

APPENDIX

Table 1. Learner-Centered Feedback Framework adapted from Ryan et al. (2023).

| Dimension | Component | Definition |
|----------------------|-------------------------------|--|
| Future Impact | Upcoming Similar Tasks | Feedback that provide concrete suggestions students can apply when completing comparable tasks in the future. (e.g., <i>“For your next report, consider adding subheadings to make the structure clearer.”</i>) |
| | Meeting Learning Objective | Feedback that directs students toward fulfilling the stated learning outcomes of the unit or task. (e.g., <i>“Be sure to include model evaluation so that you address the outcome on assessing model performance.”</i>) |
| | | Feedback that promotes the development of transferable strategies, processes, or skills applicable across disciplines or contexts. (e.g., <i>“Outlining your ideas before writing will help you produce clearer work in future assignments.”</i>) |
| Sensemaking | Strengths and Weaknesses | Feedback that highlights what was done well and what requires further improvement within specific aspects of the work. (e.g., <i>“Your discussion section is strong, but the analysis of data needs to be more detailed.”</i>) |
| | Performance Summary | Feedback that provides an overall appraisal of the student’s work in relation to the criteria or expectations. (e.g., <i>“This report satisfies most criteria but would benefit from deeper critical reflection.”</i>) |
| Agency | Active Role | Feedback that encourages learners to engage actively with their development, such as by initiating discussion, revisiting feedback, or seeking further resources. (e.g., <i>“You can bring your draft to the next lab if you’d like more detailed feedback.”</i>) |
| | Affirmation and Encouragement | Feedback that recognises effort or progress and motivates learners to continue building their skills. (e.g., <i>“You’ve improved your argument structure noticeably in this task.”</i>) |
| | Student-Teacher Relationship | Feedback that demonstrates care and interest, reinforcing a positive and constructive relationship between teacher and student. (e.g., <i>“It’s been great to see the growth in your reasoning throughout the semester.”</i>) |

Table 2. Coding Scheme for Tutor Revisions on ChatGPT-Enhanced Feedback (for RQ1)

| Code | Subcode | Description | Example |
|-----------------------|--------------------|--|---|
| 1. Interaction | 1.1. Edit | Modifying existing wording or phrasing in the feedback. | "You're a natural!" → "You're improving steadily." |
| | 1.2. Remove | Deleting parts of the feedback. | "You'll go far in life!" → (removed) |
| | 1.3. Add | Introducing new elements into the feedback. | (Added) "Try using subheadings to organize your discussion." |
| 2. Tone | 2.1. Praise | Expressing positive evaluation of the student's work. | Edit: "Fantastic work!" → "Good insight." Remove: "You're the best student I've seen!" → <i>(removed)</i> Add: (Added) "Nice effort on outlining the key points." |
| | 2.2. Encouragement | Providing motivational comments to support the student's learning journey. | Edit: "You're a natural!" → "You're improving steadily." Remove: "You'll go far in life!" → <i>(removed)</i> Add: (Added) "Keep up the good work." |
| | 2.3. Politeness | Framing the level of courtesy in the feedback to be more respectful. | Edit: "Fix this part." → "Please revise this section." Remove: "Thanks again!" → <i>(removed)</i> Add: (Added) "Thank you for your effort on this task." |
| 3. Content | 3.1. Elaboration | Supplying explanations by adding explanation, detail, or justification. | Edit: "Be clearer." → "Add an example in paragraph 2 to clarify your point." Remove: "Try harder next time." → <i>(removed — vague and unhelpful)</i> Add: (Added) "This is important because it supports your main argument." |

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| | 3.2. Correction | Concerning the accuracy of feedback content, including addressing information that is incorrect, unclear, or misleading. | <p>Edit: "Your chart is wrong." → "The chart could be clearer if the axes were labeled."</p> <p>Remove: "Linear regression always works best." → (removed — misleading claim)</p> <p>Add: (Added) "Actually, a bar chart may be more appropriate here."</p> |
| | 3.3. Suggestion | Providing actionable advice or strategies for improving the student's work. | <p>Edit: "Improve your structure." → "Use subheadings to organize your report more clearly."</p> <p>Remove: "Do better next time." → (removed — not actionable)</p> <p>Add: (Added) "You might consider starting with a summary before diving into details."</p> |
| 4. Brevity & Structure | 4.1. Simplification | Avoiding using long or complex expressions to make the feedback clearer and easier to understand. | <p>Edit: "It would be helpful if you could..." → "Consider..."</p> <p>Remove: "First of all, I think you should..." → "You should..."</p> <p>Add: (Added) "In short, be concise."</p> |

Table 3. Coding Scheme for the Interview Questions (for RQ2)

| Code | | Description | Example |
|---------------------|-------------------------------------|--|---|
| 1. Benefit | | | |
| | 1.1 Identifying Missing Content | Educators notice parts of learner-centered feedback they usually omit, identified through AI analysis. | I miss that part of affirmation and encouragement...I think that we still need to encourage them. |
| | 1.2 Promotes Reflection | AI tools help educators reflect on their feedback practices. | It helped me to reflect on my feedback. Whether I need some parts. |
| | 1.3 Improves Language and Structure | ChatGPT helps to improve phrasing, structure, and readability of feedback. | It feels a lot more structured compared to the original text...ChatGPT fleshed it out. |
| | 1.4 Saves Time | Mentions that AI tools can help save or manage time when giving feedback. | It's definitely going to reduce my time to develop and revise the feedback text. |
| 2. Challenge | | | |
| | 2.1 Trust Issues | Educators express skepticism or conditional trust in the ML model's accuracy. | I'm just not 100% sure whether or not I'm comfortable trusting how it's analysed. |
| | 2.2 Inconsistent Tone | Concern about ChatGPT altering the educator's tone in feedback. | It turned me into someone saying, well done, Sonny Jim...I didn't use that tone. |
| | 2.3 Need for Human Editing | Educators emphasize the necessity to edit GPT-generated feedback. | One should always edit the stuff after ChatGPT has gone through. |
| | 2.4 Potential Misinformation | Concern that ChatGPT generates inaccurate or fabricated content. | But what we did see was it made something up...that is inexcusable. |