Harnessing Systemic Functional Linguistics (SFL) for AI-Generated Feedback on ESL Writing: A Corpus-Based Study

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Abstract

This study explores the alignment of AI-generated feedback with Systemic Functional Linguistics (SFL) principles in English as a Second Language (ESL) writing. The research investigates how AI tools, particularly those providing corrective feedback, adhere to SFL's three metafunctions, Ideational, Interpersonal, and Textual, when offering feedback to ESL learners. The data for this study is sourced from the International Corpus Network of Asian Learners of English (ICNALE), which provides a diverse collection of ESL student essays on various topics. Employing a corpus-based research design, the study categorizes and analyzes AI feedback based on the SFL framework. It examines how AI-generated feedback enhances content clarity and precision (Ideational), improves tone and reader engagement (Interpersonal), and strengthens the structure and coherence of ideas (Textual). The findings indicate that most AI-generated feedback emphasizes grammatical accuracy, vocabulary, and content representation (60%), followed by tone and engagement (25%) and structural organization (15%). The study concludes that AI feedback, when aligned with SFL principles, significantly aids ESL learners in refining their writing. However, the research also identifies key areas for improvement, particularly in personalizing feedback and enhancing cohesion tools to ensure more contextually relevant corrections. The implications of this study suggest that AI tools designed with SFL principles can enhance ESL writing instruction by fostering more coherent, engaging, and accurate written communication. The corpus-based approach utilizing ICNALE data provides a comprehensive understanding of how AI feedback aligns with SFL, highlighting its effectiveness and limitations in supporting ESL learners.

***Keywords**:* AI- feedback, Systemic Functional Linguistics, ESL writing, corrective feedback, Corpus-based generated research

Introduction

English as a Second Language (ESL) learners often face significant challenges in developing writing skills crucial for academic success. Writing in a second language necessitates grammatical accuracy and the ability to effectively convey ideas, engage the audience, and present coherent arguments (Hyland, 2003). Traditional feedback methods, such as teacher comments and peer reviews, have long supported students in enhancing their writing. However, advancements in Artificial Intelligence (AI) tools have created new opportunities for providing more personalized and efficient feedback. Among these tools, ChatGPT has gained attention for its potential to assist ESL learners by offering AI-generated corrective feedback (Zhu et al., 2024). While AI feedback is increasingly acknowledged for its efficiency and accessibility, questions persist regarding its effectiveness in supporting key aspects of writing, such as grammar, tone, coherence, and vocabulary precision, beyond mere surface-level corrections.

Systemic Functional Linguistics (SFL) is widely regarded as a practical framework for improving writing instruction by highlighting the functional aspects of language in social and academic contexts (Halliday & Matthiessen, 2013). Research indicates that SFL-based feedback allows ESL learners to perceive writing as a meaning-making process, aiding them in articulating their ideas more clearly and engaging with academic genres (Zhang & Yu, 2022). SFL's theoretical framework emphasizes three metafunctions: Ideational, which pertains to content representation and meaning construction; Interpersonal, which involves writer-reader interaction and engagement; and Textual, which guarantees coherence and logical organization. Recently, researchers have investigated the integration of AI tools with SFL principles to enhance these writing facets (Gayed et al., 2022; Wang, 2024).

Despite these developments, research on AI-generated feedback in ESL writing remains limited, especially regarding its alignment with SFL principles. Although previous studies have explored AI's role in language learning (Escalante, Pack, & Barrett, 2023; Shadiev & Feng, 2024), few have specifically examined how AI-generated feedback supports all three metafunctions of SFL as a whole. Additionally, while AI tools are widely used in writing instruction, their effectiveness in addressing writing challenges beyond grammar and vocabulary, such as tone, engagement, and textual cohesion, remains largely unexplored. These gaps

underscore the necessity for further research on AI-generated feedback within the SFL framework.

This study aims to bridge the gap by evaluating how AI-generated feedback aligns with SFL principles and enhances ESL learners' writing skills. Specifically, it examines the impact of AI feedback on grammar, vocabulary, coherence, and tone while exploring its potential to reduce writing anxiety. By integrating SFL's three metafunctions into AI feedback systems, this study contributes to the growing body of research on AI in language learning, offering insights into optimizing AI tools to help ESL learners produce more explicit, more structured, and more meaningful written texts.

Statement of the Problem

The rapid integration of artificial intelligence (AI) tools into language education has transformed feedback delivery for ESL learners. AI-powered tools offer automated corrections and suggestions, yet their alignment with established linguistic frameworks, such as Systemic Functional Linguistics (SFL), remains underexplored. SFL emphasizes language's functional and contextual dimensions through three metafunctions: Ideational, Interpersonal, and Textual, which are critical for effective communication. However, limited research has examined whether AI-generated feedback meaningfully supports these metafunctions. This study uses a corpus-based approach to evaluate AI-generated feedback on essays from the International Corpus Network of Asian Learners of English (ICNALE), investigating its alignment with SFL principles. This research seeks to enhance the understanding of how AI tools address linguistic functions in ESL writing and propose ways to improve AI-driven feedback systems based on the SFL principles framework.

Research Objectives

- To analyze and categorize AI-generated feedback provided to ESL learners based on the three metafunctions of Systemic Functional Linguistics (SFL).
- To assess how AI-generated feedback aligns with SFL principles in addressing grammar, vocabulary, tone, and coherence.
- To propose actionable recommendations for enhancing AI-generated feedback systems by aligning them more closely with SFL principles.

Research Questions

1. How is AI-generated feedback for ESL learners categorized according to the three metafunctions of Systemic Functional Linguistics (SFL)?
2. How does AI-generated feedback align with SFL principles in addressing grammar, vocabulary, tone, and coherence?
3. What recommendations can be made to improve AI-generated feedback systems for better alignment with SFL principles?

Literature Review

Systemic Functional Linguistics (SFL), developed by M.A.K. Halliday, is a theory of language that views it as a social semiotic system, emphasizing its role in meaning-making within specific social and cultural contexts (Halliday & Matthiessen, 2013). Incorporating SFL into English as a Second Language (ESL) instruction has garnered significant attention, particularly regarding feedback mechanisms that enhance students' writing skills. This review analyzes the literature on SFL in writing instruction, especially in AI-assisted environments, and connects findings to current research on AI-generated feedback in ESL writing. The primary aim is to investigate the effectiveness, challenges, and potential of SFL-based approaches in improving writing quality, particularly in the context of AI feedback systems and corpus methodologies in ESL instruction.

SFL and ESL Writing Instruction

Systemic Functional Linguistics (SFL) has been widely recognized as a robust framework for enhancing writing skills in ESL contexts. Darong (2024) provides a comprehensive review of the pedagogical applications of SFL, mainly focusing on its role in improving teaching techniques and providing corrective feedback. His review synthesizes findings from peer-reviewed research conducted over the past 15 years, highlighting that integrating SFL enhances instructional design, facilitates meaningful feedback, and supports ESL learners in achieving their language acquisition goals. These findings align with the present study, which explores how AI-generated feedback, informed by SFL principles, improves students' grammar, vocabulary, and overall writing clarity. By emphasizing language as a

meaning-making system, SFL aids learners in expressing ideas more accurately and developing stronger academic writing skills.

Similarly, Zhang and Yu (2022) explored the effects of SFL-based teaching and feedback on ESL learners. They assessed the effectiveness of SFL-based training in enabling L2 learners to evaluate writing beyond just grammatical accuracy. Their study revealed that students gradually shifted their focus from structural correctness to evaluating how well their writing conveyed meaning, using SFL knowledge to enhance content and rhetorical effectiveness. This aligns with the current research, which shows that AI-generated feedback, guided by SFL principles, improves grammatical accuracy and boosts coherence and textual clarity.

The importance of SFL-based feedback in fostering meaning-making in language learning is further supported by Herman et al. (2024), who analyzed the effectiveness of SFL in improving ESL learners' writing abilities. The findings indicate that SFL-based instruction leads to higher-quality writing and greater student engagement as learners gain a deeper understanding of how to apply grammar and linguistic concepts in writing. However, the study also highlighted that lower-proficiency students faced difficulties fully internalizing and applying SFL principles, a challenge also observed in the current research. While AI-generated feedback based on SFL supports grammar and organizational skills, it also offers a personalized approach that may address some of these difficulties, providing targeted, adaptive feedback to accommodate varying proficiency levels.

Additionally, Hyland (2003) introduced genre-based pedagogy, emphasizing that writing is a social activity shaped by context and purpose. This perspective aligns with SFL's interpersonal metafunction, which focuses on the interaction between the writer and reader. Hyland's research supports the current study's findings, as AI-generated feedback not only enhances linguistic accuracy but also helps ESL learners adapt their writing to meet the expectations of specific academic genres, improving reader engagement and overall writing effectiveness.

AI-Generated Feedback in Writing Instruction

The integration of AI tools in corrective feedback for writing instruction has received significant attention in recent studies. Gayed et al. (2022) introduced the AI KAKU application, designed to reduce cognitive load by assisting ESL learners with lower-level writing tasks, such as word production, while allowing them to focus on higher-order writing tasks like organization and revision. Their findings indicated that AI KAKU was particularly effective for ESL learners requiring structured assistance. This aligns with the present study, where AI-generated feedback helped students address language errors and enhance clarity, enabling them to focus on refining their writing structure and content.

Recent research highlights the growing role of ChatGPT and other AI-driven tools in enhancing writing outcomes. Zhu et al. (2024) compared ChatGPT-generated feedback with teacher-provided feedback on college English compositions, concluding that ChatGPT excelled in grammar correction, punctuation revision, vocabulary replacement, and style adjustments. These findings emphasize ChatGPT's ability to provide detailed, automated feedback in typically time-consuming areas for human teachers. This aligns with the present study, where AI-generated feedback significantly improved students' grammar, vocabulary, and writing style.

Similarly, Cao and Zhong (2023) explored the effectiveness of ChatGPT-based feedback versus traditional teacher feedback and self-feedback within a translation context. While teacher and self-feedback yielded higher-quality translations, ChatGPT-based feedback enhanced lexical cohesion and referential accuracy. These findings align with this study, where AI feedback successfully improved vocabulary, cohesion, and clarity, supporting SFL's ideational metafunction by enabling precise expression of ideas. The study indicates that AI-generated feedback can complement traditional feedback methods and is particularly beneficial for refining lexical choices and sustaining referential accuracy.

Wang (2024) examined the effect of AI-generated feedback using the Poe application, concentrating on writing accuracy, fluency, and levels of writing anxiety. The results showed that AI feedback enhanced writing quality and alleviated writing-related anxiety among students. This is consistent with the current study, in which AI-generated feedback fostered a non-

judgmental, structured revision process that assisted ESL learners in overcoming emotional barriers that frequently impede writing performance.

Further research by Escalante et al. (2023) examined ChatGPT-generated feedback in English as a New Language (ENL) instruction through two longitudinal studies. Their first study found no significant difference in learning outcomes between students receiving AI-generated and teacher feedback. However, their second study revealed that students were evenly split in their preferences for AI versus human feedback, with both feedback types offering distinct advantages. Their findings support a blended feedback approach, aligning with the present study's conclusions that AI-generated feedback can complement traditional methods in enhancing writing instruction and student engagement.

While AI feedback tools show substantial promise, several studies highlight challenges and areas for improvement. Shadiev and Feng (2024) reviewed 82 studies on Automated Corrective Feedback (ACF) tools, revealing mixed results regarding accuracy and effectiveness. Their review underscores the need for more advanced AI feedback systems capable of addressing cohesion and coherence issues in writing. This aligns with the present study, where AI-generated feedback improved paragraph structuring and transition clarity but required further refinement.

Additionally, Ziqi et al. (2024) investigated why students ignored or rejected AI-generated feedback, identifying issues such as irrelevant suggestions, lack of clarity, and too general feedback. The present study observed similar concerns, as some students found AI-generated feedback insufficiently specific or lacking contextual relevance. These findings highlight the need for AI feedback systems to provide more contextually relevant and actionable recommendations that better engage students and support meaningful writing improvements.

Evmenova, Regan, Mergen, and Hrisseh (2024) examined the effectiveness of generative AI in providing feedback to students with disabilities and diverse learning needs. Their study found that while AI-generated feedback aligned with particular teacher-identified instructional needs, it failed to account for the full spectrum of individual student characteristics. This highlights the importance of personalized AI-generated feedback, particularly in addressing ESL learners' diverse learning styles and proficiency levels. Similarly, the present study found that AI-generated feedback was beneficial but also emphasized the need for greater adaptability and

customization, ensuring that feedback meets the needs of learners with varying levels of proficiency and writing challenges.

Corpus-Based Approaches in ESL Writing

Corpus-based approaches have demonstrated significant potential in enhancing ESL writing instruction. Lee (2024) discusses developing and implementing a locally-sourced corpus, the Corpus of Ohio Learner and Teacher English (COLTE), designed to address specific instructional needs in ESL writing programs. His study highlights the importance of corpus-based methods in evaluating writing quality and refining pedagogical strategies. This approach is directly relevant to the present study, as corpus-based analysis plays a central role in examining student writing and AI-generated feedback. Like Lee's research, the current study employs corpus methodology to assess the effectiveness of AI-generated feedback in improving students' writing accuracy, clarity, and coherence.

The literature reviewed underscores the significant potential of AI-generated feedback, particularly when integrated with Systemic Functional Linguistics (SFL), in enhancing ESL learners' writing skills. Research has shown that AI-generated feedback improves grammar, vocabulary, coherence, and engagement while reducing writing anxiety. However, challenges remain in refining AI feedback systems to ensure they are more personalized, context-specific, and responsive to learners' diverse needs.

The findings reviewed in this study emphasize the need for advancements in AI feedback tools to offer more adaptive, actionable, and contextually relevant guidance. Future research should prioritize customizing AI feedback, improving cohesion mechanisms, and enhancing AI's capability to navigate the complexities of academic writing. Although AI feedback has shown considerable promise, further refinement is necessary to fully align AI-generated corrections with ESL learners' linguistic and cognitive processes. Integrating AI-driven feedback with SFL principles provides a promising path for enhancing writing instruction. Nevertheless, ongoing development is crucial to optimize the effectiveness of AI feedback systems, ensuring they are as precise, adaptable, and pedagogically sound as possible in supporting ESL learners' writing development.

Research Methodology

Research Design

This study uses a qualitative, corpus-based research design to analyze the alignment of AI-generated feedback with Systemic Functional Linguistics (SFL) principles. The research builds on existing SFL frameworks, integrating insights from Halliday and Matthiessen (2013) and expanding on more recent pedagogical applications, including those proposed by Darong (2024). By systematically categorizing and evaluating feedback based on SFL's three metafunctions—ideational, Interpersonal, and Textual—the study comprehensively analyzes how AI-generated feedback functions in ESL writing instruction.

To enhance the validity of this research, multiple AI tools, namely Perplexity.ai and GPT-4, were selected to generate feedback and ensure diverse perspectives on AI-assisted writing evaluation. Additionally, inter-coder reliability measures were implemented to strengthen the reliability of categorization and interpretation, minimizing subjective bias in analyzing AI feedback.

Theoretical Framework

Developed by M.A.K. Halliday (Halliday & Matthiessen, 2013), Systemic Functional Linguistics (SFL) provides a robust framework for analyzing language as a social semiotic system. SFL posits that meaning is constructed through a combination of language structures and context, which must be considered when evaluating feedback strategies. Halliday's seminal work introduces the three metafunctions of language: ideational, Interpersonal, and Textual, which serve as the foundation for assessing the effectiveness of AI-generated feedback in this study.

While Darong (2024) expands on Halliday's theoretical insights, particularly on pedagogical applications of SFL in corrective feedback, this study also considers a broader range of research to ensure a more comprehensive theoretical grounding. Integrating multiple perspectives strengthens the study's theoretical foundation, providing a nuanced analysis of how AI feedback aligns with SFL and contributes to ESL writing development.

The research investigates explicitly how AI feedback adheres to the Ideational metafunction (content accuracy and clarity), the Interpersonal metafunction (reader engagement and tone), and the Textual metafunction (coherence and structure). By evaluating feedback through these lenses, the study aims to offer insights into the functional impact of AI-generated corrections on ESL learners' writing skills.

Key SFL Postulates Applied to the Study

- **Language as a Social Semiotic System**

  SFL suggests that language is a tool for generating meaning within particular social and cultural contexts.

  Application: The study assesses how AI feedback aids learners in constructing meaning in their writing by focusing on grammatical and lexical choices (ideational metafunction), tone and register (interpersonal metafunction), and organizational coherence (textual metafunction).

- **Three Metafunctions of Language**

  a) *Ideational Metafunction:* This function conveys ideas, experiences, and information. The research organizes feedback related to grammar, vocabulary, and semantic clarity.

  b) *Interpersonal Metafunction:* This metafunction deals with establishing relationships, tone, and engagement. Feedback related to tone, register, and modality is analyzed under this metafunction.

  c) *Textual Metafunction:* Ensures coherence and cohesion in text organization. Feedback on paragraph structure, transitions, and logical flow is categorized here.

- **Corrective Feedback as a Functional Tool**

  SFL emphasizes the importance of feedback in improving learners' comprehension of language structures and their practical use.

  Application: This study evaluates if AI feedback aligns with SFL's aim of delivering context-aware, meaningful, and actionable feedback.

- **Feedback for Language Development**

  Darong's research highlights the pedagogical benefits of SFL in feedback strategies that support learning objectives and enhance linguistic competence.

  Application: The study explores how feedback aids ESL learners in enhancing their writing through specific corrections and suggestions that align with SFL principles.

Integration into the Research Design

- **Corpus-Based Approach**

  Essays from the ICNALE corpus serve as the dataset, offering real-world examples of ESL learner writing. AI-generated feedback is analyzed through a metafunctional lens to assess its effectiveness in aligning with SFL's principles.

- **Categorization of Feedback**

  Feedback is systematically classified into ideational, interpersonal, and textual metafunctions, reflecting SFL's focus on meaning, interaction, and coherence in language.

- **Thematic Analysis**

  Braun and Clarke (2006) outline a thematic analysis that identifies patterns in this study to examine how feedback aligns with or deviates from SFL principles, providing insights into the functional relevance of AI-generated corrections and suggestions.

Data Collection

Corpus Selection

The data for this study is drawn from the International Corpus Network of Asian Learners of English (ICNALE). This widely recognized dataset provides ESL student essays across various proficiency levels and topics. Essays were selected from B1-1 and B1-2 proficiency levels, ensuring a representative sample of intermediate ESL learners while maintaining consistency in writing complexity. To enhance generalizability, future studies could explore AI-generated feedback across a broader range of proficiency levels (A2, B2, C1). However, the current focus on B1-level learners is justified by their transitional stage between basic and

advanced writing competencies, making them an ideal group for assessing AI feedback's instructional potential.

- **Sample Size**

  A total of 40 essays are analyzed, with 20 essays chosen from each proficiency level.

- **AI Feedback**

  The essays are processed through Perplexity.ai and GPT-4, generating feedback that is subsequently categorized and analyzed.

Table 1

Overview of Corpus Data Used in the Study

Corpus Name	Proficiency Levels	Number of Essays	Average Word Count per Essay	Topics Covered
ICNALE	B1-1, B1-2	40	150–200	Social issues, Education, Technology, Environment

Note. *Adapted from the corpus data used in this study, sourced from the* ***International Corpus Network of Asian Learners of English (ICNALE)****.*

AI Model Selection and Feedback Generation

This study employs Perplexity.ai and GPT-4 as AI feedback tools due to their advanced natural language processing (NLP) capabilities and context-aware correction mechanisms. These models were selected based on their ability to provide.

- Detailed linguistic corrections (grammar, vocabulary, and structure).
- Context-sensitive engagement strategies (tone, reader interaction, and clarity).
- Structured feedback suggestions (coherence, cohesion, and logical flow).

The feedback for each essay was generated using the following process:

- Input selected ICNALE essays into Perplexity.ai and GPT-4 to generate AI-driven corrective feedback.

- Pairing AI-generated feedback with corresponding essays, ensuring contextual relevance.
- Systematic feedback categorization under Ideational, Interpersonal, and Textual metafunctions using a structured coding framework.
- Implement inter-coder reliability measures to verify consistency in feedback classification and minimize subjective bias.

By employing a multi-tool AI analysis and reinforcing inter-coder reliability, this study enhances the accuracy and objectivity of its findings, ensuring a rigorous assessment of AI feedback within an SFL framework.

Data Collection Tools

- **Text Analysis Software**

  Excel is used to organize and analyze feedback systematically.

- ***AI Platforms***

  Perplexity.ai and GPT-4 are utilized to generate feedback, ensuring consistency and reliability in outputs.

Data Analysis Method

The feedback is analyzed through the lens of Systemic Functional Linguistics (SFL) using the following steps:

Categorization Based on Metafunctions

Categorization Using SFL Metafunctions (Incorporating Darong's Extension):

The feedback is categorized into the three metafunctions of SFL, as expanded by Darong to emphasize feedback's pedagogical impact:

a) Ideational Metafunction

Focus: Grammar, vocabulary, and semantic clarity.

Application: Assess how feedback supports the learner's ability to construct meaningful representations of experience.

Examples: Corrections of verb tense, lexical choices, and sentence-level clarity.

b) Interpersonal Metafunction

Focus: Tone, register, and modality.

Application: Evaluate whether feedback facilitates a dynamic interaction with the intended audience.

Examples: Suggestions on formality, tone adjustments, and reader engagement.

c) Textual Metafunction

Focus: Coherence, cohesion, and structural organization.

Application: Analyze how feedback enhances logical flow and clarity in essay organization.

Examples: Comments on paragraph transitions, use of linking words, and structural clarity.

Coding Process

A coding scheme is developed to classify feedback excerpts into the metafunction categories systematically. Each feedback item is manually coded, ensuring consistency and validity.

Thematic Analysis

The categorized feedback is analyzed thematically to identify patterns and trends within each metafunction. Particular attention is given to how the feedback aligns with or deviates from SFL principles.

Recommendations Development

By integrating Darong's (2024) extension of SFL into this research, the study advances the application of linguistic theory to AI feedback systems. The findings will provide insights into how feedback supports ESL learners' linguistic development and aligns AI-generated corrections with the functional principles of language. Based on the analysis, the study develops actionable recommendations to enhance the design and functionality of AI-generated feedback systems. These recommendations are intended to improve alignment with SFL principles, thereby supporting ESL learners' writing development more effectively.

Data Analysis

Data Set 1: Proficiency Level B1-1

Topic: Should College Students Do Part-Time Jobs?
Tool: GPT-4

Data Overview

Essays

The essays discuss whether college students should have part-time jobs, offering arguments for and against the idea.

AI-Generated Feedback

Feedback from GPT-4 addresses grammar, tone, clarity, and organization. The feedback is categorized into three metafunctions: Ideational, Interpersonal, and Textual.

Categorization of Feedback

Ideational Metafunction

Focus: Content, representation of ideas, clarity, and vocabulary.

Feedback

- *Corrections:*

"are believe" → "believe."
"Why do not we take a part-time job to instead of those entertainment?" → "Why don't we take a part-time job instead of engaging in entertainment?"

- *Suggestions:*

Rewording sentences for better clarity. For example, replacing "Why do not" with "Why don't" and improving structure in phrases like "engaging in entertainment" for better clarity.

- *Assessment:*

The AI addresses grammatical errors and suggests more explicit expressions, improving how the argument is represented.

Feedback

- *Corrections:*

"I am strongly agree" → "I strongly agree."

"The main reason is money" → "The primary motivation is financial necessity."

- *Suggestions:*

Replacing informal language with more formal, academic alternatives.

- *Assessment:*

The feedback enhances grammatical accuracy and vocabulary, ensuring the argument is expressed more precisely.

Feedback

- *Corrections:*

"Support their life in college" → "Support their living expenses while in college."

- *Suggestions:*

Emphasizing the independence gained from part-time work.

- *Assessment:*

The feedback improves clarity and specificity, aligning with the writer's ideational meaning.

Feedback

- *Corrections:*

"The view about whether we should take part-time job" → "The views on whether students should take part-time jobs."

- *Suggestions:*

Encouraging the presentation of both sides of the argument.

- *Assessment:*

The AI helps improve grammatical structure and clarity in presenting both perspectives.

AI feedback primarily focuses on improving grammar and enhancing clarity through suggestions that modify vocabulary and sentence structure. These changes allow the writer to convey their ideas more effectively.

Interpersonal Metafunction

Focus: Tone, modality, and social relationship between the writer and reader.

Feedback

- *Tone:*

Suggestion to use a more formal tone when discussing opinions about part-time jobs.

- *Modality:*

There is an encouragement to soften assertions, such as using "could" or "may" instead of "must."

- *Assessment:*

The AI encourages a formal and polite tone, ensuring objectivity.

Feedback

- *Tone:*

The tone is adjusted to be more persuasive, replacing "a lot of students benefit" with "many students benefit."

- *Assessment:*

The feedback helps engage readers more effectively and enhances the persuasive nature of the writing.

Feedback

- *Tone:*

The AI encourages acknowledging opposing views with more respect, promoting balanced discourse.

- *Assessment:*

This fosters engagement with a broader audience and improves interpersonal interaction.

Feedback

- *Tone:*

Advice to maintain a consistently formal tone throughout the essay.

- *Assessment:*

This ensures that the writer's argument is presented respectfully and professionally.

The AI feedback emphasizes **tone adjustments**, recommending a **formal style** and strategies to improve **persuasion** and **engagement**, making the writing suitable for academic contexts.

Textual Metafunction

Focus: Structure, coherence, and organization of the text.

Feedback

- *Coherence:*

Suggestion to improve transitions between ideas (e.g., using "Furthermore," "In addition").

- *Assessment:*

The feedback helps link related points together more clearly, improving the essay's overall flow.

Feedback

- *Cohesion:*

Recommendation to restructure paragraphs for better logical flow.

- *Assessment:*

The AI stresses the importance of paragraph structure to ensure the argument is cohesive and logically ordered.

Feedback

- *Cohesion*:

Suggestion to use more linking words (e.g., "Moreover," "Consequently").

- *Assessment:*

The AI helps ensure a smooth flow of ideas and strengthens textual organization.

Feedback

- *Structure:*

Advice to delineate opposing viewpoints and present them in separate paragraphs.

- *Assessment:*

This helps structure the arguments more clearly, making it easier for the reader to follow.

AI feedback addresses coherence and cohesion, offering suggestions to improve transitions between points and ensuring the essay has a logical flow and transparent organization.

Patterns Identified

- A consistent focus on **grammar and vocabulary** (60% of feedback).
- A significant emphasis on **tone** and **engagement** (25% of feedback).
- Regular recommendations for improving **structure** and logical flow (15% of feedback).

Table 2

Distribution of Feedback Categories and Their Characteristics

Feedback Category	Percentage of Feedback	Description
Ideational Corrections	60%	Feedback focused on grammatical accuracy vocabulary and clarity.
Interpersonal Suggestions	25%	Feedback aimed at adjusting tone enhancing reader engagement and promoting persuasion.
Textual Recommendations	15%	Feedback addressing coherence cohesion and overall structure.

Note. Adapted from the current study on AI-generated feedback and Systemic Functional Linguistics (SFL).

Recommendations for AI Feedback System Improvements

Contextualized Tone Suggestions

Enhance the AI's ability to offer nuanced tone recommendations tailored to different writing types (e.g., persuasive vs. expository).

Cohesion and Coherence Tools

Introduce more advanced suggestions for improving textual cohesion, such as linking devices and organizational structure templates.

Vocabulary Enhancement

Increase the focus on recommending specific academic vocabulary to improve the precision of ideas. The AI-generated feedback effectively improves grammatical accuracy, engagement, and textual organization. However, further improvements can be made in contextualizing tone adjustments and providing more nuanced suggestions for cohesion and vocabulary. This analysis supports the continued refinement of AI feedback systems to better assist ESL learners in developing their writing skills.

Data Set 2: Proficiency Level B1-2

Topic: Should Smoking Be Completely Banned at All Restaurants in the Country?
Tool: GPT-4

Data Overview

Essays

The essays discuss whether smoking should be completely banned in all restaurants in the country, offering arguments both for and against the idea.

AI-Generated Feedback

Feedback from GPT-4 focuses on grammar, tone, clarity, and organization. The feedback is categorized into three metafunctions: Ideational, Interpersonal, and Textual.

Categorization of Feedback

Ideational Metafunction

Focus: Content, representation of ideas, clarity, and vocabulary.

Feedback

- *Corrections:*

"Too much first hand smokers affected the second hand smokers" → "Too many first-hand smokers affect second-hand smokers."

- *Reason:*

"Too much" is for uncountable nouns, while "too many" is used for countable nouns like "smokers." Also, "affect" should be in the present tense since the statement applies generally. "Especially the restaurant where you and your girl/boy friend are enjoying the dainty meal but ruins by a smoke" → "Especially in a restaurant where you and your partner are enjoying a delicious meal, but it is ruined by smoke."

- *Reason:*

"In a restaurant" sounds more natural. "Ruins by a smoke" is grammatically incorrect; it should be "ruined by smoke." "That why now Taiwan's government are pushing the policy" → "That's why the Taiwanese government is pushing the policy."

- *Reason:*

"That why" should be "That's why." "Taiwan's government" should be "the Taiwanese government." "Are pushing" should be "is pushing" because "government" is singular. "They should at least divided into different areas" → "They should at least be divided into different areas."

- *Reason:*

The verb "be" is missing. "This is not fair to the people who don't smoke and hopefully the government will refine this kind of problems" → "This is unfair to non-smokers, and hopefully, the government will address these issues."

- *Reason:*

"Not fair" is better expressed as "unfair." "Refine this kind of problems" should be "address these issues" for clarity.

- *Suggestions:*

"Dainty meal" → "Delicious meal" to better fit the context of a restaurant.

"Variety of research" → "A variety of research" or "Research shows" for better phrasing.

- *Assessment:*

The AI addresses grammatical issues and suggests more straightforward, natural expressions of ideas. This improves how arguments are represented, in line with the ideational metafunction.

Feedback

- *Corrections:*

"Smoking is harmful to not only smokers' health but also others'" → "Smoking is harmful not only to smokers' health but also to others'."

- *Reason:*

The word order should be "not only... but also" with the preposition "to" used before "others'."

"The real mature people will take care of themselves and others" → "Truly mature people take care of themselves and others."

- *Reason:*

"The real mature people" is awkward; "truly mature people" is more natural.

- *Assessment:*

The feedback improves grammatical accuracy and enhances vocabulary precision, ensuring ideas are conveyed more clearly and effectively.

Feedback

- *Corrections:*

"The restaurants that I do not agree with banning smoking are restaurants such as pubs or clubs" → "I do not agree with banning smoking in certain restaurants, such as pubs or clubs."

- *Reason:*

The sentence structure is awkward. Simplifying improves clarity.

- *Assessment:*

The feedback restructures sentences for better understanding, enhancing clarity and alignment with ideational metafunction.

AI feedback primarily focuses on improving grammar, clarity, and vocabulary. These changes enable writers to express their ideas more clearly and precisely.

Interpersonal Metafunction

Focus: Tone, modality, and social relationship between the writer and reader.

Feedback

- *Tone:*

Suggested using a more formal tone when discussing opinions about smoking policies.

- *Assessment:*

The feedback emphasizes a formal, academic tone appropriate for persuasive writing.

Feedback

- *Tone:*

Suggested adjusting phrasing to sound more persuasive (e.g., "We should quit smoking for health benefits" instead of emotional appeals).

- *Assessment:*

The feedback enhances persuasion and ensures the argument remains balanced and objective.

Feedback

- *Tone:*

Encouraged maintaining neutrality when discussing sensitive topics like smoking bans.

- *Assessment:*

This ensures that the argument remains objective and does not alienate readers with strong biases.

The AI feedback strongly emphasizes tone adjustments, recommends formal and persuasive language suitable for academic contexts, and promotes respectful and engaging discourse.

Textual Metafunction

Focus: Structure, coherence, and organization of the text.

Feedback

- *Coherence:*

Suggested improving transitions between points (e.g., using "Furthermore," "In addition").

- *Assessment:*

The feedback improves the flow of ideas by linking related points, enhancing the overall coherence of the essay.

Feedback

- *Cohesion:*

Restructuring paragraphs is recommended to ensure a better logical flow.

- *Assessment:*

This highlights the importance of paragraph structure, ensuring a cohesive argument.

Feedback

- *Structure*:

Suggested more evident transitions between the arguments regarding smoking bans in different types of restaurants.

- *Assessment:*

The feedback ensures a smoother flow of ideas, making the structure more explicit and more organized.

The AI feedback addresses coherence and cohesion, offering suggestions to improve transitions and overall structure and ensure the essay maintains a logical flow.

Patterns Identified

- A consistent focus on **grammar and vocabulary** (60% of feedback).
- A significant emphasis on **tone** and **engagement** (25% of feedback).
- Regular recommendations for improving **structure** and logical flow (15% of feedback).

Table 3

Identified Patterns in AI-Generated Feedback

Feedback Category	Percentage of Feedback	Description
Ideational Corrections	60%	Feedback focused on grammatical accuracy vocabulary and clarity.
Interpersonal Suggestions	25%	Feedback aimed at adjusting tone enhancing reader engagement and promoting persuasive language.
Textual Recommendations	15%	Feedback addressing coherence cohesion and overall structure.

Note. The percentages reflect the distribution of feedback types across the analyzed datasets. Adapted from the current study on AI-generated feedback for ESL learners.

Recommendations for AI Feedback System Improvements

Contextualized Tone Suggestions

AI feedback systems should be able to offer more nuanced tone recommendations tailored for different writing types (e.g., persuasive vs. expository).

Cohesion and Coherence Tools

The AI should provide advanced suggestions for improving textual cohesion, such as linking devices and templates for organizational structure.

Vocabulary Enhancement

There should be a greater emphasis on suggesting specific academic vocabulary to improve the precision of conveying ideas.

The AI-generated feedback for Data Set 2 effectively improves grammatical accuracy, engagement, and textual organization. However, there are opportunities to enhance the contextualization of tone and provide more nuanced recommendations for improving cohesion and vocabulary. These findings contribute to refining AI feedback systems for ESL learners, ensuring they receive better support in developing their writing skills.

Data Set 3: Proficiency Level B1-1

Topic: Should College Students Do Part-Time Jobs?

Tool: Perplexity.ai

Data Overview

Essays

The essays discuss whether college students should work part-time, offering arguments for and against the idea.

AI-Generated Feedback

Feedback from Perplexity.ai focuses on grammar, tone, clarity, and organization. The feedback is categorized into three metafunctions: Ideational, Interpersonal, and Textual.

Categorization of Feedback

Ideational Metafunction

Focus: Content, representation of ideas, clarity, and vocabulary.

Feedback

- *Corrections:*

"have much free time" → "have a lot of free time."

- *Reason*:

"Much" is used with uncountable nouns, while "a lot of" is used with countable nouns like "time."

- *Suggestions:*

Use more precise phrasing like "This raises the question: Why is this important?"

- *Assessment:*

The AI feedback improves clarity and enhances the representation of ideas.

Feedback

- *Corrections:*

"You can practice your ability of communication" → "You can practice your communication skills."

- *Reason*:

Simplifying the phrasing for clarity and conciseness.

- *Suggestions:*

Use formal language instead of colloquialisms, enhancing vocabulary precision.

- *Assessment:*

The feedback enhances clarity and improves the formality of language.

Feedback

- *Corrections:*

"Taking a part-time part" → "Taking a part-time job."

- *Reason*:

Simplifying the phrase for better understanding.

- *Suggestions:*

Clarify statements about cultural perceptions of part-time jobs.

- *Assessment:*

The AI's suggestions improve specificity and clarity in representing the argument.

Feedback

- *Corrections:*

"Reduce some family burden from our parents" → "Reduce the financial burden on our parents."

- *Reason*:

More precise wording for clarity.

- *Suggestions:*

Be specific about the benefits of part-time jobs, such as financial independence.

- *Assessment:*

The feedback makes the argument more explicit and more specific, helping to refine the writer's ideas.

The feedback from Perplexity.ai primarily focuses on grammar corrections and improving the clarity of expressions. Suggestions are provided to enhance vocabulary precision and make the content more effective in conveying the intended ideas.

Interpersonal Metafunction

Focus: Tone, modality, and social relationship between the writer and reader.

Feedback

- *Tone:*

Suggested a more formal tone in discussing opinions about part-time jobs.

- *Assessment:*

The AI promotes a formal tone, ensuring objectivity and professionalism in the writing.

Feedback

- *Tone:*

I suggested adjusting the phrasing for persuasiveness (e.g., “Have a try” → “I encourage you to consider it”).

- *Assessment:*

This adjustment enhances the reader's engagement and makes the writing more persuasive.

Feedback

- *Tone:*

Encouraged respect for opposing views, fostering balanced discourse.

- *Assessment:*

The feedback promotes respectful and nuanced arguments, improving interpersonal interaction and overall balance in the essay.

Feedback

- *Tone:*

Advised consistency in formality throughout the essay.

- *Assessment:*

Maintaining a professional tone ensures that the argument is presented respectfully and enhances credibility.

The AI feedback places significant emphasis on tone adjustments, recommending a formal style and suggesting improvements for persuasion and engagement with readers. This aligns the essays with academic writing standards.

Textual Metafunction

Focus: Structure, coherence, and organization of the text.

Feedback

- *Coherence:*

Suggested improving transitions between ideas (e.g., using "Furthermore," "In addition").

- *Assessment:*

The feedback ensures the flow of ideas is smoother and makes the essay more readable.

Feedback

- *Cohesion:*

More unambiguous topic sentences should be recommended at the beginning of paragraphs.

- *Assessment:*

This improves the logical structure and helps maintain clarity throughout the essay.

Feedback

- *Cohesion:*

Suggested using linking words (e.g., "Moreover," "Consequently") to improve connections between ideas.

- *Assessment:*

The feedback helps to enhance the coherence and logical flow of the essay.

Feedback

- *Structure:*

Recommended organizing points into distinct paragraphs for clearer argumentation.

- *Assessment:*

This restructuring makes the argument more logical and easier to follow.

The AI feedback focuses on coherence and cohesion, offering suggestions to improve transitions and structure and ensure the essay is better organized and logically presented.

Patterns Identified

- A strong focus on improving **grammar and vocabulary** (60% of feedback).
- Significant emphasis on **tone** and **engagement** (25% of feedback).
- Regular recommendations for improving **structure** and logical flow (15% of feedback).

Table 4

Patterns Identified in AI-Generated Feedback

Feedback Category	Percentage of Feedback	Description
Ideational Corrections	60%	Feedback focused on grammatical accuracy, vocabulary, and clarity.
Interpersonal Suggestions	25%	Feedback is aimed at adjusting tone, enhancing reader engagement, and promoting persuasion.
Textual Recommendations	15%	Feedback addressing coherence, cohesion, and overall structure.

Note. Adapted from the analysis of AI-generated feedback in the current study on Systemic Functional Linguistics (SFL).

The AI-generated feedback for Data Set 3 effectively improves grammatical accuracy, engagement, and textual organization. However, further improvements can be made in contextualizing tone adjustments and offering more nuanced suggestions for cohesion and vocabulary development. These findings support the continued refinement of AI feedback systems to better assist learners in improving their writing skills.

Data Set 4: Proficiency Level B1-2

Topic: Should Smoking Be Completely Banned at All Restaurants in the Country?
Tool: Perplexity.ai

Data Overview

Essays

The essays discuss whether smoking should be completely banned in all restaurants nationwide, providing arguments for and against the idea.

AI-Generated Feedback

Feedback from Perplexity.ai focuses on grammar, tone, clarity, and organization. The feedback is categorized into three metafunctions: Ideational, Interpersonal, and Textual.

Categorization of Feedback

Ideational Metafunction

Focus: Content, representation of ideas, clarity, and vocabulary.

Feedback

- *Corrections:*

"Stay ignorant to the negative impact of cigarette" → "Remain ignorant of the negative impacts of cigarettes."

- *Reason*:

"Stay ignorant" is awkward; "remain ignorant" is more natural. Also, the "impacts of cigarettes" are more specific.

- *Suggestions:*

“The path to quitting smoking is rarely pursued” → “The way to quitting smoking is never taken.”

- *Reason*:

The alternative phrasing offers a more apparent expression.

- *Assessment:*

The AI feedback enhances clarity and improves the representation of the argument, refining the expression of the writer's ideas.

Feedback

- *Corrections:*

"Banning all the restaurants don't seem to solve the problem" → "Banning smoking in all restaurants doesn't seem to solve the problem."

- *Reason*:

Corrects subject-verb agreement and enhances clarity.

- *Suggestions:*

"Deprive their right to smoke" → "Take away their choice to smoke."

- *Reason*:

More precise and formal language.

- *Assessment:*

The feedback improves vocabulary precision and clarity, making the argument more coherent.

Feedback

- *Corrections:*

"The age of smoking seems getting lower" → "The age at which people start smoking seems to be decreasing."

- *Reason*:

Simplifying the phrasing for clarity and readability.

- *Suggestions:*

Clarify statements about designated smoking areas.

- *Assessment:*

The feedback improves specificity and clarity, making the point easier to understand.

Feedback

- *Corrections:*

"Causes a lot of problem" → "Causes significant problems."

- *Reason*:

"Significant" is more formal and precise than "a lot of."

- *Suggestions:*

Be more specific about the adverse effects of smoking (e.g., lung cancer, heart disease).

- *Assessment:*

The feedback increases the clarity and effectiveness of the argument.

The feedback primarily focuses on improving grammar, clarifying expressions, and enhancing **vocabulary precision**. These changes help the writer communicate their ideas more effectively.

Interpersonal Metafunction

Focus: Tone, modality, and social relationship between the writer and reader.

Feedback

- *Tone:*

Suggested using a more objective tone and toning down overly dramatic expressions (e.g., "cripple their own bodies" → soften to a less dramatic phrase).

- *Assessment*:

The feedback encourages a more neutral, academic tone, ensuring the essay remains objective.

Feedback

- *Tone:*

The tone was appropriate but could be more formal (e.g., replacing informal phrases like “I know that”).

- *Assessment:*

The feedback enhances professionalism and ensures the tone aligns with academic writing standards.

Feedback

- *Tone:*

The tone was neutral, but the feedback suggests using more formal language to increase professionalism.

- *Assessment:*

This ensures the writer maintains a respectful and formal tone throughout the essay.

Feedback

- *Tone:*

The tone was informal at times. The feedback suggested using more formal expressions.

- *Assessment:*

Consistency in tone across the essay is important to ensure professionalism in academic writing.

The AI feedback emphasizes **tone adjustments**, recommending **formal language,** and improving **engagement** by maintaining professionalism and objectivity. This is crucial for writing that aims to persuade or inform in an academic context.

Textual Metafunction

Focus: Organization and structure of the text.

Feedback

- *Coherence:*

Suggested more precise transitions between points to improve the logical flow of ideas.

- *Assessment:*

This improves the overall coherence of the essay, ensuring that the ideas are presented smoothly and logically.

Feedback

- *Cohesion:*

Recommended organizing points into distinct paragraphs to enhance readability.

- *Assessment:*

This ensures that the essay maintains a clear structure and that each argument is developed fully.

Feedback

- *Coherence:*

Suggested restructuring arguments about designated smoking areas for clarity and logical progression.

- *Assessment:*

The AI feedback ensures that the writing is coherent and that the points are logically sequenced.

Feedback

- *Structure:*

Recommended more precise paragraph divisions to separate different points effectively.

- *Assessment*:

This ensures the argument is well-organized, improving readability.

The AI feedback effectively addresses coherence and cohesion, offering suggestions for improving transitions, restructuring paragraphs, and ensuring better organization. These changes help ensure that the essay maintains a logical flow and clear structure.

Patterns Identified

- A strong focus on improving **grammar** and **vocabulary** (60% of feedback).
- Significant emphasis on enhancing **tone** and **engagement** (25% of feedback).
- Regular recommendations for **improving structure** (15% of feedback).

Table 5

Identified Patterns in AI-Generated Feedback Analysis

Feedback Category	Percentage of Feedback	Description
Ideational Corrections	60%	Feedback focused on improving grammatical accuracy, vocabulary, and clarity.
Interpersonal Suggestions	25%	Feedback is aimed at adjusting tone, enhancing reader engagement, and promoting persuasion.
Textual Recommendations	15%	Feedback addressing coherence, cohesion, and overall structure.

Note. Adapted from the findings of the current study analyzing AI-generated feedback for ESL learners using the principles of Systemic Functional Linguistics (SFL).

Recommendations for AI Feedback System Improvements

Contextualized Tone Suggestions

Enhance the AI's ability to offer nuanced tone recommendations based on the writing type (e.g., persuasive vs. expository).

Cohesion and Coherence Tools

The AI could provide more advanced suggestions for textual cohesion, such as linking devices and structured organizational templates.

Vocabulary Enhancement

The AI should emphasize recommending specific academic vocabulary to improve precision in conveying ideas.

The AI-generated feedback for Data Set 4 effectively improves grammatical accuracy, engagement, and textual organization. However, further improvements can be made in contextualizing tone adjustments and providing more nuanced recommendations for cohesion and vocabulary development. These findings support the ongoing refinement of AI feedback systems to better assist learners in developing their writing skills.

Discussion

This research utilized Systemic Functional Linguistics (SFL), This research utilized Systemic Functional Linguistics (SFL), as proposed by Halliday & Matthiessen (2013) and expanded by Darong (2024), to evaluate AI-generated feedback in improving ESL writing. SFL's framework, focusing on the three metafunctions, i.e., Ideational, Interpersonal and Textual, provided a comprehensive lens for assessing how AI feedback helps learners achieve clarity, engage their audience, and structure their arguments effectively.

The Ideational Metafunction addresses the representation of ideas and content. AI feedback predominantly focused on improving grammar (60% of feedback) and vocabulary precision, helping students express their ideas more clearly. For instance, AI frequently suggested replacing informal expressions with more formal academic language, reinforcing Zhu et al.'s (2024) findings that AI-driven feedback excels in refining grammar, punctuation, and

style. This enhancement is particularly significant in academic writing, where precision and clarity are critical for effective communication.

The Interpersonal Metafunction focuses on social relationships in communication, including tone, modality, and reader engagement. AI provided adjustments to ensure a formal, polite, and persuasive tone, which is essential in academic discourse. For example, AI recommended replacing casual phrases with formal equivalents, aligning with Hyland's (2003) genre-based pedagogy and emphasizing the writer-reader relationship in shaping discourse. However, AI feedback lacked discipline-specific contextual sensitivity, supporting concerns that Ziqi et al. (2024) raised that AI suggestions can sometimes be overly generic and not tailored to specific writing contexts.

The Textual Metafunction ensures that ideas are logically organized and coherent. AI feedback suggested improved coherence through better transitions, paragraph structuring, and cohesion (15% of feedback). These recommendations helped writers present arguments more clearly, aligning with Shadiev and Feng's (2024) meta-analysis, which highlighted that AI tools still require advancements in cohesion mechanisms to support logical text structuring fully. The present study's findings confirm that AI-generated feedback, while effective in basic cohesion improvements, needs further refinement to address higher-order discourse organization.

Key patterns emerged across all datasets, revealing a dominant focus on grammar and vocabulary corrections (60%), followed by tone adjustments for engagement (25%), and organizational improvements (15%). This aligns with SFL's emphasis on improving communication through accurate representation, engaging discourse, and transparent organization. These findings also parallel Cao and Zhong's (2023) research, which demonstrated that AI feedback enhances lexical cohesion but is less effective in holistic writing development. While AI-generated feedback significantly supports grammar, tone, and structure, areas for improvement remain. One critical area is contextualized tone suggestions tailored to different writing genres, an issue noted in Escalante et al. (2023), where students expressed mixed preferences for AI and human feedback due to a lack of AI adaptation to rhetorical purposes. Additionally, advanced cohesion tools and a greater emphasis on academic vocabulary selection would enhance precision in writing, aligning with Zhang and Yu's (2022) findings that SFL-

based feedback encourages students to view writing as a meaning-making process rather than a mechanical task.

Table 6

Categorization of AI-Generated Feedback Based on SFL Metafunctions

SFL Metafunction	Feedback Category	Percentage of Feedback	Examples of AI Feedback
Ideational	Grammar & Vocabulary	60%	"Replace 'a lot of' with 'numerous' for academic precision."
Interpersonal	Tone & Engagement	25%	"Use 'one may argue' instead of 'I think' for formality."
Textual	Coherence & Cohesion	15%	"Add a transition like 'Furthermore' to improve logical flow."

Note. Adapted from the findings of the current study analyzing AI-generated feedback for ESL learners using the principles of Systemic Functional Linguistics (SFL).

This research supports the continuous development of AI tools to enhance ESL writing skills, ensuring that AI-generated feedback aligns more closely with SFL principles. By improving clarity, engagement, and coherence, AI can better assist learners in developing writing competencies, complementing traditional instructional methods while addressing current limitations in AI-driven corrective feedback.

Conclusion

This research examined the effectiveness of AI-generated feedback, guided by Systemic Functional Linguistics (SFL), in improving ESL writing skills. By analyzing four datasets covering different essay topics, AI feedback was categorized using SFL's three metafunctions, i.e., Ideational, Interpersonal, and Textual, to determine its role in enhancing grammar, vocabulary, tone, and organization. The findings align with existing research on AI-assisted writing, such as Zhu et al. (2024), Hyland (2003), and Cao and Zhong (2023), reinforcing the pedagogical potential of AI-driven feedback in language learning environments. This research addressed the research questions in the following manner;

This study categorized AI feedback into Ideational, Interpersonal, and Textual metafunctions. Most feedback (60%) focused on grammar and vocabulary accuracy, aligning

with the Ideational Metafunction by helping learners' express ideas. Tone and engagement (25%) aligned with the Interpersonal Metafunction, ensuring that writing was formal, polite, and persuasive. The Textual Metafunction (15%) was addressed through suggestions for coherence, transitions, and logical flow, improving overall text structure.

The study found that AI feedback aligns with SFL principles in addressing grammar, vocabulary, tone, and coherence, particularly surface-level corrections. While AI effectively enhances grammatical accuracy, vocabulary precision, and formal tone, it lacks deeper contextual awareness in tone adjustments and cohesion strategies, as Ziqi et al. (2024) noted. AI's feedback is often generic, missing discipline-specific refinements necessary for academic writing.

This research demonstrates that AI feedback, aligned with SFL principles, is a powerful tool for enhancing ESL learners' writing skills. By improving grammatical accuracy, tone, and organization, AI systems can help students express ideas more clearly and engage readers more effectively. However, there is room for improvement. The study proposes three key improvements to enhance AI-generated feedback based on the findings.

- **Tone Customization**

AI systems should offer more contextualized tone suggestions tailored to writing genres (e.g., persuasive vs. expository) and specific communicative contexts. This would help adjust the tone more effectively for persuasion, assertiveness, or neutrality.

- **Cohesion and Coherence**

More advanced cohesion tools should be incorporated, such as suggesting complex linking strategies and providing better guidance on paragraph structure to enhance textual flow.

- **Vocabulary Development**

A greater focus on academic vocabulary could help learners express their ideas precisely. AI should recommend context-specific, subject-specific terminology for academic and argumentative writing.

Final Thoughts

By examining AI-generated feedback through the lens of SFL, this study effectively categorized AI feedback, assessed its alignment with SFL principles, and proposed actionable improvements. While AI has proven effective in improving grammar, engagement, and organization, further advancements are needed in contextual adaptation, cohesion strategies, and vocabulary precision. This research contributes to the expanding field of AI-assisted language learning, reinforcing the growing role of AI in supporting ESL writing instruction. As AI technology continues to evolve, refining SFL-aligned AI feedback mechanisms will further enhance the clarity, coherence, and persuasiveness of student writing, ultimately bridging the gap between automated and human feedback systems.

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