

AI in Education: Teaching, Learning, and Assessment in the Era of Generative Tools

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October 28th, 2025

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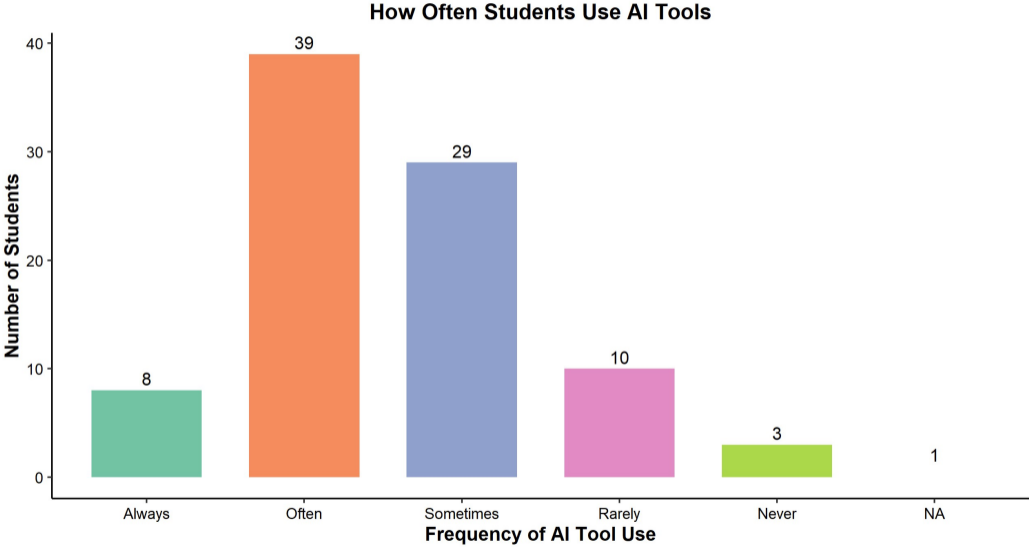
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- How GenAI reshapes **teaching** and **evaluating** scientific reasoning & communication.
- Emphasis: **transparency, critical thinking, ethical use.**

Are Students Using AI Tools?

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From Tools → Partners

What AI does well

- Drafting, summarizing, coding, feedback

Where AI struggles

Key Takeaway

Treat AI as a **collaborator to interrogate**, not an answer oracle.
Design activities that *force* verification.

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- Hallucination, bias, privacy risks
- Overreliance ⇒ atrophy of core reasoning

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Design activities that *force* verification.

Teaching

Teaching Shifts

- ① From **product** to **process**: require provenance (prompts, diffs, iterations).

Design Cue

Reward *thinking moves* (questioning, testing, explaining) rather than polished prose alone.

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- ② From **recall** to **reasoning**: justify assumptions; compare models; stress-test outputs.

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- ① From **product** to **process**: require provenance (prompts, diffs, iterations).
- ② From **recall** to **reasoning**: justify assumptions; compare models; stress-test outputs.
- ③ From **clean tasks** to **authentic messiness**: conflicting sources, stakeholder constraints.

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Reward *thinking moves* (questioning, testing, explaining) rather than polished prose alone.

Learning

Learning Shifts

With AI, students should:

- Plan–prompt–critique–revise (metacognitive loop).

Require an AI Use Statement (*which tool, for what, key outputs, validation steps*).

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Learning Shifts

With AI, students should:

- Plan–prompt–critique–revise (metacognitive loop).
- Argue from evidence: cite data/code, flag uncertainty, compare alternatives.
- Communicate for audience: clear visuals, limits & ethics section.

Require an AI Use Statement (*which tool, for what, key outputs, validation steps*).

Assessment

Assessment: Three Lanes

AI-Allowed	Open projects; grade on reasoning, verification, and provenance.
AI-Limited	Provide AI output; students must <i>debug, interpret, stress-test</i> .
AI-Free	Oral defenses, whiteboard derivations, timed labs with local data.

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Balance: measure both **independent competence** and **AI-augmented performance**.

Ethics

Ethics & Transparency

- **Transparency:** disclose use; preserve traces (prompts, versions).

Make Ethics Graded

Keep a recurring rubric row for *ethics & transparency* in every AI-touched assignment.

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- **Fairness:** probe for biased outputs; include counterfactual checks.
- **Attribution:** cite models/sources; note training data limits when known.

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Opportunities & Pitfalls

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- Personalized tutoring/accessibility

Pitfalls

Instructor Move

Pair AI with **verification tasks**: replication, unit tests, counter-examples, ablations.

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Pitfalls

- Bias & equity concerns
- Privacy/IP leakage
- Convenience over curiosity

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- ③ Calibrate with the **three lanes** across the course.

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- ② Add **verification tasks** to every AI activity.
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- ④ Collect **process artifacts**: prompts, diffs, logs.

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- ② Add **verification tasks** to every AI activity.
- ③ Calibrate with the **three lanes** across the course.
- ④ Collect **process artifacts**: prompts, diffs, logs.
- ⑤ Iterate with students: **reflect, revise, repeat**.

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