Content characteristics of relational feedback

Table 4. Characteristics of relational feedback

No.	Characteristics	Examples	Related works
Group 1	**Clarifying performance**		
1.1	Clarify the reason for the grade	"Your essay's grade was reduced by five marks due to a few grammatical errors."	Ahmed Shafi et al. (2018); Bastola and Hui (2021); Middleton et al. (2023); Schwartz (2017); Yang et al. (2023)
1.2	Acknowledge the strengths of students performance	"Your essay demonstrates a deep understanding of the topic."	Ahmed Shafi et al. (2018); Heron et al. (2023); Hill et al. (2021); Jones et al. (2012); Middleton et al. (2023); Racheva (2018); Rubid (2017); Schwartz (2017); Van De Vliert et al. (2004)
1.3	Balanced critical feedback	"Your essay demonstrates a good understanding of the topic; however, it contains some grammatical errors."	Ahmed Shafi et al. (2018); Heron et al. (2023); Hill et al. (2021); Schwartz (2017); Yang and Carless (2013)
Group 2	**Suggesting improvement**		
2.1	Identify areas for improvement	"The clarity of your essay could be improved."	Bastola and Hui (2021); Hill et al. (2021); Jones et al. (2012); Racheva (2018); Schwartz (2017); Yang et al. (2023)
2.2	Inform methods to improve work	"More focused paragraphs would greatly enhance the overall clarity of your essay."	Ahmed Shafi et al. (2018); Hill et al. (2021); Middleton et al. (2023); Robinson, Pope, and Holyoak (2013)
2.3	Actionable information	"To strengthen your argument, provide more specific examples and cite relevant research to support your claims."	Ahmed Shafi et al. (2018); Middleton et al. (2023)
Group 3	**Inviting further communication**		
3.1	Request clarification	"Could you please clarify your main argument?"	Heron et al. (2023)
3.2	Advance student thinking	"Consider exploring alternative perspectives to deepen your analysis."	Ajjawi and Boud (2017); Carless and Winstone (2023); Heron et al. (2023); Rubid (2017)
Group 4	**Evoking positive emotions**		
4.1	Positive appreciation	"Thank you for your effort in researching and writing this essay."	Bastola and Hui (2021); Heron et al. (2023); Hill et al. (2021); Kim and Lee (2019); Schwartz (2017)
4.2	Showing empathy	"Your essay shows a great deal of effort and personal reflection, and I can see how much you care about the topic. Let's work together to further develop your ideas and enhance your writing skills."	Ajjawi and Boud (2017); Bastola and Hui (2021); Carless and Winstone (2023); Payne, Ajjawi, and Holloway (2022); Robinson, Pope, and Holyoak (2013); Schwartz (2017); Yang and Carless (2013)
4.3	Phrasing feedback in a positive manner	"Your essay has the potential to be more persuasive with a bit more detail and analysis in your arguments."	Ahmed Shafi et al. (2018); Carless and Winstone (2023); Hill et al. (2021); Jones et al. (2012); Kim and Lee (2019); Middleton et al. (2023); Payne, Ajjawi, and Holloway (2022); Racheva (2018); Robinson, Pope, and Holyoak (2013); Rubid (2017); Schwartz (2017); Van De Vliert et al. (2004); Yang et al. (2023); Yang and Carless (2013)
4.4	Phrasing feedback in a polite manner	"To make your essay more persuasive, you could consider incorporating more varied perspectives."	Ajjawi and Boud (2017); Bastola and Hui (2021); Hill et al. (2021)

Our dataset:

Written feedback given by instructors to students on their course assignments. Courses were offered by the faculty of Information Technology at Monash University.

Group 1: Clarifying performance

1.1 Clarify the reason for the grade

Definition:

This code is used when feedback includes clear, precise, and detailed explanations for the grade given. It should address specific assessment criteria and provide reasoning that directly connects the grade to the student's performance on each criterion.

Example (Code):

- "Your paper received a B+ because, while your research was thorough, you did not fully address the opposing viewpoint, which affected your argumentation score."
- "You lost points on the clarity criterion because your argument was difficult to follow in several paragraphs."
- Marks deducted by late submission.
- Grouping for Z2 k-map could have been better, groups need to be as large as possible (-1).

Example (No Code):

- "Your grade is lower than expected." (Did not link the grade to students' performance. Why did the student obtain this grade?)
- Greedy Residual Fitting (6 Marks): Your code include an exit statement, this is not good python practice. (Although there is "6 Marks", feedback did not connect this mark with student performance.)
- Task A: Greedy Residual Fitting (6 Marks): Very nicely done. (Although there is "6 Marks", feedback did not connect this mark with student performance.)

1.2 Acknowledge the strengths of students' performance

Definition:

This code is applied when feedback identifies and explicitly highlights the positive aspects of a student's performance. It is more than general praise or encouragement; it focuses on specific strengths that demonstrate the student's abilities, contributing to their confidence and motivation for future tasks.

Example (Code):

- "Your thesis statement is very clear and provides a strong foundation for your argument."

- “Your analysis shows a great understanding of the key themes in the text, and you’ve done an excellent job connecting them to current societal issues. This shows strong critical thinking skills.”
- A6. Good analysis.
- Your presentation quality is good; keep up the good work! (This should be also coded under 4.1 Positive Appreciation)
- Some beautiful drawings, but the issues with the characters was the lack of details provided with each.
- The story was quite good and had a lot of detail in some areas, but try to avoid dialogue.

Example (No Code):

General praise like “Good job” without detail should not be coded.

- “Well done on this assignment.” (General praise. This should be coded with “Positive Appreciation”.)
- “This is a good paper overall.” (General praise.)
- The report structure was not bad.

1.3 Balanced critical feedback

This characteristic is about maintaining an appropriate balance between negative comments and positive comments in the whole piece of feedback. Negative comments identify areas for improvement, and positive comments indicate strengths and praise students.

Therefore, instead of manually labelling each sentence of the feedback, we apply this code to the whole piece of feedback if the feedback contains both i) **negative comments** identifying areas for improvement and ii) **positive comments** indicating strengths and praising students**.**

Specifically, we consider feedback to be balanced critical feedback if it includes sentences that are coded under the characteristics in both of the following two groups.

i) Characteristic that identifying areas for improvement:

- Characteristic 2.1 Identify areas for improvement

ii) Characteristics praising students’ work or themselves:

- Characteristic 1.2 Acknowledge the strengths of students' performance.
- Characteristic 4.1 Positive appreciation

Group 2: Suggesting improvement

2.1 Identify areas for improvement

Definition:

Feedback should explicitly suggest which particular area of the student's work requires improvement, rather than simply criticising their overall performance.

Example (Code):

- Pseudocode can be improved by explicitly stating the variables (e.g. stored in a dictionary) and how values are stored/assigned. (Pseudocode is the area identified by instructors for improvement.)
- Time complexity doesn't match the code, also better variable name conventions could be used. (Time complexity and variable name conventions are areas identified by instructors for improvement.)
- Best Single Variable Predictor: 4/4, Your calculation for the sum of squared residuals is incorrect.
- Goals could have more detail, and your last character is a little underdeveloped.
- Narrative doesn't clearly follow the 3 act structure or hero's journey.
- Q3II: good try, however, X is incorrect as should not start from 1 and don't use I2.
- Font size not consistent.
- While you have put effort on the design of the game board, your demonstration is lacking in terms of how it can be played by multiple two-player.

Example (No Code):

- Your presentation was too complicated and hard to follow. (too general to code)

2.2 Inform methods to improve work & 2.3 Actionable information (Denoted by "Actionable information")

(Feedback informing students specific methods or ways to improve is always actionable, we combine these two characteristics.)

2.2 Inform methods to improve work

Definition:

In addition to identifying areas for improvement, feedback should explicitly suggest how a student can improve those identified areas, for example, by giving specific ways or methods.

2.3 Actionable information

Definition:

Feedback should clearly outline what specific actionable steps students might take to improve their work, or help with their future learning.

New Definition:

Feedback should clearly outline what specific actionable steps or methods students can take to improve their work, or help with their future learning.

Example (Code):

- Q1I: In E step, you need to describe a hard assignment (e.g.: choose the maximum probability and set as 1; otherwise 0.)
- I prefer if you have covered the buttons, and use a simple housing/case to cover the original buttons.
- Perhaps, you could have spoken to a tutor during class times to solidify your ideas, before deciding to work on a second product.
- Good work, and consider improving it, considering the actual game experience.
- TaskA-Q5c: You should explain why those reaction (love, wow, etc.) columns are 0. (Hint: When was the reaction feature in Facebook introduced?)
- Make sure connections for all pages are present in Figma as I couldn't access many screens from a different functionality.
- Good work, main issue is in the best single predictor function. Try and fix it before attempting the next section.

Example (No Code):

- Many of the arguments need references to be acceptable. (Which arguments specifically?)
- Wireframe drawn reasonably well, could have more element-level detail. (More element-level detail is not specific.)
- This section needed more detail and analysis for all the characters, tropes, stereotypes and more. (Identified areas for improvements but did not provide specific methods)
- Goals could have more detail, and your last character is a little underdeveloped. (Identified areas for improvements but did not provide specific methods)

Group 3: Inviting further communication

3.1 Request clarification & 3.2 Advance student thinking (Denoted by "Inviting further communication")

(Considering that both human annotators and GPT models may struggle to distinguish between 3.1 Request clarification and 3.2 Advance student thinking, we combine these two characteristics.)

> **3.1 Request clarification**
>
> **Definition:** This code applies when feedback invites the student to clarify their work, often through referential questions that the instructor does not already know the answer to. The goal is to better understand the student's current knowledge and approach.
>
> **3.2 Advance student thinking**
>
> **Definition**: This code applies when feedback prompts the student to think more deeply about their work. The feedback encourages exploration of new ideas or deeper engagement with the topic through probing or elaborating questions.

New Definition:

This code applies when feedback invites the student to clarify their work, or prompts the student to think more deeply about their work, often through probing or elaborating questions. The goal is to better understand the student's current knowledge and approach, and encourage exploration of new ideas or deeper engagement with the topic.

Example (Code):

- "Can you explain what you meant by your argument on page 3? How does it connect to the evidence you provided?"
- "Could you elaborate on how your conclusion aligns with your main argument?"
- "I'd like to hear more about your thoughts on the methodology. Can you clarify why you chose that approach?"
- "Why do you think this approach to your research is the best one? Can you explain your thought process behind it?"
- "Have you considered looking at this problem from a different perspective? What would happen if you approached it from X angle?"
- "I see your point about the social implications of this theory, but what about its economic impact? How do you think that would change your argument?"

Example (No Code):

- "Why didn't you use a different method?" (While a "why" question, this may come off as judgmental rather than encouraging reflection.)
- Which POS tag should we assign to unknown words? (This is a display question that checks knowledge but doesn't seek further clarification.)

Group 4: Evoking positive emotions

4.1 Positive appreciation

Definition:

This code applies to feedback that acknowledges and appreciates the student's effort, engagement, or personal qualities related to the task, rather than focusing solely on the positive aspects of their performance.

Example (Code):

- Well done!
- Great job!
- "I can see that you've put a lot of effort into this assignment. Your dedication really shows."
- "Your creativity really shines through in this project. Great job thinking outside the box!"
- "Well done! I really appreciate your dedication to this task."
- "Thank you for your hard work on this task. I appreciate your effort in taking on such a challenging topic."

- Q3II: good try, however, X is incorrect as should not start from 1 and don't use I2.
- Q3III: well done, however, due to previous error, the plot is slight incorrect.
- Q3VII: Good try, however, your plots are slight incorrect.
- Feedback: Good attempt but incorrect solution.

Example (No Code):

- "Your conclusion is excellent." (Focuses on performance, not appreciation of the student. This feedback should be coded under Characteristic 1.2.)
- "Your argument is convincing." (Focuses on the work, not the student's qualities. This feedback should be coded under Characteristic 1.2.)
- "Your paper is well organised." (Focuses on performance, not effort. This feedback should be coded under Characteristic 1.2.)
- "This is a solid effort." (Not enough emphasis on the student's learning journey or appreciation of their contribution. This feedback can not be coded with Characteristic 1.2 as it is too general.)

4.2 Showing empathy

Definition:

This code is applied when the feedback demonstrates that the instructor understands and cares about the student's emotional and personal experience. Empathy can be shown through understanding students' struggles, acknowledging their efforts, sharing personal experiences, or mitigating the emotional impact of critical feedback.

Example (Code):

- "I can see that you put in a lot of effort, and I understand that this was a challenging task for you."
- "I understand that this assignment might have been difficult, especially considering the tight deadlines. You've made a good attempt despite these challenges."
- "I know this task was overwhelming, but you've made a good start. Keep going, and don't hesitate to reach out for help if needed."
- "I've also faced similar difficulties in my academic journey, and it's a normal part of learning. Keep pushing through—it gets easier."
- "Many students find this concept tricky at first, but with practice, it becomes clearer. You're not alone in facing this difficulty."
- All of them were quite unique and distinct, and whilst some of them weren't able to be completed (e.g. LEDs with your character), it was great to see you engage with tools, methods and technologies that you are unfamiliar with!

Example (No Code):

- "This is a common mistake, and it should be corrected."
- Probably on the shorter side of things that I would like to see for a second semester journal, but there are clear indications here of improvement from last semester and taking the feedback on board for improvement.

- There was a good level of care taken in the design and implementation of your projects, and even when they were unable to be completed as intended (WALL-E) it was still obvious that efforts had been undertaken to ensure it was refined to a good degree.
- It is clear that time and effort went into making it.

4.3 Phrasing feedback in a positive manner

Definition:
This code is used when feedback is framed in a way that aims to enhance the student's positive emotions, maintain their confidence, and foster a constructive perspective, even when addressing critical or negative aspects of their work. The feedback should aim to encourage the student, while still providing useful insights into areas of improvement.

Example (Code):

- "Your ideas are really promising, and with a bit more structure, you could take this analysis to the next level!"
- "Your introduction needs more detail, but adding some background on the main concepts would make it stronger. Keep up the great effort!"
- A second product that is more linked to the planets, could have given you a better mark.
- Would have been great to see more detail on team management!
- Perhaps, you could have spoken to a tutor during class times to solidify your ideas, before deciding to work on a second product.
- A3. Pseudocode can be improved by explicitly stating the variables (e.g. store in a dictionary) and how values are stored/assigned.

Example (No Code):

- You should also use suicide rate to describe the clusters.
- More technical details can be added.
- You should have tried to push the boundaries a little more and give yourself a good challenge.

Distinguishing between 4.1 (Positive appreciation) and 4.3 (Phrasing feedback in a positive manner):

- **Positive Appreciation** celebrates and highlights what the student has already done well without focusing on improvement or critique.
- **Phrasing Feedback in a Positive Manner** includes positive appreciation. Beyond that, it delivers constructive feedback or critique in a way that feels supportive and encouraging, helping the student see areas for improvement while maintaining motivation.

4.4 Phrasing feedback in a polite manner

Definition:

This code is applied when feedback is delivered using respectful and polite language, making it more palatable to students. The feedback should demonstrate consideration for the student's feelings and maintain a respectful tone, avoiding any potential for offence or harshness. Politeness in feedback includes strategies such as the use of hedging language, apologies when necessary, and softened directives or suggestions.

Criteria for Coding:

1) **Use of Hedging Language**: The feedback should employ hedging words like "maybe," "perhaps," "could," or "might" to soften suggestions or critiques. Hedging is used to convey feedback less assertively, making it more considerate and polite.

Example (Code):

- “You might want to consider expanding on this section to provide more clarity.”
- “Your paper is well-researched, but there are a few areas where additional detail could really enhance your argument.”
- You have done a good job with the material in your hand, but have you considered using a pressure sensor to tackle this issue?

2) **Apologising or Expressing Empathy**: Feedback that includes an apology or expression of understanding, particularly when the instructor may not fully grasp the student’s intent, should be coded as polite. This approach shows humility and helps avoid any unintended rudeness.

  - **Example (Code):** “I’m sorry if I misunderstood your point, but I think this argument could be clearer.”

Feedback examples without relational characteristics (labelling “Other”):

- some improvements needed.
- The analysis was not understandable at all.
- Wrong approach.
- Failed one extended test.