

Feedback seeking abilities of L2 writers using ChatGPT: a mixed method multiple case study

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Feedback seeking abilities of L2 writers using ChatGPT: a mixed method multiple case study

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Abstract

Purpose: The study investigated the feedback seeking abilities of learners in L2 writing classrooms using ChatGPT as an automated written corrective feedback (AWCF) provider. Specifically, the research embarked on the exploration of L2 writers' feedback seeking abilities in interacting with ChatGPT for feedback and their perceptions thereof in the new learning environment.

Design/methodology/approach: Three EFL learners of distinct language proficiencies and technological competences were recruited to participate in the mixed method multiple case study. The researcher used observation and in-depth interview to collect the ChatGPT prompts written by the participants and their reflections of feedback seeking in the project.

Findings: The study revealed that: 1) students with different academic profiles display varied abilities to utilize the feedback seeking strategies; 2) the significance of feedback seeking agency was agreed upon; and 3) the promoting factors for the development of students' feedback seeking abilities are the proactivity of involvement and the command of metacognitive regulatory skills.

Implications: Additionally, a conceptual model of feedback seeking in an AI-mediated learning environment was postulated. The research has its conceptual and practical implications for researchers and educators expecting to incorporate ChatGPT in teaching and learning. The research unveiled the significance and potential of using state-of-the-art technologies in education. However, since we are still in an early phase applying such tools in authentic pedagogical environments, many instructional redevelopment and rearrangement should be considered and implemented.

Originality/value: The work is a pioneering effort to explore learners' feedback seeking abilities in a ChatGPT-enhanced learning environment. It pointed out new directions for process-, and student-oriented research in the era of changes.

Keywords: ChatGPT; AI-enhanced learning; feedback seeking abilities; mixed method case study; corrective feedback

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Introduction

In educational studies, feedback has been understood as one of the most effective and easy-to-implement instructional interventions. Researchers have agreed upon the positive

effects and critical position of feedback in enhancing learning achievement (e.g., Hattie and Timperley, 2007; Wiliam, 2018). Similarly, Hyland and Hyland (2019) point out that feedback remains a central topic for educators and researchers in the field of second language (L2) writing with its affirmed role in “encouraging and consolidating learning” (p. 1). In light of the technological advancements, a research trend to study the impact of automated written corrective feedback (AWCF) has become increasingly visible in recent years (Barrot, 2021).

Since the advent of ChatGPT, a conversational service based on generative artificial intelligence (GAI), researchers have enthusiastically explored its capacity for an array of disciplines. According to several piloting studies, ChatGPT has the potential to outperform and replace its predecessors as an error corrector or AWCF provider (Wu, Wang, *et al.*, 2023; Yan, 2023). ChatGPT’s power to automate tasks relies on *prompts*, the interactive instructions created by users inclusive of specific job demands, contextual backgrounds, objectives for the automation, etc. Consequently, L2 writers are expected to proactively *seek* instead of *receive* feedback from the system with well-crafted prompts (White *et al.*, 2023). In a conventional L2 setting, the concept of feedback seeking behavior (FSB) facilitates the understanding of learners’ inquiry and monitoring of received feedback from teachers or peers (Papi *et al.*, 2019). However, positioned in the new and interactive learning environment, we are facing the scantness of empirical evidence in students’ actual abilities to seek feedback generated by AI-based systems.

Against the above backdrops, the study sets out to explore learners’ feedback seeking abilities in L2 classrooms using ChatGPT. Three participants with different levels of language proficiencies and technological competences were recruited for the multiple case studies employing the sequential explanatory mixed-method design. After a 5-week project, the researcher analyzed ChatGPT prompts created by the participants through

coding and quantitative document analysis. Then, transcripts of the two in-depth interview sessions were analyzed for qualitative findings. Through the data triangulation and interpretation, the following research questions are answered:

RQ1: What characterizes the feedback seeking abilities of the participants in the interaction with ChatGPT for feedback?

RQ2: How do L2 writers perceive their feedback seeking abilities in an ChatGPT-enhanced learning environment?

The study is significant as an innovative effort to explore the learning behaviors of students in a brand-new environment. The conceptual and practical contribution directed from the findings would be valuable for the field of AI-mediated language education. The next section provides a review of significant literature related to the core concept and theories related to the topic. Section 3 details the methodologies utilized in the study. Results and the interpretation are presented in Section 4 and 5 respectively before the concluding remarks, limitations, and future research directions in Section 6.

Literature Review

In this section, literature on feedback seeking behavior and automated feedback providers is reviewed before the conceptualization of feedback seeking in a GAI-enhanced learning environment.

Feedback seeking behavior

FSB, the processes of learners’ seeking feedback information, is one of the determining factors of feedback effectiveness (Leenknecht *et al.*, 2019). The dyadic construct, composing of feedback *inquiry* and *monitoring*, was borrowed from Ashford et al. (2003) to indicate the purposeful acquisition of feedback information from the

surrounding environment or agents. Papi et al. (2019) recast the term for language learning to denote students' utilization of inquiry and monitoring strategies in seeking feedback from teachers, peer learners and the learning environment.

The introduction of FSB to language learning reflects: 1) the focus on individual differences among learners in feedback (Winstone *et al.*, 2021); 2) the shift from viewing feedback as a teaching to a learning resource (Papi *et al.*, 2019); and 3) the emphasize on the proactive *involvement* instead of the *reception* of learners (Malecka *et al.*, 2022). Two research strands could be identified from existing literature on FSB in L2 learning. On the one hand, extant studies focused on the relation between FSB, its motivational antecedents, and/or subsequent learning outcomes (see Xu and Wang, 2023; Yao and Zhu, 2022). On the other hand, a few recent studies have delved into L2 learners' FSB in technology-enhanced settings. For example, Kessler (2023) argued that L2 learners in an online community actively sought feedback through *clarification* and *confirmation* requests with clear individual strategic tendencies. Similarly, Xu (2021) studied L2 writers' FSB during Covid-19 and discovered the positive correlation between feedback-seeking orientations and the use of self-regulatory strategies.

However, we still face a paucity of knowledge in how students seek feedback in emerging environments practicing *new feedback paradigm*, where the role of teachers is minimal and students' information-generation from and sense-making of technology-produced feedback are pivotal (Jensen *et al.*, 2023). FSB from existing studies remains of the *old paradigm*, in which the students, receivers of feedback, manage to strike a balance between the explicit inquiry for feedback from teachers and peers, and the implicit monitoring of the learning environment (Papi *et al.*, 2019). Conversely, the changing learning environment as well as the role of learners as feedback *generators* urge further exploration into students' feedback seeking in ChatGPT-enhanced settings.

Automated feedback providers: potential of ChatGPT

Researchers have contributed a plethora of studies exploring the effects of technology-enhanced feedback on language learning, especially L2 writing performance. In the beginning, corpus-based automated writing evaluation (AWE) systems such as Pigai, iWrite, and iTEST were widely applied in L2 writing classrooms (Zhang, 2021). Soon the AWE systems gave place to AI-based corrective feedback providers, e.g., Grammarly and QuillBot. The advantage of these AI-based solutions were empirically validated (Ngo *et al.*, 2022) and thus remained the most frequent choices for automated feedback in L2 classrooms.

Since its debut, researchers have attempted to investigate into ChatGPT’s effects on L2 writing. Yan (2023) explored L2 writers’ abilities to utilize ChatGPT’s text generation functionality in writing and their perceptions towards the potential threats to academic integrity. Barrot (2023) summarized advantages and pitfalls of ChatGPT’s potential usage in L2 writing classrooms, and offered recommendations for L2 teachers. Furthermore, efforts have been made to incorporate ChatGPT in L2 writing assessment. Mizumoto and Eguchi (2023) reported convincing accuracy and reliability from the automated scoring on L2 writing products by ChatGPT. Accordingly, the potential of ChatGPT as a powerful AWCF providers is posited on: 1) the ability to provide accurate grammatical and syntactical corrections, thanks to the tremendous volume of trained linguistic data (Fang *et al.*, 2023); 2) the mechanism of prompt engineering with which users could tap prompts to iteratively and progressively elicit feedback and responses of improved quality (White *et al.*, 2023); and 3) the observed enhancement of learners’ engagement and involvement in the interaction with ChatGPT (Yan, 2023).

Furthermore, ChatGPT brings changes to L2 learning behaviors in seeking and utilizing feedback. First, the human-ChatGPT communication is bi-directional, making ChatGPT a learner-aware, human-like, and adaptive feedback provider (Barrot, 2023). Second, once properly prompted, ChatGPT could generate feedback on a wide range of writing constructs and linguistic features, inclusive but not limited to grammar and syntactical correctness (Mizumoto and Eguchi, 2023). Third, multi-turn human-ChatGPT communication is encouraged and corroborated to be conducive to performance improvement of ChatGPT-generated feedback (Bang *et al.*, 2023). Given the human-AI communication interactivity and corresponding changes in learning behaviors, relevant studies on learning behavior from the learner perspectives are urgently needed.

Conceptualizing feedback seeking in GAI-enhanced learning

The study is grounded on interaction theory. As argued by Long (1996), the four constructs involved in learning included input, interaction, feedback and output. For L2 development, Bitchener and Ferris (2012) emphasized the understanding, internalization and processing of feedback on the basis of exiting knowledge. Furthermore, Kaptelinin and Nardi (2018) pinpointed that the deepening of the effects of technology could be attained by putting human-computer interaction within the “purposeful human activities” (p. 3). Correspondingly, a conceptual model (**Figure 1**) is proposed by integrating feedback seeking from GAI-based systems with the subsequent internalization and processing of the feedback.

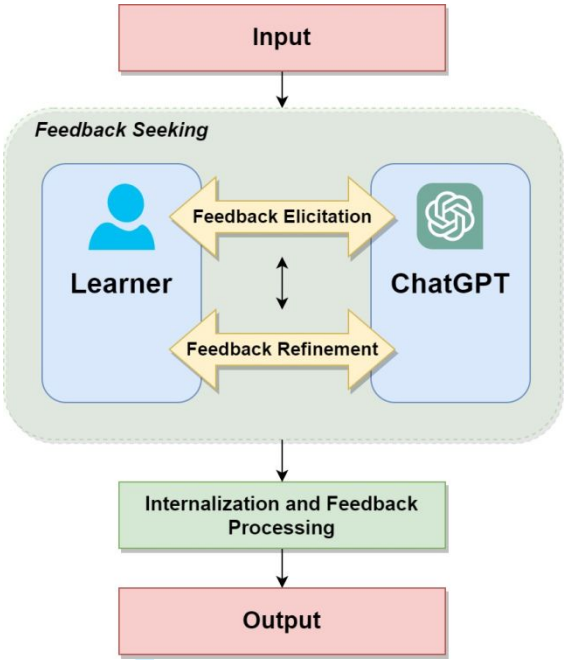


Figure 1. Conceptual Model of L2 writers' feedback seeking from ChatGPT

According to Papi et al. (2019), FSB consists of feedback monitoring and inquiry through which the learners observe and absorb relevant feedback information from the environment, and seek further explanation of the feedback. However, the emergence of GAI-based tools poses new challenges to the operationalization of the two behaviors. First, the approaches of feedback inquiry changes. Compared to the traditional teacher-fronted settings, learners no longer resort to the explanation and help from teachers or peer (Jensen *et al.*, 2023). Conversely, the affordance of GAI systems could replicate the role of both teachers and peer learners at the cost of extra prompts written and submitted through the dialog interfaces. Second, the feedback monitoring as described by Papi et al. (2019) is irrelevant for the setting with ChatGPT. With the conversational interaction with AI and proper prompt writing techniques, learners could instantly and iteratively request GAI systems to amend, improve and regenerate feedback in a rather explicit and direct manner. Hence, during a feedback episode, the feedback seeking processes could be explicitly executed for multiple times. Consequently, the original two component of

FSB could be reframed: 1) feedback elicitation, in which the learners use prompts to iteratively generate feedback with different contents and focus; 2) feedback refinement, an on-going process in which the learners repeatedly report their inner judgement to the GAI systems, after which feedback would be regenerated based on the provided evaluation. Correspondingly, feedback seeking ability refers to the capability of students to effectively use feedback elicitation and refinement strategies in the interaction with GAI systems.

Methods and Materials

Design

The study adopted a mixed method multiple case study approach (Yin, 2013). In the fields of applied linguistics (Duff, 2010) and instructional feedback (e.g., Zhang and Hyland, 2023), case study has been widely applied as an established means to collect rich data of students' actual learning experiences. Additionally, Adams (2019) argued that the limited number of research subjects in case studies had its merits in unfolding learner experiences in using the feedback other than the feedback design.

A case was defined as a student's ability to effectively use feedback seeking strategies and their perceptions thereof. Internally, a sequential explanatory mixed method design was selected so that the quantitatively displayed characteristics of students' feedback seeking abilities would be explained by their own reflection and perceptions (Creswell and Plano Clark, 2018). The study was collective in nature, since it allowed the researcher to generalize the findings across multiple cases to a broader context (Stake, 1995).

Participants

The study took place in an EFL program at a Chinese university. Students in the program were required to take two writing courses. The researcher purposefully sampled three participants with distinct level of language proficiencies and technological competences (see **The screening** criteria included: 1) mean grades in precedent L2 writing assessments; 2) experiences and interest in computer-assisted language learning and feedback reflected in a pre-project survey; 3) performance in two digital humanities courses; and 4) self-rated technological competences. The criteria ensured that students with various levels of language and technological competence were recruited, thus forming representative cases of L2 writers in the program.

Table I for their characteristics). The screening criteria included: 1) mean grades in precedent L2 writing assessments¹; 2) experiences and interest in computer-assisted language learning and feedback reflected in a pre-project survey; 3) performance in two digital humanities courses; and 4) self-rated technological competences². The criteria ensured that students with various levels of language and technological competence were recruited, thus forming representative cases of L2 writers in the program.

Table I. Demographic Information and Characteristics of the Participants

Pseudonyms	Gender	Age	Mean Grades 1*	Mean Grades 2*	Self-rated Technological Competences	Instructors' Recommendations
Toby	M	21	81/100	91/100	9/10	"His balance in both language proficiency and technology abilities make

¹ Writing tasks were developed as per the requirement of College English Test Band 6, an English proficiency examination commonly administered in Chinese universities. The writing performances were rated against a 100-mark rubric composing five writing assessment dimensions, i.e., content, organization, grammar, vocabulary, and mechanics.

² Measured by a self-reported 10-point survey including the following dimensions: a) general digital literacy; b) information retrieval and evaluation; c) communicative and collaborative skills using technology; and d) language-specific technological skills.

						him a must choice for your consideration”
Lisa	F	19	67/100	85/100	8/10	“Lisa is a rare case for female students, she is better at handling the technology-related stuffs”.
Isabella	F	20	88/100	62/100	5/10	“Just a typical liberal arts student, at least a very hard-working student in the digital humanity courses ”.

*Mean Grades 1: mean grades in precedent L2 writing assessments.

Mean Grades 2: mean grades in precedent assessments in digital humanities courses.

Based on students’ performance in pre-project language assessments and teachers’ recommendations, Toby represented those with high language proficiency and technological competence; Lisa stood for those with medium language proficiency and high technological competence; and Isabella exemplified those with high language proficiency and medium technological competence.

Data Collection

The project was a five-week teacher-scaffolded informal L2 writing practicum with a total number of 68 learners (including the three participants). During the project, all learners were required to complete and revise three argumentative essay each no less than 250 words. Additionally, two sessions of live demonstration and peer discussion were arranged for each week (see Appendix S1 for practicum details). To ensure students’ engagement with the practicum, they were allowed to choose one of the essays completed in the practicum as assignment (accounting for 15% of the final grade) of an ongoing writing course.

During the project, students were asked to keep track of the prompts they have written to interact with ChatGPT in learning logs (see Appendix S2). To overcome the potential bias in the focus and scope of ChatGPT-generated feedback due to different feedback seeking abilities and ChatGPT prompting strategies, all the participants were

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3 trained and required to use the same ChatGPT prompting template (see Appendix S1).
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5 The official GPT-3.5 version of ChatGPT from OpenAI was used in the study. Students
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7 were encouraged to explore ChatGPT’s functionality at their own paces, hence no time
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9 restraint was posed on their interaction with ChatGPT. The learning log could be filled
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11 with multimedia files as supplementary documents, e.g., screenshot, videorecording, etc.
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13 Furthermore, to record all the learning behaviors, the project took place at the
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15 computerized language laboratories equipped with real-time screen recording,
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17 keylogging, and video-based classroom monitoring devices. Upon the completion of each
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19 session in the project, students are asked to review and member-check the contents of
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21 learning log.
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26 To obtain students’ perceptions of their feedback seeking abilities in the
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28 ChatGPT-enhanced learning environment, two sessions of face-to-face in-depth
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30 interview were arranged for each participant at the third and fifth week respectively. Each
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32 interview session lasted for approximately 30 minutes. The interview processes strictly
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34 followed the interview protocol (see Appendix S3). The participants used their first
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36 language (Chinese) so that they could better express their understandings and perceptions.
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38 All contents and procedures of the interview were audio recorded, translated into English,
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40 and transcribed verbatim. To enhance the trustworthiness of the collected data, all
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42 translated texts were checked by a co-researcher who was a certified and accredited
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44 English-Chinese translator before member-checked by the participants (Birt *et al.*, 2016).
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51 ***Coding and Analysis***
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54 Data obtained from observation and interviews were analyzed and organized in
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56 accordance with the within-case and cross-case analysis techniques recommended by
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58 seminal works of case study (Stake, 2005; Yin, 2013).
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First, quantitative document analysis was applied to the ChatGPT prompts. In practice, a coding schemes of ChatGPT prompt patterns developed based on the experiences from the pilot study and the prompt engineering mechanism (White *et al.*, 2023) was applied in the study (see Appendix S4). Four coders were recruited from the teaching faculty to code the patterns of students' prompts. The inter-rater reliability measured by the Fleiss' Kappa statistics ($Kappa = .76$; [95% CI: 0.68-0.81]) revealed an acceptable level of agreement between the coders. Then, descriptive analysis and visualization were applied to the coded data.

Second, thematic analysis was applied to the transcribed interview data. In specific, the six-step procedures advocated by Braun and Clarke (2006) was adhered to. Two co-researchers were recruited to assist the researcher in the data coding and analysis. Initial codes of significant and recurring patterns were extracted from the original data, then they were refined into higher-order themes representing students' perceptions of their feedback seeking abilities from ChatGPT in language learning. To ensure the trustworthiness of the qualitative analysis, researcher triangulation and peer debriefing were practiced.

Validity

Results

Quantitative Document Analysis

Toby (**Table II**) has created a total of 2,537 pieces of prompts in 167 rounds of interaction with ChatGPT using 850 minutes; Lisa (**Table III**) has written 1,648 pieces of prompts in 193 rounds of interaction with ChatGPT using 436 minutes; Isabella (**Table IV**) has spent 1,034 minutes in her 70-round interaction with ChatGPT with 1,921 pieces of

prompts.

Table II. ChatGPT Prompts Created by Toby

	Prompt	Words	Words per prompt	Rounds	Prompts per round	Time spent (min)
Week 1	306	3213	10.5	48	6.4	251
Week 2	426	4856	11.4	35	12.2	215
Week 3	520	7124	13.7	31	16.8	177
Week 4	589	9365	15.9	27	21.8	111
Week 5	696	12389	17.8	26	26.8	96
Sum	2537	36947	-	167	-	850
Mean	507.4	7389.5	13.9	33.4	16.8	170

Table III. ChatGPT Prompts Created by Lisa

	Prompts	Words	Words per Prompt	Rounds	Prompts per Round	Time spent (min)
Week 1	249	2615	10.5	37	6.7	110
Week 2	292	3329	11.4	40	7.3	102
Week 3	301	3130	10.4	36	8.4	88
Week 4	375	4163	11.1	39	9.6	71
Week 5	431	4870	11.3	41	10.5	65
Sum	1648	18107	-	193	-	436
Mean	329.6	3621.3	10.9	38.6	8.5	87

Table IV. ChatGPT Prompts Created by Isabella

	Prompts	Words	Words per Prompt	Rounds	Prompts per Round	Time spent (min)
Week 1	245	3185	13.0	8	30.6	280
Week 2	335	4690	14.0	12	27.9	245
Week 3	442	7249	16.4	14	31.6	211
Week 4	432	6696	15.5	17	25.4	177
Week 5	467	9247	19.8	19	24.6	121
Sum	1921	31066	-	70	-	1034
Mean	384.2	6213.3	15.7	14	28	207

Against the coding scheme, the coders have categorized all prompts into two major dimensions of feedback elicitation and refinement. Then the data were further divided into 11 different subcategories of ChatGPT prompt patterns. With the coded data visualized by the temporal order, the development feature of the three participants’ feedback seeking abilities were illustrated.

Toby's development of feedback seeking abilities was steady and balanced (see Figure 2). His application of basic prompts and direct feedback regeneration was remarkably reduced as he progressed; his utilization of other feedback elicitation strategies grew consistently while his command of feedback refinement strategies experienced a transition from a rapid heating up to a gradual cooling down.

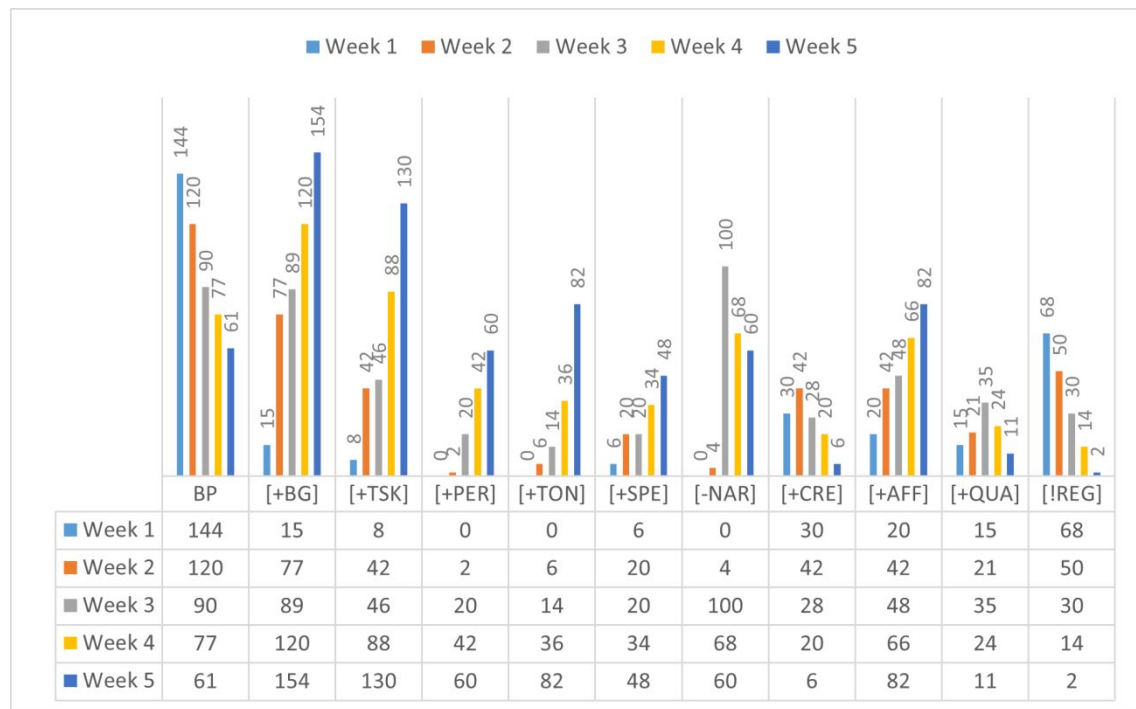


Figure 2. Prompt Patterns of Toby

For Lisa (see Figure 3), her application of basic prompts and direct feedback regeneration remained generally unchanged in the project, while a growing momentum could be observed for the rest feedback seeking strategies.

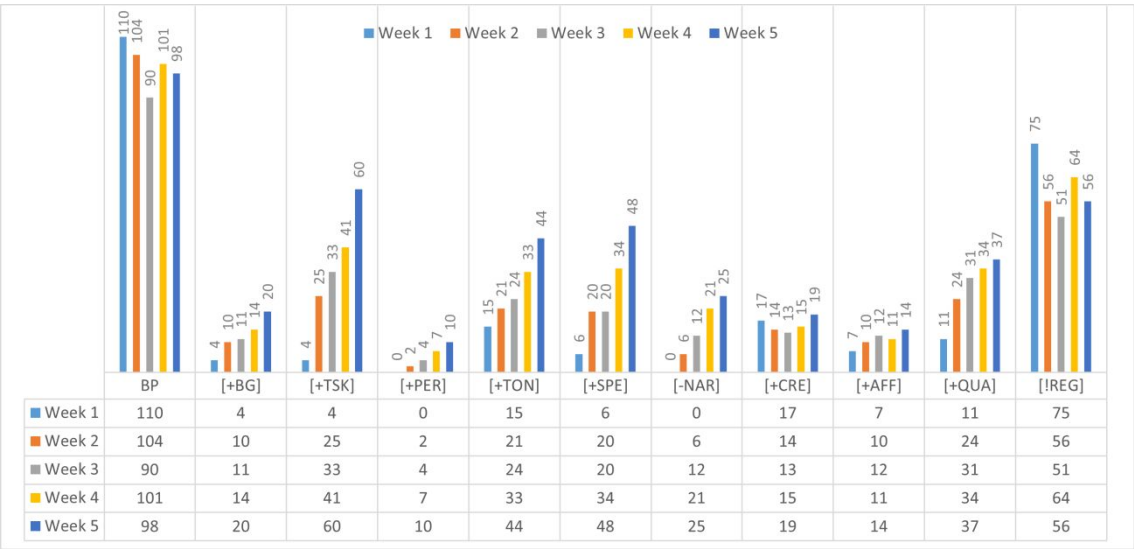


Figure 3. Prompt Patterns of Lisa

Finally, Isabella’s development was similar to Toby’s (see Figure 4), only relatively less in quantity as she appeared as a slow-paced and detailed prompt writer.

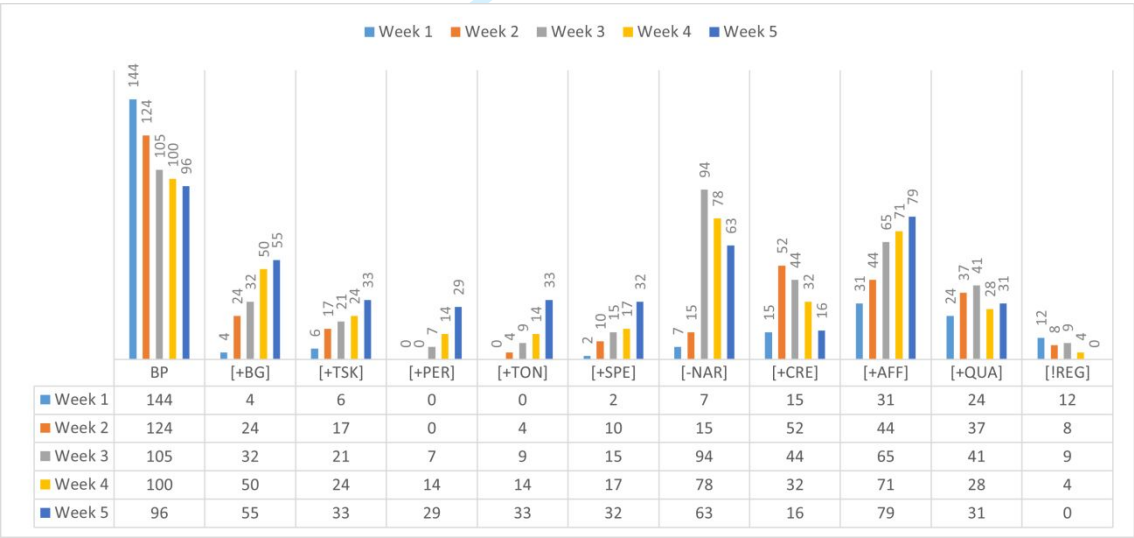


Figure 4. Prompt Patterns of Isabella

Thematic Analysis

Through the thematic analysis, the following main themes were identified: 1) perceptions of feedback seeking from ChatGPT; 2) significance of active feedback seeking; and 3) factors for the development of feedback seeking abilities. The thematic map of the interviews is shown in Figure 5. Additionally, each of the participants summarized their

learning experiences in the second interview session.

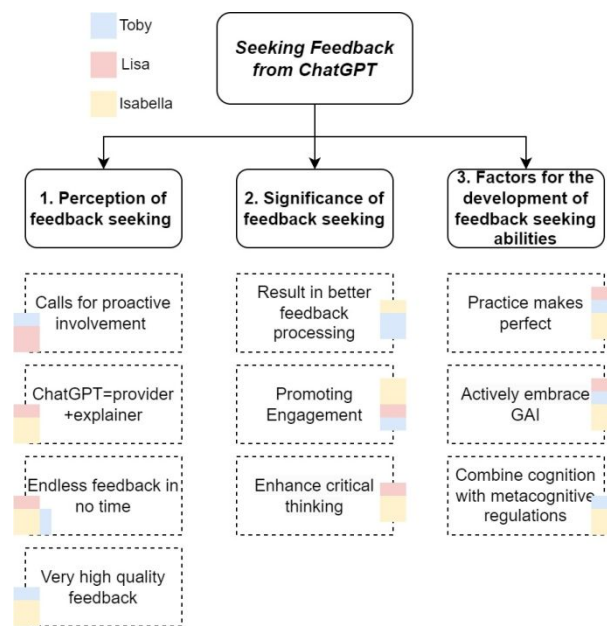


Figure 5. Thematic Map of the Interviews

Perception of feedback seeking from ChatGPT

When asked about the GAI-enhanced environments, Toby and Lisa stressed the proactive involvement of learners. As they have experienced, the shift from a feedback *receiver* to *seeker* was impactful on their “flow of learning”. In the new environment, students’ agency, creativity, and proactivity was highly valued.

Pertinent to the role ChatGPT played in L2 writing, Lisa and Isabella agreed upon the dual identity as both a feedback *provider* and *explainer*. From their viewpoints, ChatGPT availed the learners clearer and detailed explanation about the feedback. At the same time, they believed that such affordance distinguishes ChatGPT from previous feedback providers, as it could compensate for the possible unavailability of the teachers.

The three participants reached an agreement in the advantage of ChatGPT as an instant feedback provider. Learners could continuously solicit corrective feedback with improved quality from the AI system, if they were “well-versed in the language ChatGPT

spoke, aka, the prompts” (Toby, interview#1). Furthermore, Toby and Isabella argued in unison that “ChatGPT needs just a few seconds to provide feedback, and every second would be rewarded with corrections of high quality” (Isabella, interview#2). According to both Toby and Isabella, who have compared the quality of the corrections from multiple sources, e.g., Grammarly or QuillBot, ChatGPT was generally reliable and accurate.

Significance of active feedback seeking

All the three participants agreed that active feedback seeking was beneficial to the affective and behavioral outcomes of learning. Toby and Isabella emphasized that the subsequent processing of feedback gained from frequent and effective feedback seeking. Isabella underlined the value of the unfocused feedback offered by ChatGPT against the focused feedback from teachers that she “could make judgement on writing from a holistic perspective instead of paying attention merely to a certain aspect” (Isabella, interview#1).

Regarding the effects of the active feedback seeking from ChatGPT on the affective domain of learning experiences, all participants kept pace with each other. To them, the feedback seeking from ChatGPT helped creating a democratic atmosphere. Students were mentally at ease asking ChatGPT to regenerate or refine the feedback.

Furthermore, participants felt that they are motivated to actively involve in feedback seeking. In conventional settings, negative and critical feedback was treated by learners as shame. Consequently, students were generally reluctant to ask additional questions about the feedback, much less challenge it. The interactive processes to elicit feedback from ChatGPT, according to Lisa, “works like a black box, in which our shames are hidden, in a positive way” (Lisa, interview#2).

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3 Finally, for the effects of feedback seeking on L2 writer's competence, Lisa and
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5 Isabelle pointed to students' critical thinking. In accordance with their reflections, the
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7 feedback refinement processes required the learners to critically compare the values and
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9 side effects of feedback under consideration. Furthermore, the abilities to accurately
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11 identify existing issues and critically describe them in writing prompts were vital for
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13 effective interaction with ChatGPT.
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18 *Factors for the development of feedback seeking abilities*

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21 Grounded on the consensus that ChatGPT provided a promoting environment for students
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23 to develop feedback seeking abilities, all participants accentuate that the experiences of
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25 interaction with AI system were most important. ChatGPT, from their viewpoints, is
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27 "shockingly easy-to-use at first glance" (Toby, interview#2), but takes "a huge amount
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29 of practice and thinking" to "craft the skills and techniques of writing and polishing
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31 prompts" (Isabella, interview#2).
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35 Furthermore, all three participants agreed that an open-minded attitude mattered.
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37 According to Toby, the innovation ChatGPT brought about resulted in "either overhyped
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39 tunes or total rejections" (Toby, interview#1). As a result, there exists a gap between the
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41 perceived affordance of "ChatGPT as a key to good writing quality" (Lisa, interview#1)
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43 and realistic experiences that "it is a powerful yet demanding tool with diversified and
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45 unpredictable outcomes" (Isabella, interview#2). To mediate such cognitive dissonance,
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47 the participants suggested that deepening one's understanding of ChatGPT's mechanism
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49 and workflow in a real setting of L2 writing was imperative.
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53 Toby and Isabella provided their take on the concrete learning strategies needed
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55 to foster feedback seeking abilities from AI-based systems. Reflected by their
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experiences, learners’ monitoring and evaluation were decisive for feedback quality.

Toby confirmed that such refinements called for metacognitive abilities:

“To compare and select from multiple pieces of feedback, one needs to evaluate comprehensively, and use a whole flow of planning, comparing and controlling from a higher order perspective” (Toby, interview#2).

Wrap-up of individual learning experiences

In the second interview sessions, each participant summarized their learning experiences and several post-project perceptions. In specific, their perceptions of feedback seeking, recommendations for the best practices and a summary of their personal growth were elucidated. The gist of their summaries is presented in **Table V**.

Table V. Individual Summary of Learning Experiences

Participant	Toby	Lisa	Isabella
Post-project perception of feedback seeking	A learners should actively seek feedback from AI systems. During the refinement, he/she should use multiple criteria to select and compare available feedback.	We should take advantage of AI system’s ability to provide feedback from different angles.	Human understanding and judgement should not be replaced. One should think closely at the feedback provided by the AI system and make the final decision on his/her own.
Perceived best practice of feedback seeking	It’s all about the balance. The balance between the learner’s own judgement and the interaction with the system. Think hard for a clear decision, then interact proactively with the AI system to specify the details in the decision.	Proactively interact with ChatGPT for improvement in feedback. Learners should actively channel their own judgement back to the system. The more you interact with ChatGPT, the better.	Precision matters. When using the conversation with ChatGPT to produce feedback, we should give detailed and clear prompts. For the refinement, we should incorporate the AI’s response with our own linguistics knowledge.
Personal growth	A thrilling experience in using ChatGPT for feedback. I like my fast-paced growth in feedback triggering and feedback monitoring. I have tried to be bold and exploratory in dealing with ChatGPT. I will explore more advanced tricks in the future, and I believe AI-based tools will be my learning companion in the days to come.	Have truly mastered the tricks to chat with AI. But I am not satisfied with my ability to write high quality prompt. I like the feeling with ChatGPT. But I will learn more about how to write effective prompt as a language learner.	I will describe my development as a slow-paced but fruitful one. Before the project, I am not confident in myself. So, for most of the time, I write prompts with measured words and am very careful talking with ChatGPT. But I like the feeling of reading and comparing the feedback.

Discussions

Being a multiple case study, the observations and findings emerged from individual cases were triangulated and holistically interpreted. The findings are discussed against existing empirical evidence and theoretical perspectives.

In answering **RQ1**, the quantitative document analysis revealed that students with different language proficiencies and technological competences displayed diversified developmental trajectories of feedback seeking abilities. First, students with higher language proficiency (i.e., Toby and Isabella) tended to create content-rich prompts in relatively fewer rounds of interaction with AI system, while learner with moderate language proficiency (i.e., Lisa) resorted to an opposite path. The differences in the quantity and length of prompts could be partially explained by the claim that the utilization and processing of feedback depended on the learners' language skills (Koltovskaia, 2020). Such phenomenon could also be attributed to the interrelation between L2 language mindset and FSB (Yao and Zhu, 2022). Second, judging from the time consumption of the participants, Toby and Isabella (representing learners with higher language proficiency) were relatively slow-paced in action. This echoed with the observation of Ranalli (2018) that AWCF would affect mental-effort expenditure on learners with different L2 levels. However, contrary to the claim that AWCF would pose extra cognitive overload to low-proficiency learners (Bitchener and Ferris, 2012), the current study revealed that it was high-proficiency students (i.e., Toby and Isabella) who spent more time and efforts analyzing, evaluating and making use the AWCF. Such contradiction could be attributed to the iterative and interaction mechanism of ChatGPT, in which low-proficiency learners could directly ask ChatGPT to regenerate (as evidenced in Lisa's overuse of *feedback regeneration* in **Figure 2**) while high-proficiency learners

(as evidenced in the dramatic decrease in feedback regeneration of Toby and Isabella) would stop, think, and write prompts with additionally backgrounds and specific demands (as evidenced by Toby and Isabella’s prompt writing habits). Additionally, the variances in time consumption testified the existence of *inner feedback*, a natural process of processing and comparison when the learners was exposed to feedback (Nicol, 2021).

Internally, the weekly ChatGPT prompt patterns reflected the strategical aspect of feedback seeking ability development. First, students with different language proficiencies kept abreast in exerting feedback elicitation strategies in the interaction with ChatGPT. This showcased students’ progress in understanding the conversational and iterative mechanism of ChatGPT. With the progression in the project, students gradually reduced writing minimalistic prompts, instead, additional information were included to enrich and clarify the instructions prepared for ChatGPT. This finding echoed the developmental characteristics of students using ChatGPT for text generation in an L2 classroom (Yan, 2023). Second, diversity to use feedback refinement strategies surfaced from the quantitative document analysis. Students with higher language proficiencies (i.e., Toby and Isabella) steadily shifted from the style of short and frequent interaction with the AI system to a more deliberated and information-rich manner. Conversely, Lisa, representing students with moderate language proficiency but higher command of technologies, consistently carried out a straightforward way to interact with the AI system. To some extent, the finding was in tandem with the argument of Havranek and Cesnik’s (2001) that proficient learners could make better use of feedback. As feedback refinement strategies functioned on a higher order, such disparities could also be attributed to the variance in metacognitive regulatory skills. In this sense, such phenomenon could be explained by the positive correlation between metacognition and FSB (Xu, 2021).

In answering **RQ2**, the synthetization of participants' perceptions pinpointed the decisive factors for fostering feedback seeking abilities in a ChatGPT-enhanced environment. First, the consensus of participants emphasized learners' proactive involvement. Such belief was in tandem with the view that contemporary feedback was a process of self-generated meaning making (Jensen *et al.*, 2023). Based on such views, we infer that the significance of human efforts, in the era of AI-enhanced learning, should be uplifted rather than diminished. Second, the participants stressed the significance of metacognitive regulation. In the study, participants effectively combined the internal feedback processing and external feedback refinement to make better use of ChatGPT's feedback. The observation contradicted traditional views that feedback seeking encompassed limited metacognitive regulation other than the comparison of value and cost of potential feedback information (Ashford *et al.*, 2003). ChatGPT called for higher level of metacognition because students were allowed to state their affective and cognitive judgments. Such contradiction could be attributed to the *new feedback paradigm*, in which students' proactivity and agency were held pivotal (Jensen *et al.*, 2023). From another perspective, such phenomenon testified the reported effects of ChatGPT on the promotion of self-regulation skills (Wu, Lee, *et al.*, 2023).

Conclusions

The study investigated the development of feedback seeking abilities of L2 writers utilizing ChatGPT for corrective feedback. Furthermore, the research identified the key factors deciding students' development of feedback seeking abilities in the new learning environment.

The study delivered conceptual and pedagogical implications. First, a sociomaterial perspective towards feedback would trigger researchers to expand and

redevelop existing conceptualization in the field of instructional feedback (Gravett, 2022). The study revealed that ChatGPT, when actively and strategically utilized, offered a competitive solution for AWCF in L2 learning. Considering the growth in the application of AI, such domain-specific and in-depth investigations into the provision and utilization of feedback in innovative learning environments would be helpful for the sustained development of educational studies in the new era. Second, educators should consider the development of students' abilities to use state-of-the-art tools. The results showed that the quality and effectiveness of ChatGPT-generated feedback were closely related to students' feedback seeking abilities. However, to date, such abilities were understudied, let alone properly trained. There remained much to be done for educators, e.g., altering curriculum and assessment setups, (re)constructing a learning environment leveraging AI affordance and peer collaboration, providing training on AI skills, etc.

The study was not without limitations. First, the study took a relatively narrow stance towards student's learning behaviors in the new context. The study focused on human-AI interaction during the utilization of ChatGPT in L2 classrooms. Consequently, other key factors related to learning process and outcomes, e.g., achievement, engagement, motivation, acceptance, etc., were not examined. In the follow-up studies, educators and researchers could continue the exploration of the impact of ChatGPT on different aspects of pedagogy. Second, the reported findings were based on a three-participant case study and could not be easily generalizable. Considering the complexity and diversity of L2 learning, follow-up studies are encouraged to examine students' feedback seeking with a larger sample size. Third, the study intentionally adopted a student-centered perspective in research design. As a result, the effects of ChatGPT on teacher's roles and instructional approaches were not examined. In subsequent studies, researchers could posit the research settings in teacher-fronted L2 classrooms, where the

interaction between students and AI systems would be mediated by the teacher-student and peer interactions. Finally, the study is restricted by its duration. With a relatively short time span, the study delivered exploratory insights necessary to understand students' feedback seeking from GAI tools used in learning. However, due to the limited amount of collected data, the study did not apply analytical methods such as inferential statistical analysis, which would offer more evidence regarding the developmental trajectories of students' feedback seeking abilities. In subsequent studies, researchers are encouraged to conduct longitudinal studies for the deepened understanding of feedback seeking with AI-enhanced learning tools.

Acknowledgement

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Declaration of Interest

The author has no competing interests to declare.

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Dear editor,

Greetings,

Thanks for being the editor of the manuscript entitled *Feedback seeking abilities of L2 writers using ChatGPT: a mixed method multiple case study (K-09-2023-1933)*, which is currently under the consideration of Kybernetes.

I would like to extend the warmest thanks to you and all the three reviewers for the valuable comments and constructive suggestions. The manuscript has been revised in accordance with these comments. Changes made are described as follows in boxes. Correspondingly, all relevant amendments made in the revision are marked with color yellow in the manuscript.

Comments from Reviewer 1

1. Clarity of Research Question: The abstract should provide a more explicit statement of the research question or hypothesis being investigated to help readers understand the study's focus from the outset.

Response: Thank you for the comment. I agree with the reviewer that a more explicit statement of research questions would be beneficial. Hence the following sentences were added to the *purpose* section within the abstract.

Specifically, the research embarked on the exploration of L2 writers' feedback seeking abilities in interacting with ChatGPT for feedback and their perceptions thereof in the new learning environment.

2. Sample Size and Diversity: Consider expanding the sample size and diversity of participants to enhance the generalizability of findings, as three participants with distinct language proficiencies and technological competences may limit the study's external validity.

Response: Thank you for the suggestions. From my own perspective, this is a question to be answered in every research adopting a case study design.

Case study has its own advantages. For example, in the field of applied linguistics, case study has been widely applied since it is an established means of gathering rich data to analyze students' language learning experiences (Duff, 2010). Similarly, in the research field of instructional feedback, case study is also preferred and widely applied in a series

of published works (e.g., Yu and Hu, 2017; Yu and Lee, 2015).

In case studies, it is customary for the research to select a limited number of participants. This, to a certain degree, would raise the issue of generalizability and validity. However, Adams (2019) has argued that the limited number of research subjects merits the research in unfolding learner experiences in using the feedback other than the effects caused by the feedback design. For the present study, which is essentially a behavioral investigation into L2 writers' feedback seeking abilities in a ChatGPT-enhanced language classroom, the justification provided by Adams (2019) is valid and applicable regarding the limited number of participants selected.

Nevertheless, this does not mean that the selection of participants could be random in the present study. In practice, I have implemented a relatively comprehensive inclusion criteria to select representative participants for the study. In the revision, I have provided additional information regarding the sampling criteria.

Hence, the reviewer is invited to refer to the changes made in the relevant sections in the methodology section. I have made the following two major changes:

1. Justify the applicability of the case study design and corresponding limited number of participants recruited for the study. (yellow-marked parts in p.7)

2. The details of the sampling criteria which allows the researcher to select representative samples from the cohort of students. (yellow-marked parts in p.8-9)

Finally, I hold the limited number of samples as one of the limitations of the present study. Hence, I have added it as one of the four aspects of the limitations in the discussion section. Please kindly refer to the revised limitation section for details.

3. Control for External Factors: The abstract does not mention whether external factors that could influence feedback-seeking abilities (e.g., prior learning experiences or motivation) were controlled for, which could impact the internal validity of the study.

Response: Thank you for the comment. I agree with the reviewer that internal validity should be considered and guaranteed. In the present study, the following measures have been taken to control for the potential bias caused by external factors (i.e., L2 proficiency, digital literacy (AI), and motivation).

1. Using a cross-case design.

The study was collective in nature, since it allowed the researcher to generalize the findings across multiple cases to a broader context (Stake, 1995).

2. Motivating students:

To ensure students' engagement with the practicum, they were allowed to choose one of the essays completed in the practicum as assignment (accounting for 15% of the final grade) of an ongoing writing course. (p. 10)

3. Using a unified ChatGPT prompting template.

To overcome the potential bias in the focus and scope of ChatGPT-generated feedback due to different feedback seeking abilities and ChatGPT prompting strategies, all the participants were trained and required to use the same ChatGPT prompting template (see Appendix S1). The official GPT-3.5 version of ChatGPT from OpenAI was used in the study. Students were encouraged to explore ChatGPT's functionality at their own paces, hence no time restraint was posed on their interaction with ChatGPT. (p10-11)

However, I don't believe it should be listed in the abstract. From my perspective, these are details within the methodological considerations in the study that allowed data and results with better validity. Anyway, I would like to thank the reviewer again for these very valued suggestions.

4. Methodological Transparency: The abstract should briefly mention how the in-depth interviews were structured and how data analysis was conducted, providing readers with a clearer understanding of the research methodology.

Response: Thank you for the comment. I agree with the reviewer that the simplicity in the relevant part provided limited information pertaining to the analytic procedures employed in the qualitative strand of the study. The following details have been added to the corresponding sections:

1. (collection of qualitative data) The participants used their first language (Chinese) so that they could better express their understandings and perceptions. All contents and procedures of the interview were audio recorded, translated into English, and transcribed verbatim. To enhance the trustworthiness of the collected data, all translated texts were checked by a co-researcher who was a certified and accredited English-Chinese translator before member-checked by the participants (Birt et al., 2016).

2. (analysis of qualitative data) Initial codes of significant and recurring patterns were extracted from the original data, then they were refined into higher-order themes representing students' perceptions of their feedback seeking abilities from ChatGPT in language learning.

Hopefully, the added details, coupled with the research instrument listed in the appendix (S3), could provide a more concrete introduction to the data collection and analysis procedures applied in the study.

5. Statistical Significance: If applicable, consider including information about the statistical significance of the findings, such as p-values or effect sizes, to add quantitative rigor to the study.

Response: Thank you for the comment. Given the type of data collected and analyzed in the present study, I don't think statistical significance should be added. However, I hold it as a drawback of the present study, and correspondingly I have added this into the limitation. Hence, the following limitation (final aspect) was added:

Finally, the study is restricted by its duration. With a relatively short time span, the study delivered exploratory insights necessary to understand students' feedback seeking from GAI tools used in learning. However, due to the limited amount of collected data, the study did not apply analytical methods such as inferential statistical analysis, which would offer more evidence regarding the developmental trajectories of students' feedback seeking abilities. In subsequent studies, researchers are encouraged to conduct longitudinal studies for the deepened understanding of feedback seeking with AI-enhanced learning tools.

6. Discussion of Limitations: It would be beneficial to include a brief discussion of the limitations of the study, such as potential biases or constraints in the data collection process, to provide a more balanced view of the research.

Response: Thank you for the suggestion. The original discussion section has been expanded in this round of revision. Currently, four aspects of limitations are mentioned: 1) confined conceptualization of learning behaviors; 2) limited number of samples; 3) the ignorance of other agents involved in learning, such as teacher and peer learners; and 4) the limited duration of the study and the corresponding absence of inferential

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4 statistical analysis.
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6 At its current form, I think all major concerns existing in the present study have been
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8 included. Hopefully, it would provide a balance for the study to be valid within its scope
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10 and delimitations.

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13 7. Practical Implications: While the abstract mentions practical implications for
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15 researchers and educators, it could benefit from a more detailed discussion of how the
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17 findings can be practically applied in L2 writing classrooms, providing actionable
recommendations for educators.

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19 Response: Thank you for the comment. I admin the original writing of the implications
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21 is superficial and lacking actionable details. As a result, I have amended it to provide
22
23 more pedagogical recommendations for teachers and educators planning to implement
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25 GAI in their environment.

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27 8. Please avoid citing sources that were published before to 2019. Cite current research
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29 that are really pertinent to your topic. The study also lacks sufficient citations. Another
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31 critical step is to compare the topic of the article to other relevant recent publications
or works in order to widen the research's repercussions beyond the issue.

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33 Response: Thank you for the comment. Of all the 40 some cited works, only 14 are
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35 published more than 5 years ago. Additionally, most of them are cited because they
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37 pointed to several core and established concepts which underpins the present study.
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39 Some are related to methodological justifications and evidence. Please kindly refer to
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41 the following diagram showing the reason to cite such literature.

Literature older than 5 years	Why?
Ashtford, S.J., Blatt, R. and VandeWalle, D. (2003), "Reflections on the Looking Glass: A Review of Research on Feedback-Seeking Behavior in Organizations", <i>Journal of Management</i> , Vol. 29 No. 6, pp. 773–799, doi: 10.1016/S0149-2063(03)00079-5.	Established theories/concepts
Birt, L., Scott, S., Cavers, D., Campbell, C. and Walter, F. (2016), "Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation?", <i>Qualitative Health Research</i> , SAGE Publications Inc, Vol. 26 No. 13, pp. 1802–1811, doi: 10.1177/1049732316654870.	Methodologies
Bitchener, J. and Ferris, D. (2012), <i>Written Corrective Feedback in Second Language Acquisition and Writing</i> , Routledge, New York, London.	Established theories/concepts
Bitchener, J. and Storch, N. (2016), <i>Written Corrective Feedback for L2 Development</i> , <i>Written Corrective Feedback for L2 Development</i> , Multilingual Matters, doi: 10.21832/9781783095056.	Established theories/concepts
Boud, D. and Molloy, E. (2013), "Rethinking models of feedback for learning: the challenge of design", <i>Assessment & Evaluation in Higher Education</i> , Routledge, Vol. 38 No. 6, pp. 698–712, doi: 10.1080/02602938.2012.691462.	Established theories/concepts
Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", <i>Qualitative Research in Psychology</i> , Hodder Arnold, United Kingdom, Vol. 3 No. 2, pp. 77–101, doi: 10.1191/1478088706qp063oa.	Methodologies
Duff, P. (2010), <i>Case Study Research in Applied Linguistics</i> , Transferred to digital printing., Routledge, New York.	Methodologies
Hattie, J. and Timperley, H. (2007), "The Power of Feedback", <i>Review of Educational Research</i> , American Educational Research Association, Vol. 77 No. 1, pp. 81–112, doi: 10.3102/003465430298487.	Established theories/concepts
Havranek, G. and Cesnik, H. (2001), "Factors affecting the success of corrective feedback", <i>EUROSLA Yearbook</i> , John Benjamins Publishing Company, Vol. 1 No. 1, pp. 99–122, doi: 10.1075/eurosla.1.10hav.	Established theories/concepts
Lipnevich, A.A. and Smith, J.K. (2009), "Effects of differential feedback on students' examination performance", <i>Journal of Experimental Psychology: Applied</i> , American Psychological Association, US, Vol. 15, pp. 319–333, doi: 10.1037/a0017841.	Established theories/concepts
Long, M. (1996), "The role of the linguistic environment in second language acquisition", in Ritchie, W. and Bhatia, T. (Eds.), <i>Handbook of Second Language Acquisition</i> , Academic Press, San Diego, CA, pp. 413–468.	Established theories/concepts
Stake, R.E. (1995), <i>The Art of Case Study Research</i> , Sage Publications, Thousand Oaks.	Methodologies
Stake, R.E. (2005), <i>Multiple Case Study Analysis</i> , Illustrated edition., The Guilford Press, New York.	Methodologies
Yin, R.K. (2013), <i>Case Study Research: Design and Methods</i> , Fifth edition., SAGE Publications, Inc, Los Angeles.	Methodologies

Furthermore, I have replaced/added some newly published works related to the topic in the literature review. Following the reviewer's suggestions, in the discussion, I have tried to compare the findings of the present study against more recent published works on feedback (both feedback used in language teaching/learning and feedback used in more generic pedagogical settings). I would invite the reviewer to read the amended sections in the manuscript.

Comments from Reviewer 2

1. I would have preferred to see more participants

Response: Thank you for the suggestions. From my own perspective, this is a question to be answered in every research adopting a case study design.

Case study has its own advantages. For example, in the field of applied linguistics, case study has been widely applied since it is an established means of gathering rich data to analyze students' language learning experiences (Duff, 2010). Similarly, in the research field of instructional feedback, case study is also preferred and widely applied in a series of published works (e.g., Yu and Hu, 2017; Yu and Lee, 2015).

In case studies, it is customary for the research to select a limited number of participants. This, to a certain degree, would raise the issue of generalizability and validity. However, Adams (2019) has argued that the limited number of research subjects merits the research in unfolding learner experiences in using the feedback other

than the effects caused by the feedback design. For the present study, which is essentially a behavioral investigation into L2 writers' feedback seeking abilities in a ChatGPT-enhanced language classroom, the justification provided by Adams (2019) is valid and applicable regarding the limited number of participants selected.

Nevertheless, this does not mean that the selection of participants could be random in the present study. In practice, I have implemented a relatively comprehensive inclusion criteria to select representative participants for the study. In the revision, I have provided additional information regarding the sampling criteria.

Hence, the reviewer is invited to refer to the changes made in the relevant sections in the methodology section. I have made the following two major changes:

1. Justify the applicability of the case study design and corresponding limited number of participants recruited for the study. (yellow-marked parts in p.7)

2. The details of the sampling criteria which allows the researcher to select representative samples from the cohort of students. (yellow-marked parts in p.8-9)

Finally, I hold the limited number of samples as one of the limitations of the present study. Hence, I have added it as one of the four aspects of the limitations in the discussion section. Please kindly refer to the revised limitation section for details.

Comments from Reviewer 3

1. Write organization of paper at the end of Introduction

Response: Thank you for the comment. The outline of the paper organization is added to the introduction section in a brief form as follows:

The next section provides a review of significant literature related to the core concept and theories related to the topic. Section 3 details the methodologies utilized in the study. Results and the interpretation are presented in Section 4 and 5 respectively before the concluding remarks, limitations, and future research directions in Section 6.

2. Elaborate different sections of Literature Review at the start

Response: Thank you for the comment. I tried to added a brief introduction within the literature review section as follows:

In this section, literature on feedback seeking behavior and automated feedback

providers is reviewed before the conceptualization of feedback seeking in a GAI-enhanced learning environment.

3. Include research gaps

Response: Thank you for the comment. In the introduction, the research gaps have been introduced as follows *“In a conventional L2 setting, the concept of feedback seeking behavior (FSB) facilitates the understanding of learners’ inquiry and monitoring of received feedback from teachers or peers (Papi et al., 2019). However, positioned in the new and interactive learning environment, we are facing the scantness of empirical evidence in students’ actual abilities to seek feedback generated by AI-based systems.”* Additionally, the gap has been specified in the literature review. At the end of each subsection, the gaps existing and the reason for us to explore and address such gap are included. I would like to invite the reviewer to notice the way gap is introduced in the manuscript.

4. Draw flow chart of research methodology

Response: Thank you for the comment. I have appended a flow chart of the practicum arrangement in the updated supplementary materials (S1-3). Hopefully, more details of the research design could be understood by the readers. Additionally, in answering other reviewers’ comments, the research procedures have been elaborated in greater detail, which would also be helpful in addressing this very comment.

5. Include theoretical, practical, and social implications as separate sub-sections

Response: Thank you for the comment. In the discussion section, I elaborated the conceptual and pedagogical implications of the present study. However, I didn’t try to separate them since they are internally connected. Additionally, in this round of revision, I tried to make the implication section more actionable and concrete. I would like to invite the reviewer to reread the revised section.

6. Add limitations and future scope in conclusion

Response: Thank you for the comment. The limitation and future direction are already provided in the conclusion section. In this round of revision, I have tried to include all

limitations, hence the section grew from merely two aspects into 4. I would like to invite the reviewer to review the improved limitation, which is at the end of the conclusion section.

References for this response:

Adams, G. (2019), “A narrative study of the experience of feedback on a professional doctorate: ‘a kind of flowing conversation’”, *Studies in Continuing Education*, Routledge, Vol. 41 No. 2, pp. 191–206, doi: 10.1080/0158037X.2018.1526782.

Duff, P. (2010), *Case Study Research in Applied Linguistics*, Transferred to digital printing., Routledge, New York.

Yu, S. and Hu, G. (2017), “Understanding university students’ peer feedback practices in EFL writing: Insights from a case study”, *Assessing Writing*, Vol. 33, pp. 25–35, doi: 10.1016/j.asw.2017.03.004.

Yu, S. and Lee, I. (2015), “Understanding EFL students’ participation in group peer feedback of L2 writing: a case study from an activity theory perspective”, *Language Teaching Research*, SAGE Publications, Vol. 19 No. 5, pp. 572–593, doi: 10.1177/1362168814541714.

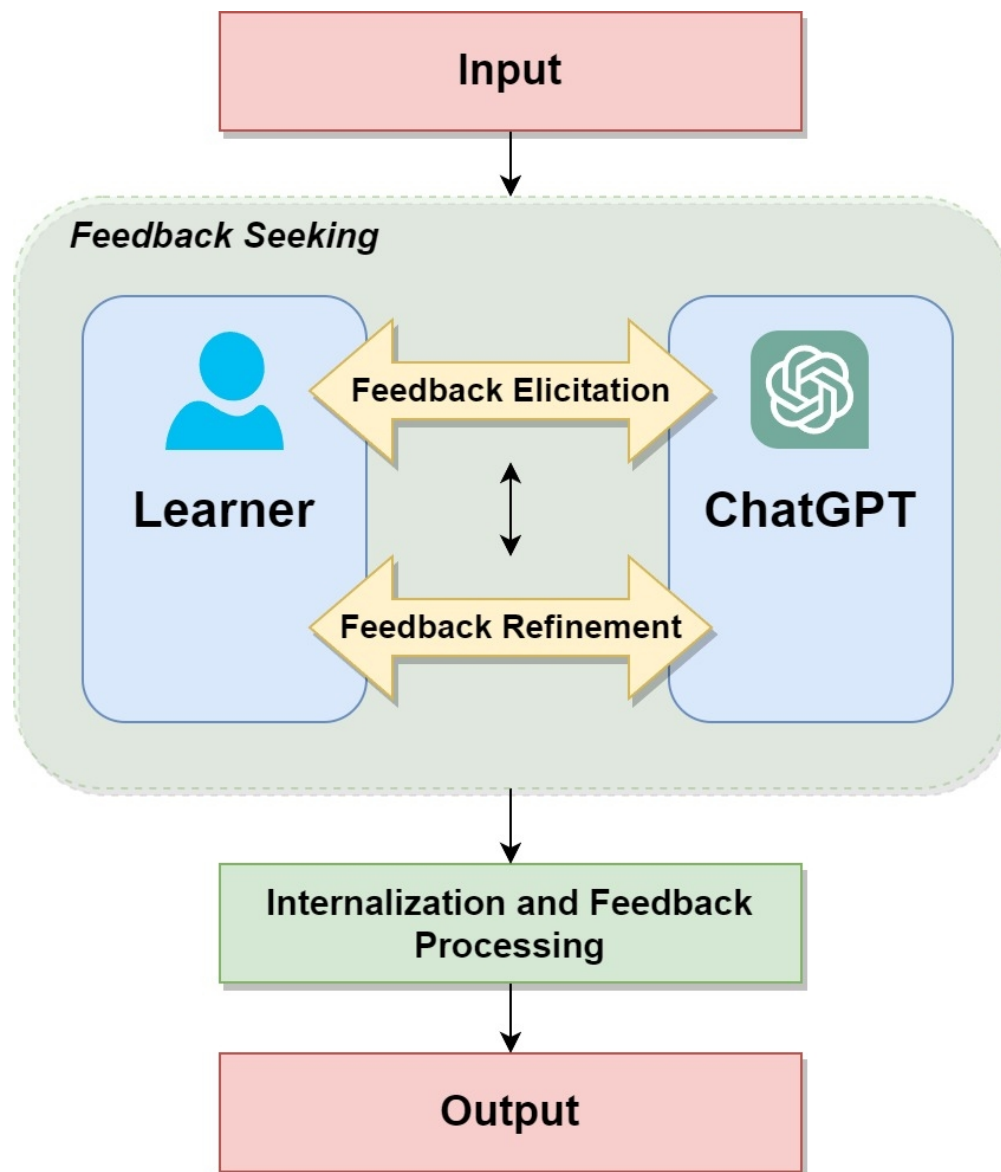


Figure 1. Conceptual Model of the Feedback Seeking in the Context of ChatGPT-enhanced Learning

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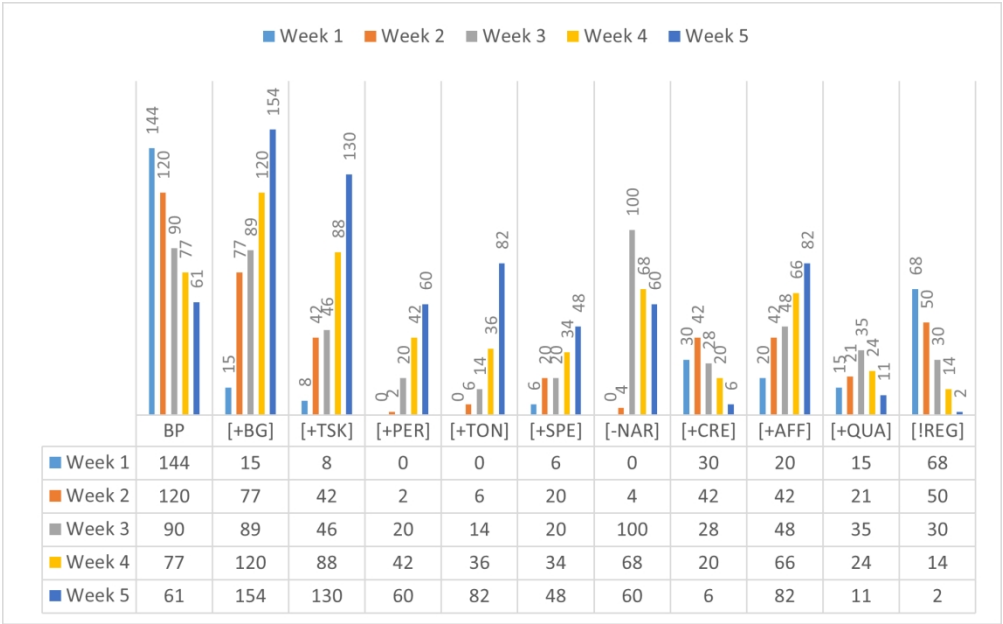


Figure 2. Weekly Frequency of Prompt Patterns Adopted by Toby

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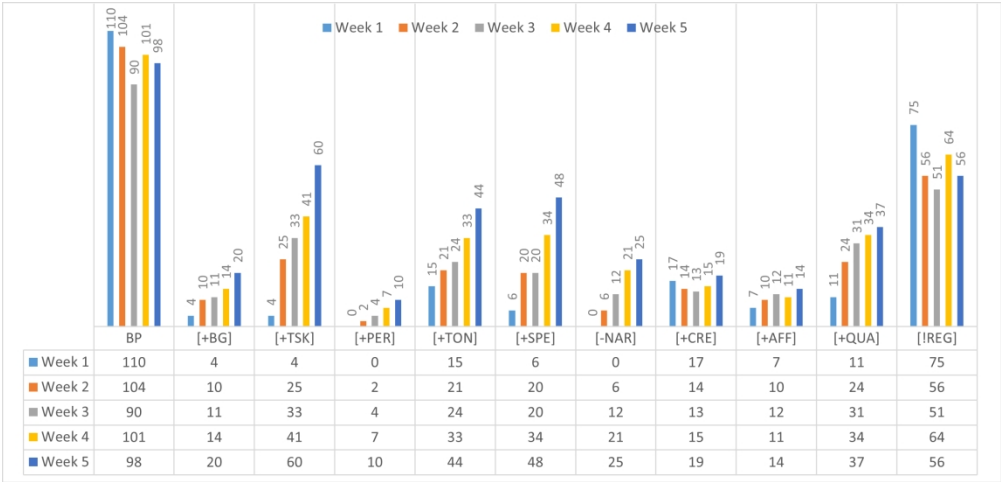


Figure 3. Weekly Frequency of Prompt Patterns Adopted by Lisa
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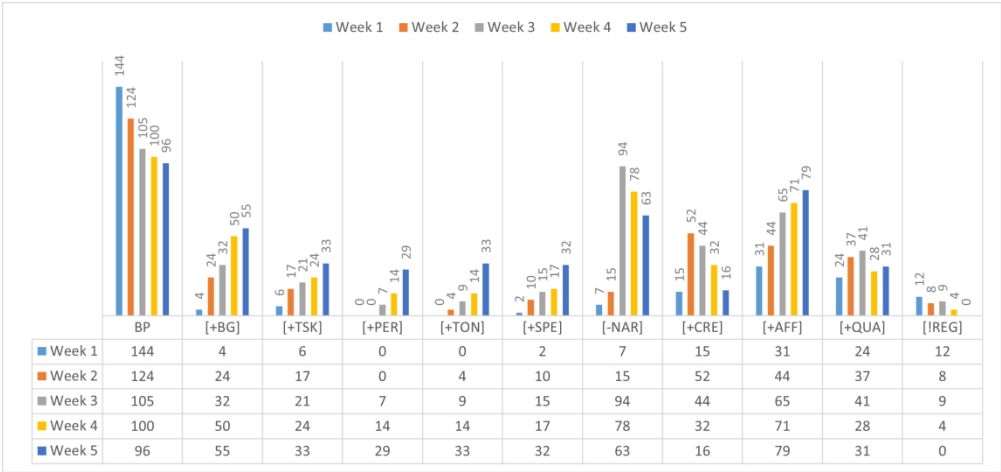


Figure 4. Weekly Frequency of Prompt Patterns Adopted by Isabella

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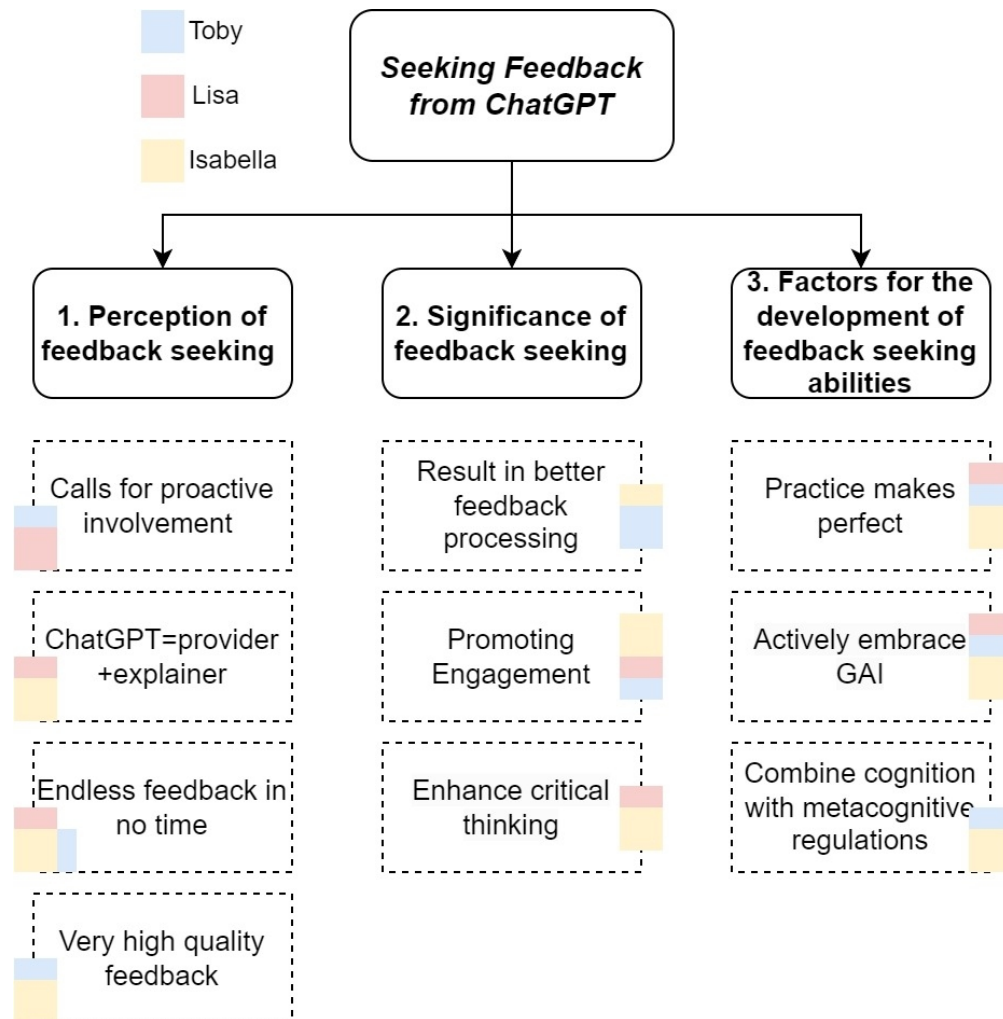


Figure 5. Thematic Map of the Interviews

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Table I. Demographic Information and Characteristics of the Participants

Pseudonyms	Gender	Age	Mean Grades 1*	Mean Grades 2*	Self-rated Technological Competences	Instructors’ Recommendations
Toby	M	21	81/100	91/100	9/10	“His balance in both language proficiency and technology abilities make him a must choice for your consideration”
Lisa	F	19	67/100	85/100	8/10	“Lisa is a rare case for female students, she is better at handling the technology-related stuffs”.
Isabella	F	20	88/100	62/100	5/10	“Just a typical liberal arts student, at least a very hard-working student in the digital humanity courses ”.

*Mean Grades 1: mean grades in precedent L2 writing assessments.
Mean Grades 2: mean grades in precedent assessments in digital humanities courses.

Table II. Descriptive Statistics of the ChatGPT Prompts Created by Toby

	Prompt	Words	Words per prompt	Rounds	Prompts per round	Time spent (min)
Week 1	306	3213	10.5	48	6.4	251
Week 2	426	4856	11.4	35	12.2	215
Week 3	520	7124	13.7	31	16.8	177
Week 4	589	9365	15.9	27	21.8	111
Week 5	696	12389	17.8	26	26.8	96
Sum	2537	36947	-	167	-	850
Mean	507.4	7389.5	13.9	33.4	16.8	170

Table III. Descriptive Statistics of the ChatGPT Prompts Created by Lisa

	Prompts	Words	Words per Prompt	Rounds	Prompts per Round	Time spent (min)
Week 1	249	2615	10.5	37	6.7	110
Week 2	292	3329	11.4	40	7.3	102
Week 3	301	3130	10.4	36	8.4	88
Week 4	375	4163	11.1	39	9.6	71
Week 5	431	4870	11.3	41	10.5	65
Sum	1648	18107	-	193	-	436
Mean	329.6	3621.3	10.9	38.6	8.5	87

Table IV. Descriptive Statistics of the ChatGPT Prompts Created by Isabella

	Prompts	Words	Words per Prompt	Rounds	Prompts per Round	Time spent (min)
Week 1	245	3185	13.0	8	30.6	280
Week 2	335	4690	14.0	12	27.9	245
Week 3	442	7249	16.4	14	31.6	211
Week 4	432	6696	15.5	17	25.4	177
Week 5	467	9247	19.8	19	24.6	121
Sum	1921	31066	-	70	-	1034
Mean	384.2	6213.3	15.7	14	28	207

Table V. Individual Summary of Learning Experiences

Participant	Toby	Lisa	Isabella
Post-project perception of feedback seeking	A learners should actively seek feedback from AI systems. During the refinement, he/she should use multiple criteria to select and compare available feedback.	We should take advantage of AI system’s ability to provide feedback from different angles.	Human understanding and judgement should not be replaced. One should think closely at the feedback provided by the AI system and make the final decision on his/her own.
Perceived best practice of feedback seeking	It’s all about the balance. The balance between the learner’s own judgement and the interaction with the system. Think hard for a clear decision, then interact proactively with the AI system to specify the details in the decision.	Proactively interact with ChatGPT for improvement in feedback. Learners should actively channel their own judgement back to the system. The more you interact with ChatGPT, the better.	Precision matters. When using the conversation with ChatGPT to produce feedback, we should give detailed and clear prompts. For the refinement, we should incorporate the AI’s response with our own linguistics knowledge.
Personal growth	A thrilling experience in using ChatGPT for feedback. I like my fast-paced growth in feedback triggering and feedback monitoring. I have tried to be bold and exploratory in dealing with ChatGPT. I will explore more advanced tricks in the future, and I believe AI-based tools will be my learning companion in the days to come.	Have truly mastered the tricks to chat with AI. But I am not satisfied with my ability to write high quality prompt. I like the feeling with ChatGPT. But I will learn more about how to write effective prompt as a language learner.	I will describe my development as a slow-paced but fruitful one. Before the project, I am not confident in myself. So, for most of the time, I write prompts with measured words and am very careful talking with ChatGPT. But I like the feeling of reading and comparing the feedback.

Appendices

Appendix S1. Practicum Details

1. Practicum Schedule

Week 1: Introduction to ChatGPT
<ul style="list-style-type: none">• Introduce the concept of AI and explain how ChatGPT works.• Demonstrate how to use ChatGPT as a writing assistant to provide feedback on grammar and sentence structure.
Week 2: Identifying Common Writing Mistakes
<ul style="list-style-type: none">• Discuss common writing mistakes such as run-on sentences, subject-verb agreement, and punctuation errors.• Demonstrate how to use ChatGPT to identify and correct these mistakes.
Week 3: Using ChatGPT for Structural Analysis
<ul style="list-style-type: none">• Discuss the importance of essay structure and how it impacts the overall quality of an argumentative essay.• Demonstrate how to use ChatGPT to analyze the structure of an essay and provide feedback on the organization of ideas.
Week 4: Analyzing Cohesion and Coherence
<ul style="list-style-type: none">• Discuss the importance of cohesion and coherence in writing and how it impacts the reader's understanding of the text.• Demonstrate how to use ChatGPT to analyze the cohesion and coherence of a piece of writing.
Week 5: Using ChatGPT for Language Use
<ul style="list-style-type: none">• Discuss the importance of using appropriate language in writing and how it impacts the overall quality of an argumentative essay.• Demonstrate how to use ChatGPT to identify inappropriate language use such as slang or colloquialisms.

2. Task Worksheet Template

Task Worksheet for Writing Task # _____

Name: _____ Matric No.: _____ Date: _____ Session: _____

1. Writing Prompt:

The issue of same-sex marriage remains a topic of controversy and debate within society. On the one hand, there are those who argue that the prevalence of same-sex unions has detrimental effects on the social fabric. On the other hand, proponents of same-sex marriage contend that it is a natural and justifiable expression of human choice and rights. The legal status of same-sex marriage is a matter of much deliberation, raising important questions about the role of the law in regulating social norms and values.

Give reasons for your answer and include any relevant examples from your own knowledge or experience. You should write at least 250 words.

2. Draft Writing

Writing		Grading
1		
2		
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8		
9		
10		
...		

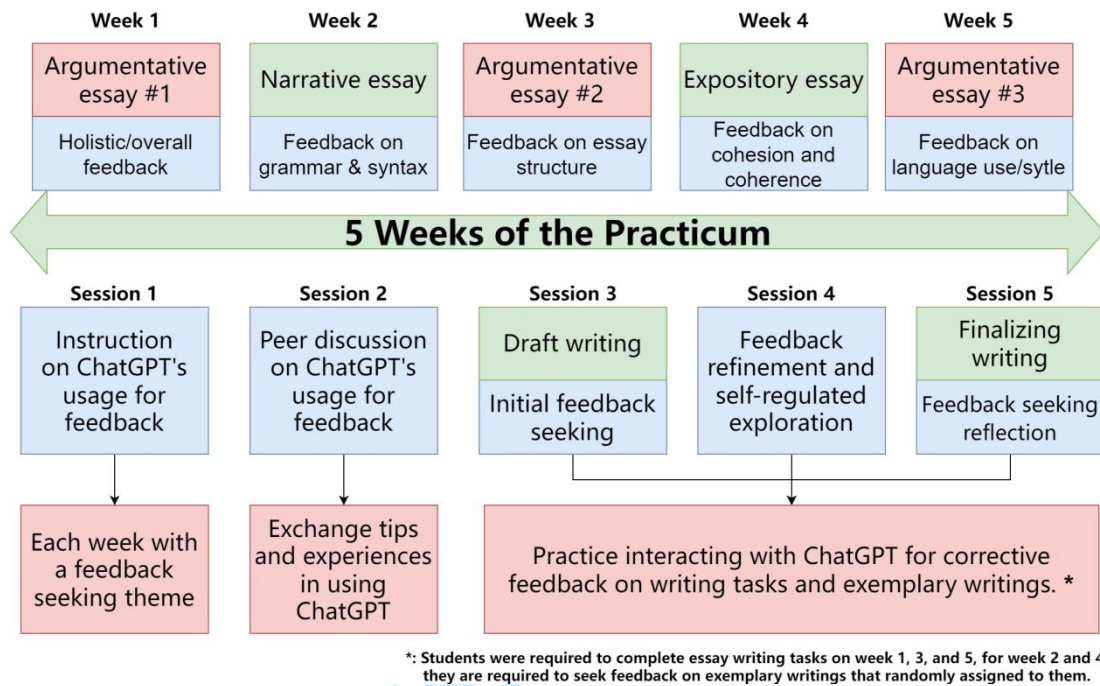
3. Formative Revisions (Screenshots are encouraged and preferred):

No.	Revision Reason	ChatGPT's Feedback	Finalized Revision
1			
2			
3			
4			
5			

4. Final Writing Version

Writing		Grading
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
...		

3. Practicum arrangement



4. Prompting template

1. FEEDBACK REQUIREMENT, TASK CONTEXT, AND OTHER INFORMATION

I would like you to provide feedback and evaluation on an essay writing by a second-year university English as a foreign language (EFL) learner. For the rating, you could consult the rating criteria that follows. For the feedback for writing improvement, try to focus on grammatical correctness, fluency, coherency, and the quality of the language. Try to give detailed feedback and explain any suggestions for improvement.

2. RATING CRITERIA

[(Holistic or Partial) Rating rubric to be used in plain text]

3. THE WRITING PRODUCT

[The draft essay/writing product on which ChatGPT provides automated feedback]

Appendix S2. Student Learning Log

Name: _____ Matric No.: _____ Date: _____ Session: _____

1. Learning experiences in using ChatGPT for feedback:

2. Feedback seeking prompts and results:

Context		Prompt	ChatGPT's Feedback	Issues	Feedback Evaluation
1					
2					
3					
4					
5					

3. Adopted and rejected feedback and reasons:

ChatGPT's Feedback		Decision	Reason	Follow-up Prompts?	Comments
1					
2					
3					
4					
5					

4. Supplementary Materials and Resources:

Appendix S3. In-depth Interview Protocol


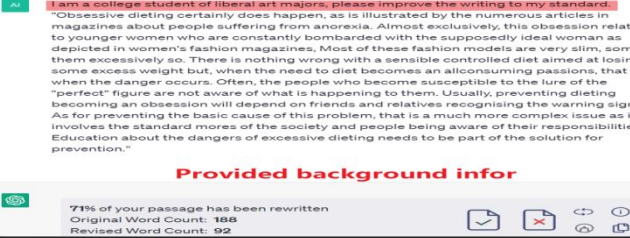
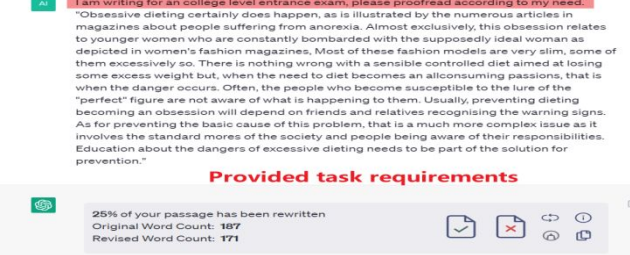
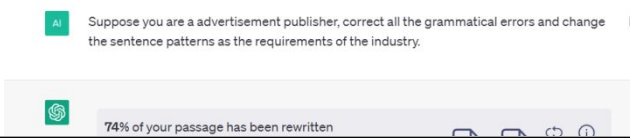
Warm-up Questions (randomly select 2-3 questions for each session):

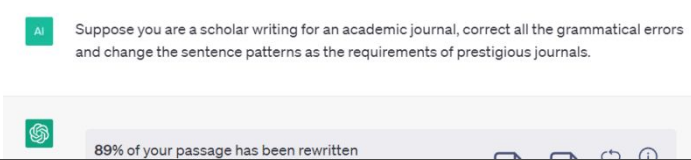
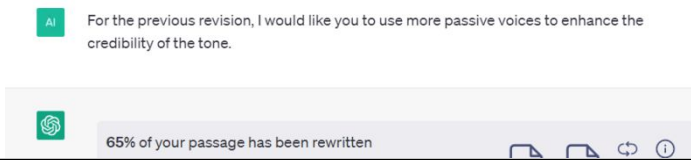
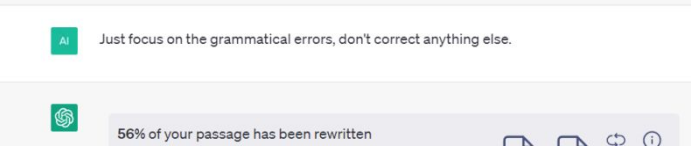
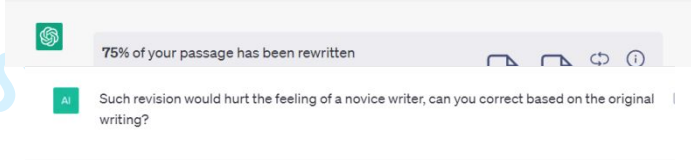
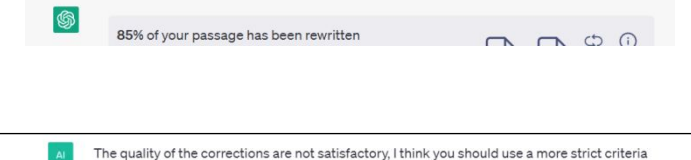
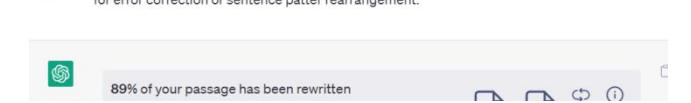
1. What are the effects of ChatGPT on grammatical corrections from your experiences?
2. What are the advantages of ChatGPT over its precedents and alternatives?
3. How do you evaluate the quality of corrective feedback from ChatGPT?
4. What is the most striking feature of ChatGPT in your experience?
5. How do you think about the rapid spread of ChatGPT in online communities?
6. Do you support or oppose the usage of ChatGPT in writing classrooms?
7. Do you think the official introduction of ChatGPT in language education will have a bright future?
8. If we are to use ChatGPT regularly in classrooms, what do you think we need to adjust most urgently?

Main Interview Questions

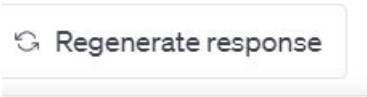
1. How would you explain the way you seek feedback from ChatGPT?
2. Compared to the conventional L2 classroom, what are the most dramatic differences in receiving and utilizing the feedback brought about by ChatGPT?
3. How would you describe the role ChatGPT plays in L2 classrooms for providing feedback?
4. What are the major advantages of ChatGPT as a feedback provider?
5. Do you think the time and efforts to feedback from ChatGPT are worthy spending? If yes, please elaborate.
6. Do you think using ChatGPT makes you a motivated student? Are you engaged in the process of feedback seeking?
7. If we are to use ChatGPT for feedback in the future, what aspects of students' competence will be influenced?
8. Please list three main experiences you have got from the project so far?
9. For those who will join us using ChatGPT in L2 classrooms, what are your recommendations?
10. How can a student prepare himself/herself to effectively use ChatGPT as a feedback provider in L2 classroom?

Appendix S4. Coding Scheme of ChatGPT Prompt Patterns

Prompt Patterns	Code	Descriptions and Examples	Example and Excerpted Feedback
A. Feedback Elicitation			
Barebone prompt	BP	A minimal prompt asking ChatGPT to provide corrective feedback of the provided composition.	 <p>The screenshot shows a ChatGPT conversation. The user prompt is: "Please proofread the following text." The AI response is a paragraph about anorexia. Below the response, a feedback box states: "6% of your passage has been rewritten. Original Word Count: 177. Revised Word Count: 169." The feedback box also includes icons for undo, redo, and other editing functions.</p>
Provide background information	[+BG]	Provide additional background information, e.g., identity of the author, context for the writing, etc.	 <p>The screenshot shows a ChatGPT conversation. The user prompt is: "I am a college student of liberal art majors, please improve the writing to my standard." The AI response is a paragraph about anorexia. Below the response, a feedback box states: "71% of your passage has been rewritten. Original Word Count: 188. Revised Word Count: 92." The feedback box also includes icons for undo, redo, and other editing functions.</p>
Provide task requirement	[+TSK]	Provide additional information related to the task requirement, e.g., writing genre, writing purpose, etc.	 <p>The screenshot shows a ChatGPT conversation. The user prompt is: "I am writing for an college level entrance exam, please proofread according to my need." The AI response is a paragraph about anorexia. Below the response, a feedback box states: "25% of your passage has been rewritten. Original Word Count: 187. Revised Word Count: 171." The feedback box also includes icons for undo, redo, and other editing functions.</p>
Provide a virtual persona	[+PER]	Provide information of a virtual persona for ChatGPT, e.g., proofreading from the perspective of a stakeholder, professional or a layman to a certain field.	 <p>The screenshot shows a ChatGPT conversation. The user prompt is: "Suppose you are a advertisement publisher, correct all the grammatical errors and change the sentence patterns as the requirements of the industry." The AI response is a paragraph about anorexia. Below the response, a feedback box states: "74% of your passage has been rewritten." The feedback box also includes icons for undo, redo, and other editing functions.</p>

Ask for feedback in style and tone	[+TON]	Inform ChatGPT the style or tone requirement, e.g., ask ChatGPT to provide corrective feedback with an academic or informal style.	
Ask for feedback with specific additional demands	[+SPE]	Any additional demands in addition to the previous categories.	
B. Feedback Refinement			
Narrow down the foci of feedback	[-NAR]	Ask ChatGPT to focus on a specific issue for corrective feedback, e.g., only for grammatical errors, etc. The evaluation is typically negative, indicating the satisfaction of the user regarding the specificity of the feedback for the user's major concerns.	
Checking the credibility	[+CRE]	Doubting about the credibility of information sources in ChatGPT's feedback. Since ChatGPT would provide information based on the trained language data, it risks providing unverified or made-up information.	
Feedback Regeneration based on learners' affective evaluation	[+AFF]	Provide affective or attitudinal judgement of the feedback, e.g., expressing emotional disagreement with ChatGPT's corrective feedback, etc.	
Feedback Regeneration based on learners' quality evaluation	[+QUA]	Provide a quality evaluation of the feedback, typically a negative judgement regarding the value and accuracy of the ChatGPT's feedback.	

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Ask for regeneration of feedback without additional information	[!REG]	Directly asking for a regeneration of corrective feedback. This typically represents the users' utter dissatisfaction with the feedback.	
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Kybernetes