

METHODS

This project used classroom pilots, reflective prompts, and human-centered design methods. Students engaged with structured thinking prompts, quick sketches, and AI-supported workflows for ideation and explanation.

Impact was evaluated using an anonymous survey (n = 15) and open-response questions. We focused on problem definition, structure of reasoning, and confidence communicating complex ideas. Responses emphasized difficulty externalizing internal thinking and interest in tools that help organize thought.

Quote: "It [complex Idea] feels like a word jumble in my mind."

Ellison Carter, Ashley Geraets
Colorado State University

With thanks to Katey Shirey, our mentor

MAKING THINKING VISIBLE

CHALLENGES

Limited faculty participation despite high initial interest

reasons

- semester time constraints
- lack of control over courses
- student demands & hesitancy

Reduced faculty-ask & student-demand approach:

pivot

- lightweight survey on AI tool use
- quiz to match tools with personal preference
- deeper follow-up for those interested

NEXT STEPS: SPRING 2026

Student mental model elicitation & emergent EOP framework mapping

spring plan

- Students (100+) draw mental models in-class
- ALL students take web tools quiz
- work with small population of students interested in using a web tool to further convey their mental model
- gather, analyze, and map emergent themes of student outputs to EOP framework
- compare to pilot survey themes & feedback

PROGRESS

Students consistently reported difficulty explaining complex ideas without losing structure. Many described frustration, rushing, or over-explaining when communicating their thinking.

Visual or structured scaffolds were widely perceived as helpful. AI tool use was common, but attitudes varied, reinforcing the importance of framing AI as a support for organizing thought rather than replacing it

Quote: "I realize I've shared four ideas when I meant to share one."

This project shifted our teaching focus from answers to thinking processes. For students, it has potential to reduce frustration and improve confidence with complex sustainability problems.

Institutionally, the model offers a low-cost way to integrate sustainability, reflection, and emerging tools. Future evaluation will expand deployment to four courses serving 100+ students and include artifact-based assessment and follow-up surveys.

Quote: "I'm not sure I want a tool that pulls my thinking out of my head."

CONCEPT & MOTIVATION

Sustainability challenges demand systems thinking, uncertainty management, and clear communication.

Yet sustainability education often emphasizes content more than the cognitive work required to explain complex reasoning.

This initiative supports sustainability by strengthening how students structure and communicate thinking.

The pilot ran in two upper-level technical electives in civil and environmental engineering, enrolling undergraduate and graduate students.

The approach embeds durable skills within existing courses and is broadly transferable.

WEB TOOLS MINI-APP

Inspired by personality index quizzes & "choose your adventure" games, users journey through questions to elicit preferences for: use case, collaboration, budget, time pressure, aesthetic, learning style, AI use, and motivation

goal:

help users understand the type of user they are and see how that maps onto their task & tool recommendations



plantshley.github.io/web-tools-persona-quest