A Study on Feedback Engagement of College English Learners under a Human-AI Collaborative Writing Feedback Model

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Abstract: This study explores how 50 first-year English majors respond to a DeepSeek-based human-AI collaborative English writing feedback model. Data are collected through a background questionnaire, a questionnaire on feedback engagement, as well as students' initial and revised writing drafts. The results reveal that students generally have a positive attitude towards this feedback model, but the three-dimensional engagement is uneven. While the cognitive engagement reaches the highest level, behavioral engagement is the lowest. This lack of sufficient behavioral commitment has been confirmed in a moderate level of feedback adoption rate shown in students' actual writing. In addition, students' revisions are mostly made on surface language problems, and less demanding revision suggestions are implemented. It is therefore concluded that, when designing a human-AI collaborative writing feedback model, teachers can regulate the feedback content and interaction mechanism with AI, so as to promote students' overall feedback engagement.
***Keywords*:** human-AI collaborative feedback; feedback engagement; AI; English writing

1. Introduction

Over the past several years, generative artificial intelligence (GenAI) has been frequently introduced into the field of English writing, and has become an important tool for providing writing feedback. Compared with the traditional teacher feedback, human-AI collaborative feedback empowered by GenAI for English writing has shown advantages in presenting revision advice in a timely manner and a potential of dealing with various information comprehensively. With growing attention in academic field, there has also been a gradual increase in empirical research. While much of the research has centered on construction of roles and feedback models in human-AI collaboration, there remains a lack of studies that investigate the effectiveness of human-AI collaborative feedback model used for English writing from the perspective of feedback engagement of second language learners, especially college language learners.

To fill the research gap in this area, the present study is conducted to explore the general features of feedback engagement shown by university EFL learners to writing feedback within a collaborative human-AI framework built upon DeepSeek. It is also aimed to examine whether the learners respond differently in various dimensions to the feedback. If such differences could be identified, a further discussion is then expected to be given over the findings on the concrete manifestations of these differences. Through an analysis and interpretation of related data, this study intends to provide empirical evidence to researches within this field and enhance the understanding of the practical value of human-AI collaborative feedback.

2. Literature Review

The concept of feedback engagement originates from the construct of learner engagement, a well-established idea within educational psychology. Fredricks et al. (2004), in their widely cited review, identified three interconnected dimensions of learner engagement—behavioral, emotional, and cognitive engagement. This theoretical framework adopts a multi-dimensional perspectives to highlight the intricate inner mental processes taking place among learners. Since the proposal of this framework, it has served as an important conceptual foundation for later investigations into feedback engagement.

Taking the framework as a theoretical basis, Ellis (2010) adapted it for research on corrective feedback. In his point of view, feedback engagement refers to how second language learners react to corrective feedback given in both oral and written forms. He similarly categorizes feedback engagement into three facets including behavioral, affective and cognitive engagement. These facets can be observed respectively through the extent learners incorporate feedback into revisions, their attitudes and emotional reactions toward feedback, as well as the attention they allocate to feedback content and the depth at which they process such information cognitively.

Building on Ellis's conceptualization of feedback engagement, research on learners' feedback engagement in the field of L2 English writing has been gradually increasing in recent years. A study on written corrective feedback found that learner engagement is dynamically changing and marked by prominent individual differences, being shaped by factors such as

individual learning goals, prior feedback experiences and beliefs, and context (Han & Hyland, 2015). Another study on peer feedback suggested that students showed high and positive affective, behavioral, and cognitive engagement with feedback on linguistic form, whereas their cognitive and behavioral engagement with feedback on content was comparatively low (Fan & Xu, 2020).

With the advancement of artificial intelligence technology, research on L2 English learners' feedback engagement under multiple feedback modes has gradually emerged and is becoming an emerging frontier of scholarly attention. A small number of empirical studies have begun to explore how multiple sources of collaborative feedback reshape students' feedback engagement mechanisms, thereby offering feasible design ideas for writing instruction. Research has shown that a pedagogical approach that systematically integrates automated, peer, and teacher feedback can effectively promote students' engagement with writing feedback in the behavioral, affective, and cognitive dimensions (Zhang & Hyland, 2022). Other research has argued that, in multiple-interaction environments, learners' feedback engagement is dynamically developing and is driven by multiple factors including individual goals, teacher instruction, peer influence, and assessment etc.; sustained instructional guidance from teachers is the key to helping learners fully perceive and utilize various types of feedback and to enhancing their feedback literacy (Long & Qiu, 2024) In addition, the different dimensions of learners' feedback engagement in multiple-interaction environments are both interrelated and contradictory; overt behavioral engagement might be misleading, and teachers need to attend simultaneously to learners' internal cognition and emotion, promoting genuine deep engagement through proper training and regulation (Xu & Long, 2022).

With respect to the human-AI collaborative writing mode in particular, with the application of generative AI technologies represented by large language models, feedback engagement has taken on new characteristics. Existing research indicates that, under such feedback model, second language learners exhibit very positive revision behaviors and report high satisfaction with the feedback (Li, 2026).

Although the existing literature has made some progress regarding general engagement in multiple feedback modes and human-AI collaborative writing, there is still clearly room for expansion in related research. Existing studies have mostly focused on the writing process or final outputs; empirical research and data support concerning the engagement of college English learners with human-AI collaborative writing feedback remain insufficient.

3. Methodology

3.1 Participants

The participants of this study were 50 first-year English majors who were about to take the writing course in the second semester and who had already completed the compulsory course English Writing I in the first semester of their first year.

3.2 Research instrument

To better understand how students engage with a newly-designed human-AI collaborative feedback model for English writing, two major questionnaires are employed in this study. Specifically, one is for background information regarding students' past experience with AI use in English writing. It is assumed that data collected from this questionnaire might help explain potential differences in learners' response to the feedback. Another questionnaire is intended to collect data directly on feedback engagement. The questionnaire is designed in light of a writing engagement scale created by Parsons et al. (2023), and it covers three aspects of behavioral, cognitive, and affective engagement with twelve items. The students need to rate each item on a five-point Likert scale.

The two questionnaires were delivered to the students before the wiring task and when the task was completed respectively, to gather background information in the first place and collect data on feedback engagement at the end. All the data are processed with SPSS 22.0.

3.3 Data collection

During the delivery of the English Writing II course in the second semester of the first year, the researchers explained to the students the form of writing feedback to be adopted during the experimental period, namely, writing feedback that combined the domestic large language model DeepSeek with teacher feedback.

Having agreed to be part of the study, the students finished their first drafts within the limited time in class and sent the digital version to the teacher. Then, the teacher used the preset prompts to have DeepSeek generate feedback on the drafts. After reviewing the output produced by the AI tool, the teacher refined it into clear and usable revision suggestions. Then, the students revised their texts according to these feedback and submitted the final version. The preliminary drafts and and the revised drafts were collected as text data.

There are a number of 50 valid questionnaires for background information and another 50 for data on feedback engagement. The reliability test of the latter suggests a cronbach's α of 0.83, indicating a relatively high level of internal consistency.

4. Research results and analysis

Data collected through the background questionnaire shows that more than half of the participating students have used AI tools, including DeepSeek and ChatGPT, more than a dozen times throughout the semester to assist in English writing. Few of these learners said that they had no experience in using AI-assisted writing before. As for the specific way they use these tools, most respondents rely on them to correct grammar errors, refine wording, brainstorm ideas for essays or draft outlines. The data shows that the use of AI-assisted English writing has become common among students participating in the research, and these students have rich practical experience in operating the core functions of these AI writing tools. Theses major findings from this background questionnaire are expected to offer attribution basis for features of students' feedback engagement shown in the engagement questionnaire.

After reviewing the responses to the feedback engagement questionnaire, it was found that students' engagement in human-AI collaborative writing feedback was generally high (M=3.6). These statistics show that learners generally accept this feedback model. Combined with the results of the background investigation, it is postulated that their willingness to engage does not stem from curiosity about emerging AI technologies; rather, it is grounded in their previous experience in using AI writing aids.

Based on the data collected from the feedback engagement questionnaire, the researchers further examined how students respond to the feedback in different dimensions. It turns out that cognitive engagement (M=3.75) is the most prominent of the three, with the average of all four questionnaire items measuring cognitive engagement higher than the average of the overall sample, which can be seen in Table 1.

Table 1. Participants' Feedback Engagement on Cognitive Level (N=50)

Item	M	SD
C1: I read the Human-AI feedback carefully, thinking about how it can help me improve my essay.	3.74	0.66
C2: Regarding the problems identified in the Human-AI feedback, I think carefully about how to revise.	3.68	0.74
C3: When revising based on Human-AI feedback, I judge whether the suggestions are reasonable and worth adopting.	3.84	0.65
C4: After completing the revision, I go back to check whether the problems identified in the feedback have actually been resolved.	3.74	0.78

It is worth noting that the item C3 received one of the highest ratings (M=3.84). This observation is closely related to the frequent use of AI writing tools by participants. Repeated exposure to such systems seem to help them make a basic judgement about where the machine feedback is reliable and where is is limited.

Although students show a high degree of feedback engagement at the cognitive level, their behavioral dimension presents a different scene, with a relatively low average of 3.42. As is displayed in Table 2, of the four items under cognitive engagement, three fall below the overall average.

Table 2. Participants' Feedback Engagement on Behavioral Level (N=50)

Item	M	SD
B1: When reading Human-AI writing feedback, I can stay focused.	3.6	0.7
B2: Even when some Human-AI feedback suggestions are difficult to implement, I persist in trying.	3.34	0.69
B3: I devote sufficient time and effort to revising my essay according to Human-AI feedback.	3.42	0.76
B4: If there is anything uncertain in the Human-AI writing feedback, I will proactively ask my teacher or classmates for help.	3.32	0.91

Based on the data from this table, students seem less likely to follow all the feedback, which is reflected in a short of persistence in the face of challenges and lack of sufficient time, effort and the tendency to take the initiative to ask for help.

Based on the findings above, it can be inferred that students can process feedback information in a prudent and critical way at cognitive level; however, this high level of cognitive engagement has not been fully transformed into actual revision behavior. From the perspective of the learning promotion effect, if there is a lack of behavioral commitment that matches

cognition level, it is hard for students to transform the cognitive insights into practical learning results, and the potential of human-AI collaborative feedback for promoting learning will also be limited.

To further investigate the degree of students' behavioral engagement, the researchers analyzed their initial drafts and revised versions. Then the acceptance rate of four feedback categories was calculated, including direct substitution, sentence rewriting, paragraph reorganizing, and content addition. The results are shown in Table 3.

Table 3. Students' Adoption of the Four Types of Feedback

Feedback Type	Count	Fully Adopted	Partially Adopted	Adoption Rate
Direct substitution	136	79	34	83.10%
Sentence rewriting	85	31	21	61.20%
Paragraph reorganization	51	9	13	43.10%
Content addition	68	10	16	38.20%
Total	340	129	84	62.60%

According to the data, the overall feedback adoption rate of students reached 62.6%. This medium-level figure is basically consistent with the feedback on behavioral engagement shown by the questionnaire. Observations of students' drafts also support this view that the overall behavioral commitment is not strong.

Although more than half of the feedback suggestions were adopted by students in general, the adoption of direct substitution is as high as 83.1%, which is much higher than the other three types of feedback. The low adoption rate of paragraph reorganization (43.1%) and content addition (38.2%) reflects the low engagement of students in feedback that is intended for changes on the structure or content of the text. The revision mainly focuses on surface language issues, while the adoption rate of feedback requiring more comprehensive modification is far behind.

This actual feedback adoption pattern coincides with the characteristics of AI use revealed by the background questionnaire. Most of the students' previous AI-assisted writing activities focused on surface and local adjustments such as grammar correction and wording, and rarely involved high-order modification such as discourse reconstruction and content deepening. It can be seen that surface feedback is given priority because of the low threshold of operation, while deep feedback is shelved because it exceeds the existing scope of experience.

In response to the gap between student's "high cognition and low behavior", the human-AI collaborative feedback mechanism should make targeted adjustments. It can disassemble the complicated revision tasks and provide examples, so as to turn suggestions into simpler and actionable steps. At the same time, teachers can guide students toward upgrading the use of AI from a simple error correction tool to a collaborative partner that can be employed to polish outlines and check logic, so that AI can really play a role in promoting learning.

5. Conclusion

This study examines how college English learners respond to human-AI collaborative writing feedback based on DeepDeek. The results show that the overall reaction of learners to such feedback is positive, but the degree of engagement is uneven in three dimensions. The cognitive engagement is relatively high and the behavioral engagement is relatively limited, and this inadequacy has been further confirmed in the feedback adoption of their compositions. Accordingly, when building a human-AI collaborative writing feedback model, teachers can optimize the prompt design of AI feedback and enhance the in-depth interaction between learners and AI so as to improve the overall feedback engagement.

This research provides useful reference for the teaching design of English writing involving human-AI feedback. There are various limitations in the research such as the limited sample size and the relatively single data source. Therefore, follow-up research can expand the sample of learners and incorporate more data sources to further test and deepen the findings of this study.

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