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In Brief: Metacognition & GAI in Course Assessment

Brief Description

A guide on metacognition and ethical generative AI use in course assessment, concluding a 3-part series on pedagogy and GAI.

Introduction

As generative AI becomes increasingly integrated into learning and teaching in higher education, instructors are navigating complex questions around academic integrity and student learning. While many emerging policies emphasize detection and sanctions, this guide offers a proactive alternative—a metacognitive approach, grounded in research evidence from the learning sciences and inclusive pedagogy that supports students in articulating their learning process. By centering trust, transparency, reflection, and student agency, the instructor can shift the focus from interrogation to ethical GAI use and cultivating a growth-oriented learning environment.

1. What Does the Research Tell Us About Metacognition?

Metacognition—the ability to reflect on and regulate one's own thinking—is a critical driver of deep learning and the transfer of knowledge. Research in the learning sciences shows that when students engage in metacognitive practices, such as articulating their reasoning or revising work with intention, they are more likely to internalize concepts and apply them flexibly. Schuster and colleagues (2020) found that "metacognitive skills are task-general and transferable to a wide variety of learning tasks," and that combining cognitive and metacognitive strategies "improved both students' near and far transfers of metacognitive skills," underscoring the importance of intentional scaffolding in instructional design. Stebner and colleagues (2022) further demonstrate that metacognitive training not only improves strategy application but also enhances content knowledge acquisition—highlighting its dual impact on how students learn *and* what they retain. Similarly, Ortega-Ruipérez and Correa-Gorospe (2024) emphasize that "when evaluating the work of peers, metacognitive strategies of critical reflection are employed," and that structured peer assessment—especially when paired with instructor feedback—"helps the student reflect on what is wrong and why, and how to improve," reinforcing metacognition as a social and dialogic process. Embedding metacognitive reflection into assessment shifts the emphasis from detecting academic misconduct to cultivating academic integrity through transparency and ownership of learning.

While there is evidence that intentionally designed activities cultivate students' critical thinking skills cultivated, emerging studies also suggest that overreliance on generative GAI tools may reduce opportunities for critical thinking and hinder cognitive development (Melisa et al. 2025). Rivas, Saiz, and Ossa' (2022) systematic review demonstrates that metacognitive training

significantly enhances students' critical thinking and reasoning skills. Strategies like "paper wrappers," which prompt students to surface their thinking by explaining their process, offer practical ways to embed metacognition into assessment design that make the learning process explicit and have the added benefit of reducing the likelihood of unauthorized GAI use by encouraging students to reflect on how they learn, not just what they produce (Bowen 2013).

Reflection Prompts:

- **Where in your course assessment do students need to demonstrate their thinking process?**
- **How might metacognition reflection support deeper learning in your discipline?**

2. Why Does Metacognition Matter When Teaching with GAI?

As GAI tools become more embedded in academic engagement, fostering students' transparency around their use is essential—not only for maintaining respect for intellectual property and original work but for supporting meaningful and transformative learning. Kılınç (2024) emphasizes that ethical GAI integration "must move beyond restrictions to foster innovation and academic integrity," offering educators adaptable strategies for diverse learning environments. Encouraging students to develop their own "theory of use" supports them in critically evaluating when and how GAI supports their goals, rather than relying on it passively or opportunistically. Lineman and colleagues (2023) argue that "AI-driven personalization and metacognitive scaffolding together shift higher education from content delivery to transformative learning," enabling students to surface and refine their thinking in real time. When students are asked to rigorously reflect on how they arrive at an answer—not just what the answer is—they can engage authentically and are less likely to outsource their work to GAI.

Metacognitive framing also shifts the classroom dynamic away from surveillance and suspicion towards self-efficacy and trust—key aspects in Northwestern University's Principles of Inclusive Teaching. Alkouk and Khlaif (2024) advocate for "AI-resistant assessments" that emphasize "evaluating not only the final product but also the student's interaction with AI tools throughout their learning journey," promoting ethical engagement and reflective practice. Bowen's (2013) concept of "paper wrappers" reinforces this approach by prompting students to explain their process, guiding them to "understand their strengths and weaknesses, assess their own performance, [and] identify strategies that work for them." Rivas, Saiz, and Ossa (2022) further affirm that "critical thinking improves with the use of metacognition," highlighting its role in helping students regulate their reasoning and learning behaviors. Further research suggests that while metacognition does not directly predict critical thinking performance, it significantly influences students' motivation to think, which in turn supports the development of critical thinking skills (Ossa, Rivas, and Saiz 2023). This layered relationship reinforces the value of metacognitive framing in supporting students engage GAI with intentionality and purpose. Thus, metacognition in course assessment empowers *all* students to engage with GAI as a tool rather than as a threat to their learning and development. By asking students to explain their process—including how and why they used GAI—instructors can encourage

honest engagement and reduce the appeal of unauthorized shortcuts with GAI. Rather than awaiting to report an academic integrity violation, instructors can foster a culture of accountability and trust by communicating clearly with students and asking them to disclose when and how they do or would be tempted to use GAI in place of meaningful learning.

Reflection Prompts:

- **How do you currently talk with students about GAI use in your course assessment?**
- **What would it look like for students to take ownership of their learning process with GAI?**

3. What Can We Do?

The following ideas offer scalable entry points—from quick additions to existing assignments to deeper collaborations with students on ethical GAI use, including estimated times for instructors to implement these ideas.

15–30 Minutes

1. **Use paper wrappers with metacognitive questions**, reinforcing students' metacognitive habits. Here are examples of questions to prompt student reflection on their learning strategies for a closed GAI use policy:
    - Where did you feel tempted to take a shortcut using GAI?
    - When did you think GAI could do your work better or faster?

2. **Add a reflection question to assignments**, focusing on students' processes over products and asking them to describe how they used GAI tools and how doing so supported their learning. This both promotes transparency around GAI use and also discourages misuse of GAI. Here is an example of a prompt for a conditional or open GAI use policy:
    - Explain your writing process, including how you used GAI.

1–2 Hours

1. **Incorporate a cover letter-style reflection for major assignments.** Instruct students to include a cover letter to accompany their assignment (e.g., paper, project, or portfolio). The goal is to prompt students to communicate their processes, decisions, and use of GAI technology in a structured, intentional way that also encourages reflection and ownership of learning. Cover letter elements can include:
    - **Purpose and goals** of the assignment from the student's perspective
    - **Strategie**s used to complete the work (e.g., planning, drafting, revising)
    - **GAI tools** used, including when and why they were used (for a conditional or open GAI use policy)
    - **Challenges** faced and how they addressed them with or without GAI
    - **Learning outcomes** of the assignment for the student

2. **Facilitate a class discussion on GAI use and learning goals in assessment activities.** You might use a think-pair-share or poll to surface students' perspectives and assumptions to prompts like:
    - Where does GAI fit (or not fit) into how your learning is assessed in this course?
    - How do you plan to use (or not use) GAI tools in ways that support your learning goals in this course's assessment activities (e.g., quizzes)?

1–2 Days

1. **Co-design a GAI use policy addressing course assessment with students**, through the following activities:

    First: Reflect on your own philosophy regarding how GAI might support and/or undermine your students' learning goals in the course. Determine your approach to course policy on GAI use—how and when GAI tools are prohibited unless explicitly stated otherwise by the instructor (closed use) or permitted with boundaries such as students' assessment and disclosure (conditional or open use) for course activities, assignments, and assessments.

    Next: Discuss and draft a policy with students that addresses your own thoughts and asks students to incorporate their ideas and feedback around ethical use of GAI to assess their learning. For your policy, consider including: a clear statement of purpose, guidelines for different course activities that will be assessed, and expectations for disclosure and reflection on GAI use. Confirm students' individual and collective agreement with the policy, revisiting and revising mid-term based on experiences. Here are some prompts for discussion:
    - **What do you think is fair and ethical GAI use in this course?** What are acceptable and unacceptable uses of GAI in this course?
    - **What kinds of GAI tools would help you learn?** And what might get in the way of your learning?
    - **When and how could you disclose GAI use?**
    - **What kinds of support do you need to use GAI responsibly?**

    Last: Update your syllabus with your GAI use policy. Below is example language to get started:

Closed GAI Use Policy

This course emphasizes the development of your own critical thinking, creative writing, and problem-solving skills. Unauthorized use of generative AI tools undermines these goals and your learning. Therefore, the use of GAI tools is not permitted for any course activities, assignments, or assessments, unless explicitly authorized by the instructor. Submitting GAI-generated content as your own work constitutes a violation of academic integrity. If you are unsure whether a tool is allowed, please ask before using it.

Conditional or Open GAI Use Policy

This course values critical engagement with emerging technologies. Using generative AI responsibly can support your learning, but it must not replace your own critical thinking, creative writing, or problem-solving. Therefore, you may use select GAI tools (e.g., CoPilot) to support your learning in this course, provided you do so transparently and ethically. For any course activity, assignment, or assessment where AI may be used, you must submit an additional reflection (e.g., paper wrapper or cover letter) that explains:

- What GAI tool(s) you used
- How you used them

How to Cite This Guide

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