürgensmeier & Skiera, 2025).

These discoveries have practical relevance. Educators ought to synchronize feedback methods with job intricacy, employing text-only for mechanical precision and multimodal for conceptual comprehension. Students can utilize the advantages of each medium, while developers and course designers must enhance multimodal feedback for engagement without overwhelming learners. Maintaining focus on AI precision, ethical application, and critical literacy is essential (Roe et al., 2023; Mogoale et al., 2025).

Ultimately, these restrictions merit attention. The duration of the intervention, sample size, learner proficiency, novelty effects, and the quality of multimodal design may have impacted the outcomes. Subsequent research ought to investigate extended interventions, varied learner demographics, and enhanced multimodal frameworks to elucidate the connection among engagement, cognitive load, and quantifiable learning outcomes. In conclusion, multimodal feedback improved engagement and perceived clarity, but text-only input facilitated quicker, more direct revisions, suggesting that the usefulness of feedback is contingent upon the specific task rather than being universally superior.

5. Conclusion

This study sought to evaluate the effectiveness of AI-driven multimodal feedback compared to text-only AI feedback in improving EFL students' writing skills and to explore students' views of various feedback modalities. The findings demonstrate that both forms of feedback significantly enhanced the quality of students' writing, supporting earlier research that highlights AI's ability to promote accuracy, efficiency, and learner autonomy in writing development (Dewi, 2022; Tambunan et al., 2022; Nazari et al., 2021).

A significant discovery is the divergence between learner views and quantifiable performance. Students indicated increased engagement, motivation, and confidence with multimodal AI input, although text-only feedback yielded slightly better enhancements in writing performance; however, this disparity was not statistically significant. This presents empirical evidence that positive perceptions of AI feedback do not inherently lead to improved short-term results, underscoring the task-dependent characteristics of feedback efficacy.

Qualitative insights elucidate this trend. Students appreciated text-only feedback for its clarity, directness, and effectiveness in addressing grammar and sentence-level concerns, but multimodal input was regarded as more beneficial for intricate explanations and conceptual comprehension. The findings suggest that multimodal feedback should be seen as an auxiliary resource, ideally utilized in situations necessitating higher-order learning, whereas text-only input is helpful for mechanical correctness.

These results yield practical ramifications. Educators have to synchronize feedback methods with task intricacy and educational goals, utilizing hybrid strategies that amalgamate both feedback sorts. Instruction for students and educators can enhance engagement and optimize the use of AI tools. Developers ought to concentrate on creating multimodal systems that harmonize richness and clarity, reducing cognitive overload while facilitating conceptual learning.

The study presents numerous limitations, including a small sample size (45 students), a short intervention duration, a singular institutional environment, restricted writing tasks, and insufficient data regarding students' prior experience with AI tools. Subsequent study must tackle these limitations via longitudinal studies, larger and more heterogeneous samples, varying proficiency levels, and various writing tasks, while also examining the quality of multimodal feedback design and cognitive load during processing.

This study illustrates that AI feedback can improve performance and engagement in EFL writing; however, its efficacy is contingent upon task requirements, learner attributes, and instructional design, highlighting the necessity for intentional incorporation of AI technologies in educational settings.

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