



Human versus Generative AI feedback: Effects on academic writing proficiency, revision quality, and writing self-efficacy among Indian ESL undergraduates

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Abstract

Generative artificial intelligence (AI) is being increasingly integrated into educational practice, changing the dynamics of writing instruction and feedback. This study examines the relative effectiveness of writing instruction based on (1) instructor feedback versus (2) generative AI-assisted feedback on undergraduate ESL learners' academic writing skill, revision quality and self-efficacy. We utilized an explanatory sequential mixed-methods design with 100 undergraduate students randomly assigned to AU (control, traditional instructor feedback) or experimental (AI-assisted spelling/grammar feedback) groups over an eight-week intervention. Analytic rubric was used to evaluate writing performance, whereas the questionnaire was administered to calculate writing self-efficacy. Qualitative data were obtained using semi-structured interviews. Illustrative results show some additional improvements with AI-assisted feedback on both quality of revision and writing confidence (compared to instructors) but instructor feedback was still better at supporting higher-order argument development. The results emphasize the educational potential that generative AI can provide as an additional feedback resource in a CALL context.

Keywords: Generative AI, academic writing, ESL, feedback, call, writing self-efficacy

Introduction

Artificial Intelligence (AI) has entered the world of higher education, changing how we learn a language and teach academic writing. Familiar examples of recent technological developments include the generative AI tools such as ChatGPT, Gemini, and Claude that are now available to learners to provide immediate, personalized, iterative feedback on their work as pedagogical tools. In contrast to traditional automated writing evaluation systems, generative AI generates context-sensitive feedback, employs interactive dialogue and uses adaptive support to enable new opportunities for second language (L2) writing development.

In India, where multilingualism is a strong characteristic of the society and population, academic writing still accounts for one of the great hurdles for English as a Second Language (ESL) learners. From an academic perspective, several common weaknesses in students include failure to structure ideas with an overall direction/purpose and thesis, organisation – lose track of tests leading into confusion/digression redirections – coherence, clarity coalescing structure + mastery of conventions via identifying argument without losing the thread. Traditional instructor feedback has been regarded as an invaluable avenue for writing improvement, but rising teacher-student ratios often mean less availability for customized feedback (Hyland & Hyland, 2019) ^[5]. Emerging evidence indicates that skills related to generative AI can support use as an interactive writing tutor, providing real-time feedback on grammar, vocabulary, organization and argumentation (Yan & Zhang, 2024). This kind of feedback may promote learner independence and provide more opportunities for revision. However, there are still concerns about the reliability of AI-generated feedback as well as its accuracy and teaching effectiveness (Kasneci *et al.*, 2023) ^[6]. However, in the context of Indian higher education, there is very little

empirical research comparing human feedback and generative AI feedback, despite increasing interest among practitioners. This study aims to bridge this gap by investigating the effect of AI-based feedback on academic writing proficiency, revision quality and writing self-efficacy among Indian undergraduate ESL learners.

Research Questions

Research Question 1: To what extent does generative AI-assisted feedback improve the academic writing performance of undergraduate ESL learners?

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Research Question 2: How does the revision quality of students receiving AI-assisted feedback compare with that of students receiving instructor feedback?

Q: Do students receiving AI-assisted feedback perform better or worse when revising than those provided instructor feedback and advice?

Research Question 3: What effect does AI-assisted feedback have on learners' writing self-efficacy?

Impact of AI-assisted feedback on writing self-efficacy

Research Question 4: How do learners perceive the usefulness and limitations of AI-assisted writing feedback? Training Set Prompt.

Literature Review

Sentence Para Academic Writing in ESL Contexts

Abstract In general, academic writing is considered one of the most complex language skills that students must acquire because of the cognitive, linguistic and rhetorical level involved. This means that effective academic writing retains the abilities of learners to combine information, build arguments, and use conventions in an acceptable way (Hyland 2016) ^[4]. Many Indian ESL learners find the

challenges of academic writing quite difficult due to their lack of exposure to real academic English and little opportunity for personalized feedback. As research indicates, targeted feedback offered in a meaningful way causes large increases in learners writing performance and practices of revision (Ferris, 2014) ^[3].

Generative AI in the Context of Computer-Assisted Language Learning (CALL)

Computer-Assisted Language Learning (CALL) has witnessed a considerable amount of change over the last two decades. In this context, generative AI is a disruptive overview of traditional CALL tools for moving toward intelligent systems that interact with learners live.

Learner-centered instruction is made possible by CALL technologies as they enable learners with the freedom to learn through flexible and self-directed learning environments, (Beatty, 2013) ^[2]. Engaging one-on-one in a written conversation is really powerful, and with generative AI it becomes personalized feedback that adapts to your 'explanations' of what you do or don't understand. Kasneci *et al.* As per Soule *et al.* (2023) ^[6], generative AI can revolutionize education by expanding access to quality learning, fostering personalized/differentiated instruction and promoting 21st century skills of collaboration, communication, creativity and critical thinking — the “Four Cs” — needed for higher order thinking in work. Nonetheless, they warn that an educator must carefully weigh the gesture and moral lessons of AI infusion.

AI-Based Feedback in Writing Training

Feedback provides an important premise in developing writing competency. More traditional means of feedback typically comprise instructor comments that focus on both lower order concerns (linguistic accuracy) and higher order concerns (argumentation and organization). Studies show that the presence of Artificial Intelligence (AI)-powered feedback can help enhancing the quality of revised submissions, and increase learner engagement. According to Mahapatra (2024), ChatGPT-assisted writing tasks greatly improved grammatical accuracy and writing confidence in ESL learners. In a similar vein, Yan and Zhang (2024) found that learners who use AI-generated feedback are more engaged and improved their revision strategies. Despite these advantages, some limitations related to AI-written feedback have also been identified by scholars Zhai (2024) such as inaccuracies or simplistic suggestions and ultimately the risk of learners becoming over-reliant on AI.

Writing Self-Efficacy

Self-efficacy as defined by Bandura (1997) ^[1] is a key predictor of learning outcome, according to Social Cognitive Theory. Writing self-efficacy refers to learners' beliefs about their capacity to execute writing tasks successfully; High self-efficacy in writing has been shown to yield increased persistence, enhanced revision behaviours, and better academic performance (Pajares, 2003) ^[7]. There is emerging evidence showing potential of AI-assisted learning environments to positively affect self-efficacy through immediate support and by mitigating writing anxiety (Teng, 2024).

Methodology

Based a sequential explanatory mixed-methods design to explain the quantitative results through applying qualitative

data collection, we aim this study. In this design, quantitative data are collected and analysed first and subsequently qualitative data are then gathered to explain and detail the results from the quantitative analysis.

Quantitative Phase

The quantitative phase is the part where we measure how good Generative AI is for students in critical thinking, academic performance and learning engagement.

Pre-Test

All subjects undergo a pre-test, to measure baseline knowledge and critical thinking skills and classify them: how well do they understand the subject prior to the interventional study. The purpose of the pre-test is to quantify improvement in student performance resulting from exposure to Generative AI tools.

Intervention

In the intervention stage, the selected Generative AI tools (e.g. ChatGPT, Gemini, Copilot or other AI based learning platforms) are introduced to students. They are embedded within classroom activities, tasks, problem-solving and dialogue over an extended time (eg 4–8 weeks). Students are urged to use AI tools for research, generating ideas, writing and clarifying concepts in accordance with academic ethics.

Post-Test

A post-test, using similar assessment instruments to the pre-test, is also conducted at the end of the intervention period. Then the results are compared to pre-test scores to find improvements in academic achievement, critical thinking capacities and time spent learning. You can use statistical analysis to identify significant differences and trends, like the paired-sample t-test-descriptive statistics, or correlation.

Qualitative Phase

After the quantitative analysis, qualitative data are collected to obtain greater insights into students' experiences and perceptions of the use of Generative AI in learning.

Semi-Structured Interviews

A small sample of students and faculty engage in semi-structured interviews. The study involved interviews with participants about their perspective on the pros and cons of Generative AI in education, as well as ethical implications and perceived effectiveness. The qualitative part is useful in deeper understanding why certain quantitative results were produced.

Sample interview questions may include:

Shagha: How this influenced my learning with the help of Generative AI ?

What benefits have you gained from working with AI tools?

What challenges/limitations was last you experience?

Did AI make you a better thinker? Why or why not?

Reflection Reports

During the intervention period, students submit reflection reports detailing their interactions with Generative AI. In general, these reports encourage participants to consider how their studying behavior may have evolved, skills they feel they have improved and sandtrap areas they are worried about with AI. These reflection reports offer a secondary,

narrative data source to supplement the findings from these structured interviews.

Quantitative and Qualitative Integration

Phase-2 is the final phase of the study, and essentially involves combining the findings from both phases side by side. Quantitative findings describe the magnitude of changes in learning outcomes, and qualitative results explain why those changes occurred. The integration of these constructs allows for more nuanced insights into the effect and role of Generative AI on students' critical thinking, engagement in class, and academic performance which will bolster the rigour and validity of the research.

Participants

Table 1: Description of table

Variable	Details
UG Students	100 students
Institution	SKASC
Age Range	18–22
English Level	B1–B2

Groups

Group	N
Teacher Feedback	50
AI Feedback	50

Intervention

Duration: 8 Weeks

Writing Tasks:

1. Argumentative Essay
2. Cause–Effect Essay
3. Problem–Solution Essay
4. Reflective Essay



Fig 1: Writing Rubric (50 Marks)

Results

Academic Writing Performance

Table 2: Illustrative Writing Scores

Group	Pre-Test Mean	Post-Test Mean
Teacher Feedback	28.4	35.2
AI Feedback	27.9	40.1

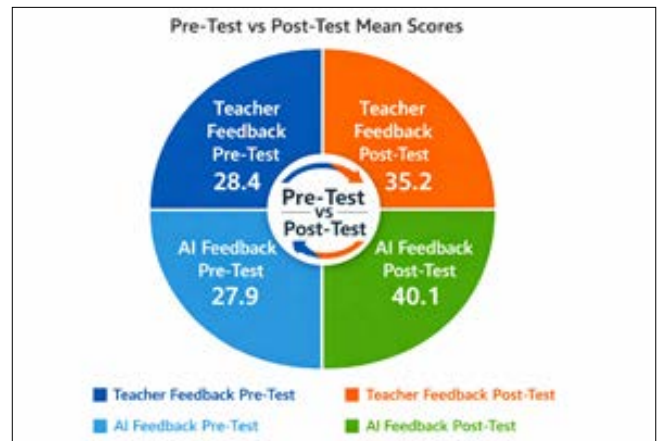


Fig 3: The illustrative data indicate improvements in both groups, with larger gains observed in the AI-feedback group.

Writing Self-Efficacy

Table 3: Illustrative Self-Efficacy Scores

Group	Pre-Test	Post-Test
Teacher Feedback	3.02	3.81
AI Feedback	2.98	4.24

Revision Quality

Table 4: Illustrative Revision Changes

Revision Type	Teacher Group	AI Group
Grammar Revisions	145	228
Vocabulary Revisions	96	183
Structural Changes	71	102
Content Expansion	88	110

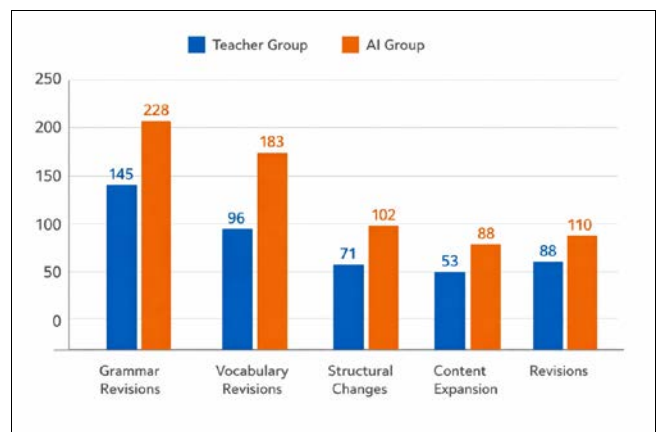


Fig 4: AI group appeared to perform a greater number of revisions across categories.

Qualitative Findings

Theme 1: Immediate Feedback

Participants noted that AI-generated feedback was immediate and prompted them to revise multiple times.

"I did not have to wait on feedback. My essay could be better right away."

Theme 2: Increased Confidence

A number of students said that while revising their essays they felt more confident.

"Without any shame, the AI pointed out mistakes that I should identify."

Theme 3: Learner Autonomy

Students reported feeling more autonomy in managing their writing process.

I learnt how to fix my own writing instead of waiting for the teacher.

Theme 4: Concerns About Accuracy

There were participants who raised concerns regarding wrong or generic recommendations.

"Throughout the revisions, sometimes the AI recommended edits that were not consistent with my argument."

Discussion

Key Findings Generative AI-aided feedback appears to benefit the process of developing an academic writing. More revision activity in the AI group is consistent with research showing that immediate feedback on writing tasks-results in more active engagement. This may suggest that AI-assisted environments help foster learner confidence, as reflected in the comparatively improved self-efficacy scores. Nonetheless, as we discovered in our analysis some encouragement for AI that can approve or reject rough drafts but not replace the instructor feedback due to a better concern that called into question the quality of the review. The results of these findings also underscore some CALL perspectives, which characterize technology as an instrumental tool that fosters learner autonomy and self-regulated learning.

Pedagogical Implications

This study has important implications for language teaching and learning. There are two main components in the presentation: 1- Language instructors might consider using AI-based feedback tools as a regular part of the writing process in writing courses. Since AI systems can quickly respond to drafts, students have a introduction to identify language errors — and revise different ways as well as modifying the sentence structure of their composition before submitting assignments. This will foster high level of learner autonomy and prompt an ongoing revision process. And secondly, they should educate students not to accept the suggestions of AI blindly but rather to learn how to examine them critically. AI feedback is helpful but sometimes grossly inaccurate and not contextually appropriate. ChatGPT will almost inevitably produce recommendations that some students might want to use in their writing, so developing their critical reasoning skills should help them judge if these recommendations are relevant and reliable.

Third, the best possible solution might come from a synergy of instructor feedback combined with AI feedback. The human factor of commenting on nuances of content, organization, argumentation and audience awareness should be augmented by AI's ability to correct grammatical, lexical and mechanical mistakes in writing. Together, they provide contrasting, complementary sources of feedback that could make for a richer learning experience on the part of students. AI is finally that you need to consider an AI as an addendum not the substitute of teacher feedback. While AI may make our lives more convenient and offer personalized assistance, it cannot replace the ability of instructors to exercise pedagogical discretion, empathy, and the knowledge of context. Hence, AI is most useful as an

assistance tool rather than a replacement for teachers to nurture students into good writers.

Conclusion

Does generative AI represent a viable supplemental writing tutor for ESL learners? The research explores the effect of AI on writing ability, revision behaviour and learner confidence by comparing feedback generated by an AI with traditional instructor feedback. With the adoption of generative AI transforming educational settings, recognizing its potential value in pedagogy is critical to language educators and researchers alike.

Hypotheses

This study aims to investigate the effect of GPT-3, a powerful generative AI tool(2), summary feedback on Indian artificial intelligence (AI)-assisted summarisation based academic writing proficiency scale compared to traditional instructor feedback on revision excellence regression equation and how such changes in academic writing proficiency would relate with their self-efficacy (i.e. Trainability):Writing self-efficacy among undergraduate Learners of English as Second Language in India.

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