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Discursive and Metalinguistic Perspectives on AI-Generated Writing Feedback: A Student Perception Study

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ABSTRACT

This study aims to describe students' perceptions of the role of Grammarly and QuillBot as artificial intelligence (AI)-based tools for providing feedback in writing instruction. Employing a qualitative descriptive approach, the research was conducted at three senior high schools in Lhoksumawe, Indonesia, with 12 purposively selected respondents based on their prior experience using both applications. Data were collected through semi-structured interviews lasting 30 - 45 minutes, analyzed using thematic analysis, and validated through data triangulation and member checking. The findings indicate that the majority of students perceived Grammarly as effective in detecting grammatical, spelling, and punctuation errors, with its explanatory features aiding their understanding of error patterns. QuillBot was regarded as superior in paraphrasing, enriching linguistic variation, and reducing plagiarism risks. Both tools accelerated the revision process, enhanced confidence, and improved language accuracy. However, identified challenges included limitations of free features, potential meaning distortions in paraphrasing, cultural-context mismatches, and risks of overreliance. The findings underscore the importance of a "human-in-the-loop" model that integrates AI's speed and consistency with teacher validation and contextual assessment. This blended feedback strategy holds potential for improving writing quality while fostering students' critical thinking and self-evaluation skills. The study recommends AI literacy training, restricted use in final revision stages, and classroom discussions based on AI-generated corrections to promote more reflective and effective writing instruction.

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1. Introduction

The advancement of artificial intelligence (AI) in education has opened new opportunities to enhance learning quality. AI integration in education can improve teachers' comprehension and stimulate student engagement, equipping them with future-ready skills

through collaborative interaction with AI technology (Hajar et al., 2025). Specifically, in the domain of writing, AI has demonstrated a significant impact. It supports academic writing by generating ideas, refining grammar, suggesting lexical improvements, organizing content, summarizing research papers, ensuring proper citations, detecting plagiarism, and enhancing clarity and coherence in writing style. ChatGPT, for instance, has garnered considerable attention since its launch in late 2022 due to its potential to transform—and even disrupt writing pedagogy (Barrot, 2023).

One increasingly prominent role of AI is its ability to provide automated feedback on students' writing. Such feedback encompasses not only linguistic aspects, such as grammar and spelling, but also structural coherence, argumentative depth, and overall composition. The use of AI as a feedback tool in writing has been supported by prior research. When employed as structured feedback interventions, AI-generated content systems can significantly enhance undergraduate students' critical writing skills (Zhang, 2025).

However, the effectiveness of AI also hinges on user perceptions and acceptance, particularly among students who may perceive machine-generated feedback as lacking human nuance. While AI can deliver instant corrections, students often value feedback that incorporates empathy and sociocultural context—an area where AI systems still face challenges. This aligns with Gerlich's, 2023) assertion that public consensus portrays AI as either a boon or a bane for humanity, contingent upon factors such as trust, breadth of application, and perceived vulnerabilities. Similarly, Jiang et al., (2024) found that while users appreciate AI's accuracy and reliability, they express concerns about its lack of emotional engagement and uniqueness.

Thus, despite AI's promise of efficiency and personalization, students' perceptions of AI-generated feedback warrant deeper investigation, particularly within the Indonesian educational context. This study seeks to address this gap by exploring how students in Indonesia specifically at three senior high schools in Lhoksumawe, Aceh perceive the role of AI in their writing development.

Additionally, the local context of Aceh presents a compelling case due to the scarcity of similar studies in the region. Most research on AI in education has concentrated on major urban centers, while areas like Aceh remain underrepresented. Given that AI tools are predominantly developed for urban and conventional teaching environments, there is an inherent bias regarding their applicability across diverse settings (Castro et al., 2025). Yet, cultural factors, technological accessibility, and institutional policies may significantly shape students' perceptions of AI. Consequently, this study not only contributes empirical insights but also enriches the understanding of how student perceptions vary across geographical and sociocultural contexts.

This study introduces novelty by integrating technological and pedagogical perspectives within Indonesia's secondary education framework. To date, research on AI in education has predominantly focused on higher education (Zawacki-Richter et al., 2019), while its implementation in secondary schools remains underexplored (Ng et al., 2024). Furthermore, this study adopts a student-centered perspective, prioritizing the voices of end-users who are

often overlooked in AI tool development. By examining their perceptions, educators and developers can design more user-friendly and pedagogically effective systems.

The study holds both practical and theoretical significance. Practically, its findings can guide teachers and schools in considering AI integration into writing curricula. If students respond positively, AI may serve as an effective supplementary tool; conversely, if resistance is observed, educators can devise strategies to enhance technological acceptance. Theoretically, the study expands the literature on technology acceptance in education, particularly in Indonesia. It also lays the groundwork for future research on developing AI systems that are more adaptive to the needs of students across diverse cultural backgrounds.

Thus, this study is not only academically relevant but also carries tangible implications for technology-driven educational development in Indonesia. Through a qualitative approach, it aims to provide an in-depth understanding of how students at three senior high schools in Lhoksumawe perceive AI's role in their writing process, as well as the factors influencing these perceptions.

2. Literature Review

Automated Feedback in Writing Instruction

Over the past two decades, research on automated writing evaluation (AWE) and AI-driven feedback tools has evolved from a focus on mechanical corrections (e.g., grammar and spelling) to capabilities that also target higher-order thinking aspects such as coherence, argument organization, and content development. Recent meta-analyses and systematic reviews indicate that automated feedback interventions yield moderate effects on writing skill improvement, though study heterogeneity suggests that not all implementations are equally effective and that pedagogical context and feedback design significantly influence learning outcomes (Fleckenstein et al., 2023). These findings confirm that automated feedback can serve as a valuable formative support tool, yet its optimal benefits depend on pedagogical integration and alignment with human teaching practices.

The advancement of generative AI models has expanded the scope of AWE, enabling not only error detection but also constructive suggestions for argument structure, evidence evaluation, and academic writing style modeling. Some studies even report no significant differences in learning outcomes between generative AI feedback and human instructor feedback for certain metrics, while others highlight AI's superiority in structural and organizational aspects (Escalante et al., 2023; Zhang, 2025). However, cross-study consistency remains limited due to variations in assessment instruments, writing task types, intervention duration, and differences in prompt design and model parameters.

Student Perceptions of AI Feedback

Studies on student perceptions reveal that attitudes toward AI feedback are multidimensional: learners evaluate aspects such as usefulness, ease of use, trustworthiness, specificity, and motivational impact (e.g., perceived support or encouragement). The Technology Acceptance Model (TAM) remains relevant in

understanding adoption intentions and engagement levels. Research indicates that perceived usefulness is the primary predictor of AI feedback tool adoption, whereas ease of use often exerts indirect influence through perceived usefulness (Zhang, 2025). Additionally, the literature underscores the role of feedback literacy students with strong metacognitive skills and evaluative abilities tend to utilize AI feedback more productively, whereas those with limited feedback literacy may accept AI suggestions passively or uncritically.

Contextual factors such as age, education level, and task type also moderate perceptions. Middle school studies suggest that classroom climate, instructional implementation, and teacher support influence how students perceive AWE; for instance, scaled implementation and instructor guidance correlate with more positive system evaluations (Wilson et al., 2024). Qualitative studies complement these findings, revealing that students value concrete, timely, and actionable feedback, while expressing concerns about motivational aspects (e.g., impersonal tone) and accuracy in nuanced areas (e.g., argument depth or evidence relevance). These insights support the view that learner preferences are not dichotomous many favor a blended approach that combines AI's speed and precision with the humanistic touch of instructor feedback (Escalante et al., 2023; Wilson et al., 2024).

Learning Mechanisms and Pedagogical Implications

From a cognitive perspective, AI feedback enhances writing processes by enabling rapid, granular, and iterative feedback cycles unconstrained by instructor capacity. Recent experimental studies demonstrate that when AI feedback targets organization and content development (beyond mere grammar), writing performance can improve within a relatively short timeframe (Zhang, 2025). These results suggest that feedback prompting planning, critical thinking, and structured revision is more effective for enhancing writing quality. However, meta-analyses caution against viewing AI as a standalone solution, given high outcome variability and the necessity of instructional adaptation (Fleckenstein et al., 2023).

The literature offers several practical principles for the effective implementation of AI feedback tools in writing instruction. First, it is essential to clearly define AI's role within the learning process, positioning it as a supplementary tutor that supports rather than replaces human instructors. Second, developing students' feedback literacy is crucial to enable them to critically evaluate and meaningfully integrate AI-generated suggestions into their revision processes. Third, maintaining active instructor involvement remains vital, particularly for addressing motivational needs and substantive aspects of writing that AI may not fully capture. Finally, ongoing assessment of AI-generated feedback quality should be institutionalized to ensure its pedagogical value (Escalante et al., 2023; Fleckenstein et al., 2023).

This hybrid pedagogical model, which combines AI capabilities with human expertise, is supported by empirical evidence demonstrating that AI functions most effectively as an instructional partner that enhances - rather than supplants - human feedback capacity. The

approach acknowledges both the technological advantages of AI and the irreplaceable value of human judgment in fostering comprehensive writing development.

3. Method

This study employed a qualitative descriptive approach to explore students' perceptions regarding the role of artificial intelligence specifically Grammarly and QuillBot—in providing writing feedback. The research was conducted at three senior high schools in Lhoksumawe, Aceh, with 12 purposively selected student participants based on their familiarity with both tools. This purposive sampling approach allowed for an in-depth exploration of students' experiences and interpretations of AI-generated feedback, aligning with qualitative research principles that emphasize contextual understanding and individual perspectives (Creswell & Poth, 2018).

Data were collected through semi-structured interviews, designed to allow participants to openly share their experiences while maintaining focus on the central theme: their perceptions of Grammarly and QuillBot as AI-powered writing feedback tools. Semi-structured interviews were chosen for their flexibility in thematic exploration and their ability to elicit detailed and spontaneous responses (Kvale & Brinkmann, 2009). Interview questions centered on participants' evaluations of the completeness, clarity, and relevance of the feedback provided by both tools, as well as the extent to which this feedback helped improve their writing quality. To ensure participant comfort and avoid disrupting school schedules, interviews were conducted face-to-face outside school premises and outside class hours. Each interview lasted 30–45 minutes, was audio-recorded with consent, and later transcribed verbatim for analysis.

Data analysis followed the thematic analysis procedures outlined by Miles et al., (2018) which included 1) Data condensation through selection, simplification, and extraction of key insights, 2) Data presentation in narrative and thematic formats, 3) Conclusion drawing and verification of students' perceptions regarding AI feedback. Thematic analysis enabled the identification of recurring patterns in participants' perceptions, including ease of use, benefits in grammar and style improvement, and challenges such as limitations of free versions and contextual accuracy issues (Setiawan & Alkhowarizmi, 2025).

To enhance research validity, internal triangulation was applied by cross-verifying findings across participants, and member checking was conducted with selected respondents to ensure that the researcher's interpretations aligned with the participants' intended meanings (Creswell & Poth, 2018). Findings were then contextualized within recent literature on student perceptions of AI-powered feedback tools, such as studies highlighting Grammarly's superiority in grammar correction and QuillBot's effectiveness in paraphrasing, though both tools exhibit limitations when relied upon exclusively (Setiawan & Alkhowarizmi, 2025). Additionally, prior research in the Indonesian educational context indicates that while Grammarly effectively boosts writing confidence, its free version has notable constraints (Fitria, 2021).

4. Result and Discussion

Thematic analysis of semi-structured interviews revealed that the majority of respondents viewed Grammarly and QuillBot as effective tools for improving their writing quality. Eleven out of twelve students reported that Grammarly helped them identify previously overlooked grammatical and spelling errors, while ten students found QuillBot beneficial for enriching linguistic variation through alternative phrasing. These findings align with Zhao's (2025) study, which demonstrated that AI-enhanced tools significantly improve language precision by facilitating grammar checking, vocabulary enhancement, and sentence structure refinement.

Participants also highlighted the efficiency of both tools in streamlining the revision process, as feedback could be obtained instantaneously. This result is consistent with Edelblut's (2020) findings on the positive impact of machine-generated feedback in enhancing student writing outcomes. However, some students emphasized that while AI provides useful suggestions, the role of instructors remains critical for academic justification and ensuring contextual appropriateness.

The Role of AI in Writing Feedback

Interview data indicated that Grammarly was perceived as particularly effective in detecting mechanical errors, such as grammar, punctuation, and spelling. Students noted that visual notifications (e.g., red or green underlines) heightened their awareness of errors and prompted immediate corrections. This supports Assalahi's (2025) findings, which showed that Grammarly's feedback integration significantly improved writing accuracy and fostered positive attitudes toward its autonomy-enhancing features.

Additionally, several respondents appreciated Grammarly's explanatory feature, which not only identifies errors but also provides rationales for corrections, thereby helping them recognize recurring mistakes. This aligns with Zinkevich and Ledeneva's (2021) framework, which categorizes Grammarly's feedback into five quantitative dimensions: correctness, clarity, delivery, engagement, and style.

However, criticisms emerged regarding Grammarly's rigidity in stylistic suggestions, particularly in creative or argumentative writing contexts. Some students also noted that Grammarly's utility was limited for intermediate learners, with advanced students benefiting more significantly. These observations reinforce Zinkevich and Ledeneva's (2021) conclusion that while Grammarly cannot autonomously think or write, it aids learners in identifying and tracking writing issues, particularly for advanced users.

In contrast, QuillBot was praised for its ability to restructure sentences and paragraphs to sound more natural and varied. Ten students reported using QuillBot primarily for paraphrasing academic texts to avoid plagiarism. This finding corroborates Fitria's (2022) study, which highlighted QuillBot's capacity to alter word order, employ synonyms, modify voice, and segment information—features that enhance paraphrasing efficiency. Thohir et al., (2024) similarly, reported strong student approval of QuillBot's instant, user-friendly interface for improving literacy skills.

Nevertheless, concerns were raised about QuillBot's occasional semantic distortions and inappropriate vocabulary choices, particularly in complex or culturally nuanced texts. These limitations echo Campo-Ruiz (2025), who found that generative AI systems present a limited picture of the cultural setting, emphasizing a sense of cultural context that is curated, shown, and commercialized. Kacena et al. (2024) further noted that while AI reduces drafting time, it necessitates rigorous fact-checking.

Challenges and Limitations

Beyond dependency risks, students identified accessibility barriers, with eight respondents noting that advanced features (e.g., style suggestions or premium paraphrasing modes) were restricted to paid users. This aligns with Setiawan and Alkhowarizmi's (2025) identification of premium feature limitations as a key constraint in AI tool adoption.

Contextual mismatches also emerged as a challenge. Some students observed that AI recommendations occasionally conflicted with Indonesian linguistic norms or assignment-specific requirements. Cultural identity influences how people use AI to form their identities in connection to others, as well as the impact of AI on crucial decision-making processes (Barnes et al., 2024). Cultural values significantly influence individuals' learning processes, and AI that mimics their decision-making patterns can also reflect these values (Lee & Joshi, 2020). As a result, AI should not be employed alone, but in conjunction with human intelligence. This is consistent with the recommendations of Holmes et al., (2019) who emphasize that AI tools should be integrated into pedagogy as scaffolding mechanisms rather than alternatives for human learning. Steiss et al., (2024) further demonstrated that human raters consistently outperform AI in delivering high-quality, context-sensitive feedback.

Despite AI's benefits, all students agreed that instructors remain irreplaceable in validating AI suggestions, explaining revisions, and providing personalized guidance. This supports Zhang's (2025) advocacy for a "human-in-the-loop" model, where teachers and AI collaborate to deliver comprehensive, contextually grounded feedback.

To optimize AI integration in writing instruction, a blended feedback strategy is recommended, which strategically combines the speed and consistency of AI tools with the contextual sensitivity and pedagogical expertise of instructors. This hybrid approach ensures that students benefit from technological efficiency while maintaining the depth and nuance of human-guided learning. Key recommendations for effective implementation include AI literacy training to develop students' ability to critically evaluate AI-generated suggestions, restricted AI use (such as limiting its application to final revision stages) to encourage the development of independent writing skills, and structured classroom discussions that analyze AI corrections to deepen students' understanding and practical application of feedback. This comprehensive framework not only enhances writing outcomes but also fosters critical thinking and self-regulated learning, ensuring that AI serves as a supportive tool rather than a replacement for traditional pedagogical methods.

This strategy resonates with Granjeiro's et al., (2025) emphasis on human oversight to uphold academic integrity and Nguyen's et al., 2024) proposal for human-AI collaboration

in higher education. With careful implementation, Grammarly and QuillBot can serve as pedagogical partners, supporting effective, creative, and reflective writing development.

5. Conclusion and Recommendations

This study concludes that the use of Grammarly and QuillBot contributes significantly to improving students' writing quality at three senior high schools in Lhoksumawe, particularly in aspects of grammatical accuracy, spelling, and linguistic variation. Most students reported that both tools expedited the revision process and enhanced their writing confidence. Grammarly excelled in detecting and explaining mechanical errors, while QuillBot played a more prominent role in enriching paraphrasing and sentence variation.

However, the findings also reveal several challenges, including limitations of free features, potential meaning distortions in paraphrasing, and the risk of overreliance, which may hinder the development of self-evaluation skills. Additionally, contextual mismatches were observed, where AI-generated recommendations did not always align with cultural nuances or assignment-specific requirements. Consequently, the role of teachers remains indispensable in providing validation, contextual adjustments, and conceptual reinforcement elements that AI cannot fully replicate.

The study underscores the importance of adopting a "human-in-the-loop" model in AI-assisted writing instruction. Integrating AI with teacher guidance creates a balanced feedback ecosystem, where AI's speed, consistency, and analytical capacity complement instructors' pedagogical sensitivity and cultural awareness. This blended feedback approach has the potential not only to enhance writing quality but also to foster critical thinking and writing autonomy among students. Furthermore, schools should consider providing access to premium features or conducting training sessions to optimize students' use of AI writing tools effectively and responsibly.

For future research, this study opens opportunities for comparative studies involving larger and more diverse samples, including participants from different regions and educational levels, to obtain a more comprehensive understanding of Grammarly and QuillBot's effectiveness. Subsequent research could also explore the long-term impact of AI usage on writing skills, particularly concerning personal style development, originality, and critical writing awareness. Additionally, further investigation is needed into how AI algorithms can be adapted to align with users' linguistic and cultural characteristics, ensuring that feedback becomes more contextually relevant. By doing so, AI integration in writing instruction will not merely serve as a technological solution but will evolve into a sustainable pedagogical strategy aimed at fostering holistic literacy development.

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