

Using GenAI Better, Not More: A Multi-Course Evaluation of a Lightweight Scaffolded AI Lab

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A brief, course-embedded scaffold for strategic, critical, learning-oriented GenAI use



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**BETTER,
NOT MORE**

Students reported more strategic prompting, stronger verification, and clearer boundaries.
Self-reported use on homework and programming projects remained stable.

Why a lightweight scaffold?

Students already use GenAI, but access alone does not teach them to prompt well, verify plausible outputs, or decide when not to use the tool. Many instructors also cannot redesign an entire course around AI. AI-Lab fits those goals into one class meeting plus a short reflection.

AI-Lab in three moves

1 Orient

Set course expectations and integrity boundaries. Introduce basic prompting and the idea that plausible answers still require judgment.

2 Critique

Students inspect course-aligned outputs designed to be plausible but incomplete or wrong, then explain what failed and how they know.

3 Use + reflect

On a homework task, students document how prompts evolved, what they verified, and where the model failed or became unhelpful.

Designed to be low overhead

50-80

minutes in class

30-60

minutes lecture
prep

30-60

seconds grading
/ student

Instructor setup also included about 30 minutes for pre-lab and survey preparation.

Adapted across four course contexts

Competitive programming | Data structures and algorithms | First-year engineering

The scaffold stayed fixed while prompts, examples, and the post-lab task changed with local course goals.

Topics included strongly connected components, union-find / disjoint sets, and engineering project brainstorming.

Mixed-methods, multi-course study

2

semesters

4

course
contexts

831 / 826

paired survey
responses

6

focus groups

Paired pre/post perception and usage surveys, followed by thematic analysis of post-intervention focus groups.

Primary inferential analyses used the three CS courses: N=778 for perception and N=773 for usage.

What changed after AI-Lab?

Paired two-tailed Wilcoxon signed-rank tests in the CS sample

Openness

2 shifted | 1 stable

Conceptual questions

↑ increased

p=.0008

Debugging

↔ stable

p=.659

Homework help

↑ increased

p=.014

Comfort

3 of 3 shifted

Conceptual questions

↑ increased

p<.0001

Debugging

↑ increased

p=.0009

Homework help

↑ increased

p=.0118

Self-reported frequency

1 shifted | 2 stable

Debugging

↑ increased

p=.0239

Homework

↔ stable

p=.681

Programming projects

↔ stable

p=.973

**COMFORT SHIFTED BROADLY.
REPORTED USE SHIFTED NARROWLY.**

Why this matters

Teaching GenAI does not have to mean encouraging more use. A lightweight lab can focus on judgment: what to ask, what to verify, and when to stop.

The intervention separated readiness from reliance: greater comfort and more strategic engagement, without broader graded-work use.

How students described the shift

"I don't know if I've used it more, but I definitely use it differently."

Focus Group 5, Speaker 3

1 Prompt more strategically

Students described adding context, constraints, and follow-up prompts instead of treating the first response as final.

2 Verify more skeptically

They discussed testing code, tracing logic, checking course materials, and recognizing confident but incorrect answers.

3 Set clearer boundaries

They framed GenAI as support for understanding and debugging while naming risks around integrity, dependence, and ownership of learning.

What instructors can take away

1 Teach prompting, verification, and boundaries together.

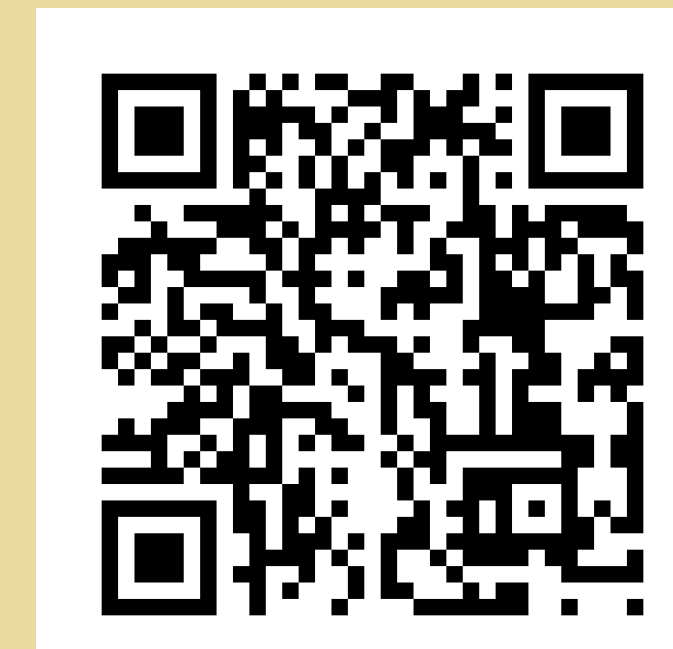
2 Let students encounter a plausible failure themselves, not just hear a warning.

3 Require a short record of prompts, checks, and reflection on where the tool failed.

4 Keep graded-work policies explicit. Instruction does not have to mean unrestricted use.

Read the full study + use the materials

Full paper



arXiv:2505.00100

AI-Lab resources



Handout + slides

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