Designing for Metacognition: Incentivize Thinking That Transforms Learning

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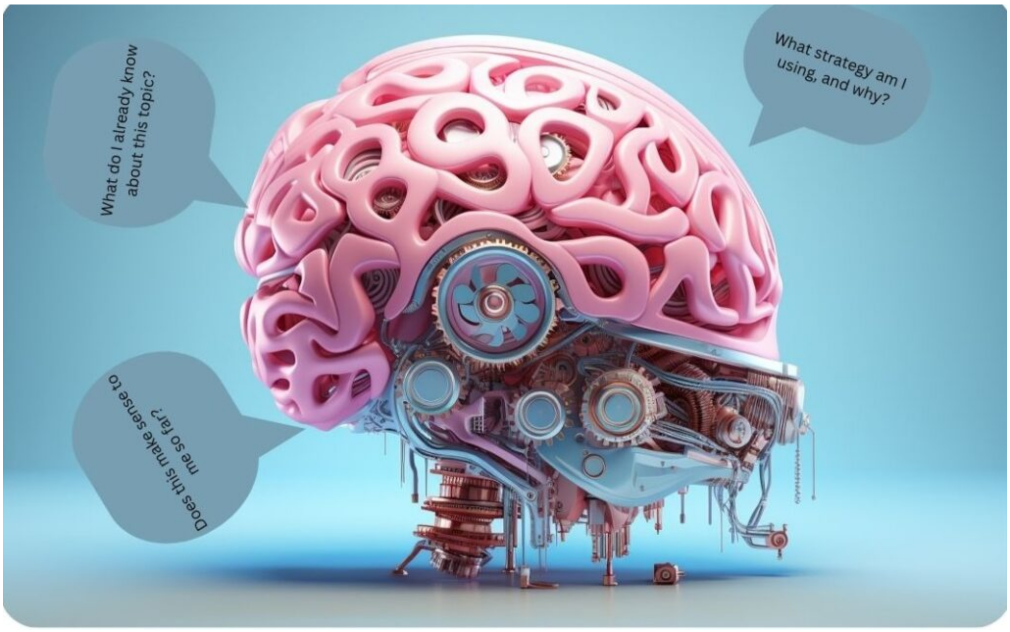
Metacognition is the habit of thinking about and understanding one's own thinking, which is essential for meaningful learning (Fan et al., 2024; McGuire & McGuire, 2023; Richmond et al., 2017). Yet, a persistent challenge remains: How can instructors help students develop this habit while continuing to prioritize disciplinary content? For many faculty, intentionally teaching learning processes alongside course material can create instructional tension. Teaching learning processes often feel time-consuming, difficult to integrate, and frustrating, especially when those skills are not perceived as part of the course's "core" content. For this reason, this instructional tension is precisely why metacognition and critical thinking must be taught.

Many first-year college students arrive with limited experience in reflecting on their learning, monitoring comprehension, or adjusting their strategies when challenges arise (Richmond et al., 2017). Without these foundational reflective skills, students often engage with learning in ways that limit persistence, transfer, and long-term success (Richmond et al., 2017). Hence, addressing metacognition is not an add-on to content instruction but necessary for helping students engage with content more effectively and become successful, self-directed learners (Fan et al., 2024).

Metacognitive skills do not develop automatically or in isolation (Fan et al., 2024; Richmond et al., 2017). Students are more likely to engage in metacognitive work when it is intentionally designed into a course (Fan et al., 2024; Richmond et al., 2017; Rivas et al., 2022). As students' metacognitive abilities deepen, they may become more self-regulated and use AI more selectively, aligning its use with learning goals rather than convenience. Adding incentives to metacognitive work signal to students that reflecting on their learning is not optional or peripheral, but central to academic success. Instructors can use incentives to invite, sustain, and deepen students' engagement in metacognitive work, facilitating deeper learning. When metacognitive practices are embedded into core assignments, they become more than reflective exercises; they become catalysts for learning transformation. The following are five incentives adapted from Santangelo and colleagues (2021).



1. Be Transparent: Help students understand *why* metacognitive engagement matters for learning and long-term success.

Example: The instructor introduces metacognition at the beginning of the semester, defines it clearly, scaffolds it during instruction, and explains its relevance in learning and long-term academic success. Metacognitive reflection is highlighted in the syllabus as a supportive learning process and reinforced as a core competency of allassignments. The instructor emphasizes that students become more effective learners when they clearly become aware of their thinking. This awareness, in turn impacts how students plan, monitor, and revise their learning process. Students will begin to understand that developing metacognitive awareness supports high-quality work and sustained learning.

2. Integrate into Core Assignments: Help students see metacognition as a core academic skill rather than extra work.

Example: In an undergraduate engineering course, the instructor requires students to submit a design portfolio that includes brief reflections alongside technical artifacts (e.g., test data and graphs or prototype documentation). The instructor explains that these reflections are part of the portfolio – not add-ons – and further iterates that because effective engineers regularly evaluate how they approach problems, they test solutions regularly, and revise designs. Throughout the course, the instructor reinforces that reflecting on decision-making and problem-solving strategies is a core professional skill that supports stronger design outcomes and long-term learning.

3. Actively and Intentionally Scaffold Students: Support sustained engagement rather than one-time compliance.

Example: In an undergraduate nursing course, the faculty structures a clinical care plan assignment in stages, asking students to complete short check-ins as students assess patient information, select interventions, and evaluate outcomes. During this process instructors scaffold by providing targeted prompts at each stage guiding students to consider what they know, where they are uncertain, and how they are adjusting their decisions. Faculty revisits student responses to prompts across assignments rather than requiring a single reflection at the end of the assignment, thus supporting sustained metacognitive habits of ongoing clinical reasoning.

4. Link Metacognitive Work to Assessment: Communicate that how students think and learn is valued in evaluation.

Example: In an undergraduate mathematics course, the instructor includes a small reflection component on major exams and problem sets that asks students to explain how they approached selected problems and checked their solutions. The instructor clarifies that these reflections are evaluated for clarity of reasoning and strategy use, not for arriving at the correct answer alone. By incorporating metacognitive work into grading criteria, the instructor communicates that how students think and learn is an important part of assessment, reinforcing problem-solving as both a cognitive and reflective process.

5. Provide Feedback as an Incentive: Reinforce the intellectual value of metacognitive engagement.

Example: In an undergraduate web development course, the instructor provides targeted feedback on students' project reflections, commenting not only on the functionality of the final website but also on how students planned features, debugged issues, and revised their code. The instructor acknowledges effective problem-solving strategies and suggests alternative approaches where appropriate, reinforcing the intellectual value of reflecting on one's development process. By offering substantive feedback on students' metacognitive work, the instructor communicates that thoughtful reflection is a core part of learning to design and build effective web applications.

These concepts help students move beyond surface-level engagement toward deeper critical thinking, where they actively monitor their understanding, evaluate strategies, and adapt their approaches across contexts. Over time, students begin to see learning not as task completion, but as an intentional, transferable process they can control and refine. For instructors, integrating metacognition is not about sacrificing content but about amplifying its impact. Courses designed with these incentives foster learners who think critically about *what* they are learning and *how* they are learning – skills that are essential in an increasingly complex, AI-supported academic landscape. Metacognition, when intentionally incentivized, becomes a pathway to greater intellectual agency, persistence, and meaningful learning outcomes.

If you are interested in integrating metacognition more intentionally into your course design, assignments, or assessments, contact the CETL to explore strategies, examples, and support tailored to your teaching goals. We would be glad to partner with you in designing learning experiences that foster learning transformation.

References

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