Feedback literacy:
A framework for effectively using AI outputs in teaching and learning

Feedback is essential in any teaching and learning context. Hattie and Timperley describe feedback as "the information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding"[4]. As well as people providing feedback, systems — including AI applications — now also provide feedback. How do we ensure that all students get the most out of AI system-produced feedback? **Feedback literacy** is a theory-driven framework that can help teachers and system and resource designers to answer this question. It can help these groups to work out what we should teach about AI systems and how we should design related learning activities and learning systems that involve students interacting with the outputs of teaching and learning AI applications.

Feedback literacy and AI-produced explanations

Three theories (**feedback types**, **student feedback literacy**, and **teacher feedback literacy**) are useful to think about within a feedback literacy framework[6]. Each of these component theories has been developed with the idea that the teacher and student are interacting directly rather than an AI application providing the feedback. However, in research on how teachers might use AI tools in computer science classrooms to help students learn to program, Cucuiat and Waite (2024) found that feedback literacy was essential to analyse how AI-enhanced explanations can be introduced for student use[6].

Key concepts

Feedback literacy:
A set of competencies that support the social interaction of feedback.

Feedback types:
Different classifications of feedback, which include feedback as telling, guiding, developing understanding, and opening up[1].

Student feedback literacy:
Student competencies related to feedback, which include the ability to appreciate the feedback process, make judgements about feedback, take action, and manage one's responses to (the affect of) the feedback[2].

Teacher feedback literacy:
Teacher competencies related to feedback, which include the ability to design feedback within the learning context, take account of the relational aspects of feedback, and be pragmatic about feedback[3].
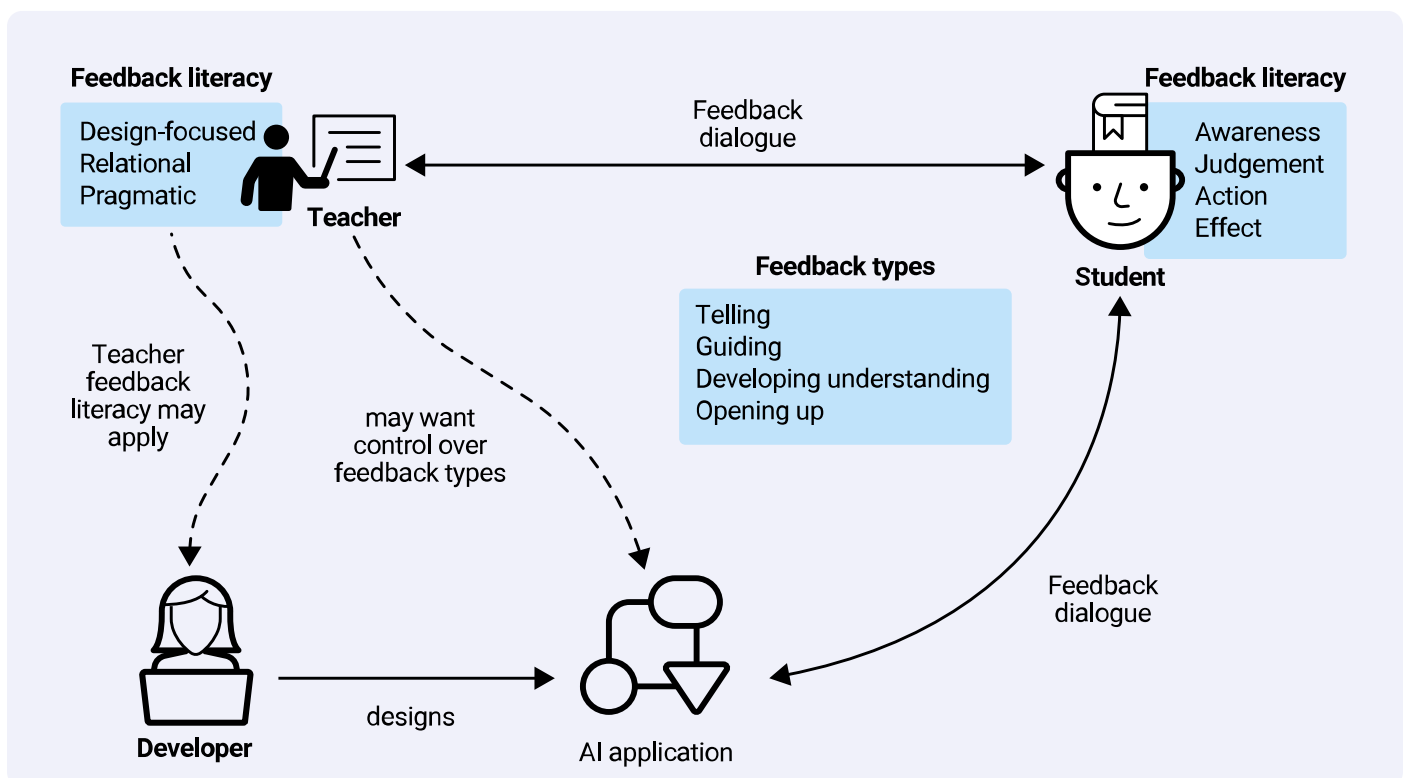
The three theories of feedback types[1], student feedback literacy[2], and teacher feedback literacy[3] are interconnected and may also influence developers and AI applications (inspired by Rohlfing et al.[5]).

Feedback types

The four feedback types (**telling**, **guiding**, **developing understanding**, and **opening up**) are simple ways of describing the feedback created by people and by systems[1].

Feedback type	Educator role	Student role
Telling	Unidirectionally transmit 'correct' information	Passive
Guiding	Point in the right direction	Active — apply knowledge
Developing understanding	Provide targeted teaching	Active — construct or adjust knowledge
Opening up	Present new perspectives	Active — interpret and evaluate new knowledge

When exploring AI system-produced explanations of program error messages, teachers have asked for feedback in the form of telling to be avoided; such feedback can lead to students becoming over-reliant on AI systems and not actively learning themselves. Teachers would prefer students to not be told the answers but instead guided to them.

Feedback should also feed-forward[7] and generalise, so that students can reuse new knowledge in other contexts.

Teachers are likely to use a range of feedback types without even realising it, adapting to the student, the topic, the task being done, and the progression they expect for that learning experience. How effective AI-produced feedback will be in providing such nuanced feedback remains to be seen.

Student feedback literacy

Student feedback literacy has been described as having four main aspects: students need to be able to appreciate the feedback process, make judgements about the feedback, take action, and manage their responses to (the affect of) the feedback[2]. It serves as an important framework when thinking about how students should handle feedback.

Teacher feedback literacy

Teacher feedback literacy is a framework that identifies key teacher competencies in relation to feedback. It has been described as entailing the ability to design feedback within the learning context, take account of the relational aspects of feedback, and be pragmatic about feedback[3].

Embedding feedback literacy in classroom practice

As AI applications become more prevalent in classrooms, teachers will need to change what they teach and how. Meanwhile, students will need guidance as the way they learn changes. Indeed, many students are already using feedback produced by AI applications in different ways, to greater and lesser degrees of success (e.g. as discussed by Kazemitabaar et al.[8]).

Feedback literacy provides a framework to begin addressing these changes and ensuring that teachers and students get the most out of AI teaching and learning applications in the classroom.

Feedback literacy can help students to:

- Compare and judge what to do with feedback from their teacher, feedback from their peers, and output from an AI system
- Understand why AI-produced feedback may be wrong, use unfamiliar vocabulary, or point them towards a next step that is not very useful for their learning progression
- Learn new processes to work with AI-produced explanations, such as evaluation techniques and how to record judgements

Feedback literacy can help teachers to:

- Consider how and when AI-produced feedback might enrich or even replace existing teacher-student dialogue
- Teach students about feedback literacy and support students in developing and applying their own feedback literacy

As time goes on, teachers may also demand more from AI tools, expecting functionalities such as the ability to turn off feedback in the form of telling and have feedback only in the form of guiding, to better lead students towards pre-defined learning objectives and feed-forward to useful knowledge building.

References

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