# TEACHING IN THE AGE OF COGNITIVE OFFLOADING: RETHINKING ENGAGEMENT AND LEARNING

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# AGENDA

- **Theory:** Distributed Cognition, Cognitive offloading, Metacognition
- **Practice:** Strategies & examples
- **Conversation:** Your questions & ideas

# UNDERSTANDING THE “WHY”

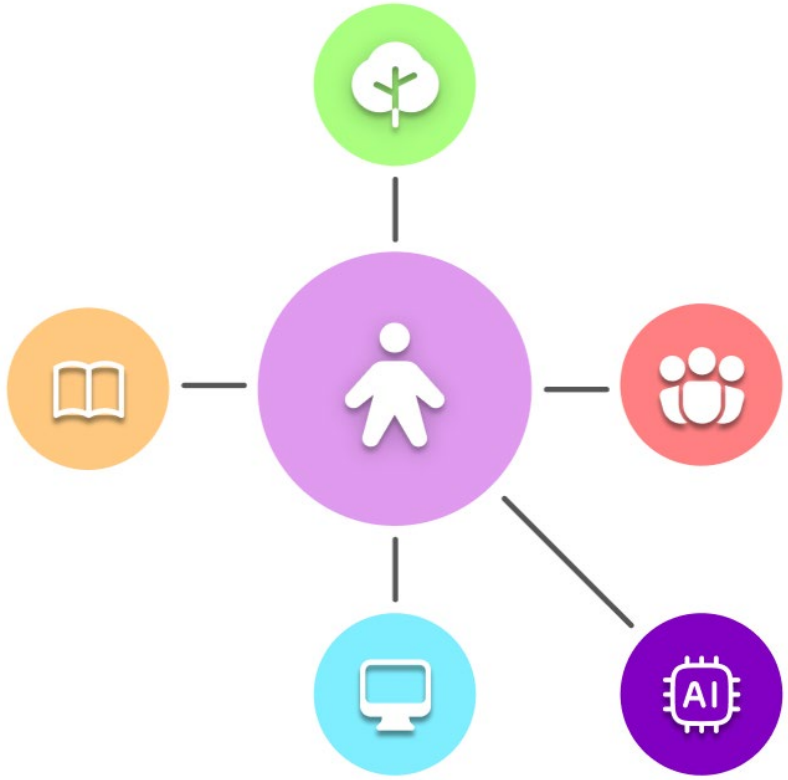
Distributed Cognition, Cognitive Offoading, Metacognition

# DISTRIBUTED COGNITION

- Real-world thinking is distributed out across our minds, bodies, the tools we use, and the people we interact with (Hollan, Hutchins & Kirsh,2000)

# DISTRIBUTED COGNITION W/ GENAI

- What is the role of this new partner in the learning process?
- How do we ensure the student remains the leader of this cognitive partnership?
- How do we design tasks that leverage the entire system?
- What emotional connections do we develop while learning with AI?



# COGNITIVE OFFLOADING – BENEFITS

- Tedious, lower-level tasks are offloaded, reducing cognitive load, allowing us to focus on higher-order skills, which enhances our academic success (Iqbal et. al, 2025)
- Short-term performance gains such as increased speed in finishing tasks (Grinschgl, Papenmeier & Meyerhoff (2021)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# COGNITIVE OFFLOADING – DRAWBACKS

- Short-term gains comes at the price of long-term knowledge and expertise, as core cognitive work is bypassed (Grinschgl, Papenmeier & Meyerhoff, 2021)
- Significant negative correlation between frequency of AI tool usage and critical thinking ability (Gerlich, 2025)


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# COGNITIVE OFFLOADING – MORE COMPLEX THAN WE THINK

- Student goals are important in their decision to cognitively offload or not. When students were aware of a memory test in the future, they strategically reduced their offloading, even when they were required to offload maximally, they were still able almost completely counter-act negative effects on memory that offloading causes (Grinschgl, Papenmeier, & Meyerhoff, 2021)
- Choosing to offload is not driven by performance but by metacognitive beliefs, this leads to metacognitive errors (incorrect judgement of our own abilities). Offload is often driven by our feelings, intuition, or past experiences about what we *think* will be difficult, and what we *think* will help. (Dunn & Risko, 2015)

# METACOGNITION – A POTENTIAL APPROACH

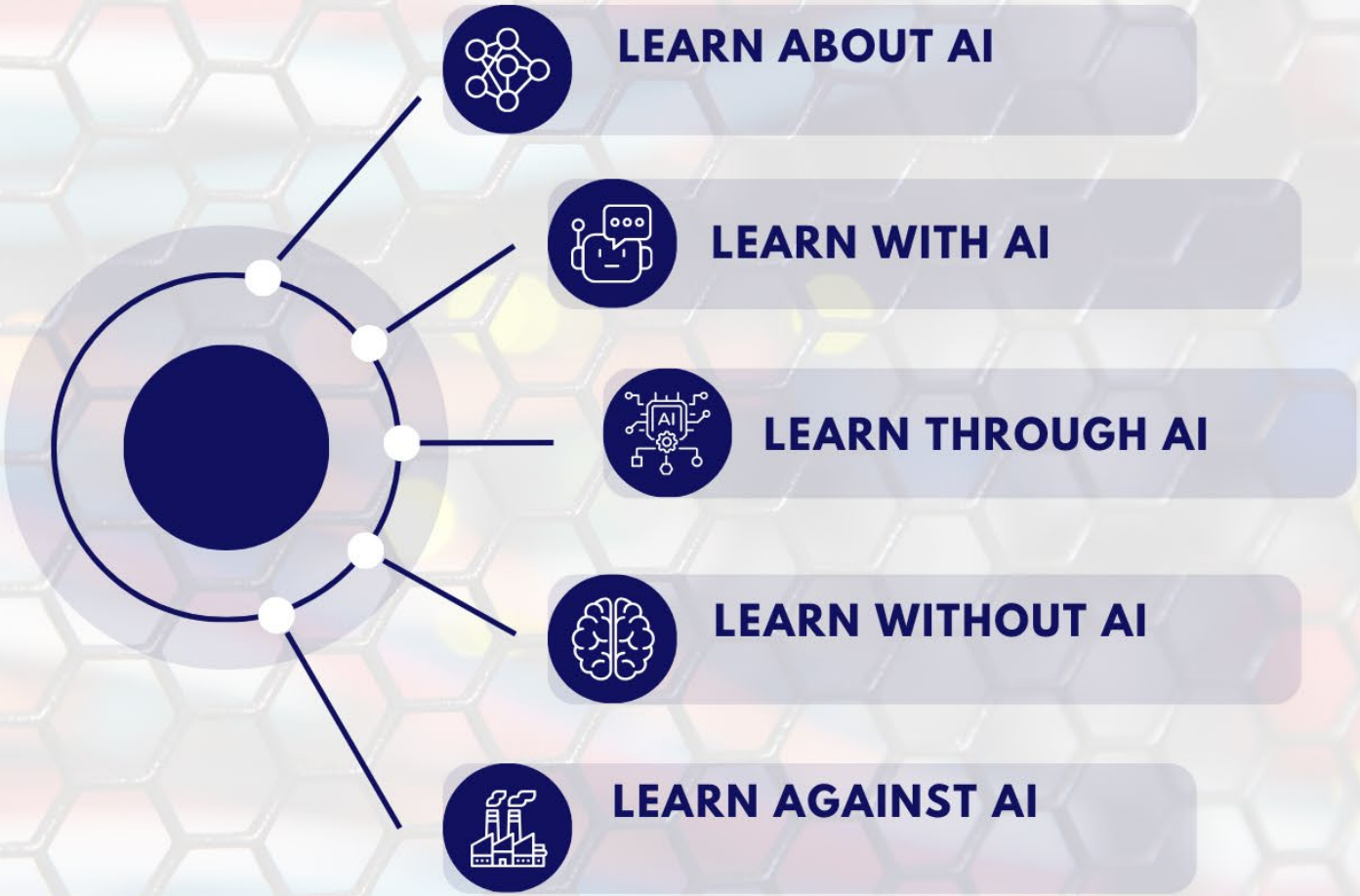
- Thinking about thinking (Flavell, 1979)
- The monitoring and control of thought (Martinez, 2006)
- 2 primary components (Lai, 2011)
  - Metacognitive knowledge – what we know about ourselves as learners
  - Metacognitive thought – active monitoring and control of our thinking

# METACOGNITION & SOCIAL DISCOURSE

- Martinez (2006) argues that higher-order thinking which includes metacognition begins as social discourse that is internalized
- Tsoukas (2009) also states that new knowledge is created through productive dialogue, where there is conceptual combination, expansion, and reframing; resulting in new distinctions
- Scardamalia & Bereiter (2006) theory of Knowledge Building is a principled approach that highlights collective responsibility for community knowledge through increased epistemic agency

# PRACTICAL STRATEGIES / EXAMPLES

# FIVE WAYS TO LEARN AI

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# 1-TEACHING/CRITIQUE THE AI

- **Mode:** LEARNING ABOUT AI
- **Activity:** Provide students with an AI-generated answer to a complex question. Their task is to critique it: identify its strengths, find at least factual error or oversimplification, and explain how they would improve it, citing specific evidence.
- **Rationale:** This flips the dynamic. The student must be the expert, evaluating the AI's work. It directly assesses their critical thinking and deep knowledge, making them the driver of the cognitive process.
- Critical Information Literacy (Tewell, 2015) / Caufield (2019)
- Protégé Effect (Cohen, Kulik & Kulik, 1982)

# 2-PROMPT WRAPPERS

- **Mode:** LEARNING **WITH** AI
- **Activity:** Use a 'Prompt Wrapper' worksheet that requires students to state their goal, list their own initial ideas, *then* write their prompt, and finally reflect on how the AI's output will be integrated with their own thinking.
- **Rationale:** This structures the partnership. It ensures the student isn't just a passive receiver of information but an active collaborator who starts from their own base of knowledge and makes conscious choices about how to use the AI's contribution.
- Metacognitive Wrapper (Lovett, 2013)

# 3-FOSTERING ENGAGEMENT & MAKING THINKING VISIBLE

- AI Role-Plays (WITH AI): Students use AI to simulate a job interview or debate a historical figure. This is active, applied learning. (*Situated Learning* – Lave & Wenger, 1991)
- Custom GPT Creation (THROUGH AI): Have students build a custom GPT trained on course materials to act as a study bot. Their grade is based on how well it works and their documentation.
- Process Journals (WITH AI): Students document their AI use, showing their prompts and reflecting on their revisions. This assesses the *process* of working with a cognitive partner. (*Reflective Practice – Schon, 1983)*
- In-Class Debate (WITHOUT AI): A spontaneous, in-person debate where students must rely on their own retrieved knowledge and critical thinking skills on the fly.

# YOUR IDEAS & THOUGHTS

Q & A

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