

Teaching with AI

Much of the conversation about AI has focused on teaching about and with AI so students graduate ready to succeed in an AI-infused workplace. This is certainly important. But as instructors we need to go beyond bolting AI onto our teaching to meet employers' expectations – we need to **use AI in the service of learning**.

To that end, there are two basic pathways for integrating AI into your teaching practice – 1) using AI behind-the-scenes to assist you in the design of your course and development of your course materials, and 2) using AI to enhance student learning and engagement.

Using AI in the course design process

The list below contains just a few of the ways you might use AI as you develop your course. Note how often the word “draft” appears in this list. It’s important to remember that generative AI is an *assistive technology*. **Because AI cannot distinguish fact from fiction, you should always refine AI-generated output.**

- Draft learning outcomes
- Draft module/unit descriptions
- Draft slides or other teaching materials
- Draft examples for lectures, worksheets, discussions, self-assessments
- Draft discussion prompts
- Draft rubrics
- Improve accessibility by providing alternative formats
- Evaluate responses to common student questions (students may ask ChatGPT in real time during lecture instead of asking the instructor; students may ask to summarize a reading)
- Brainstorm authentic assessment ideas
- Evaluate effectiveness of proposed AI-resistant assessments
- Identify and analyze themes in student feedback (e.g., mid-quarter check-in survey). Note: To protect student privacy and comply with FERPA requirements, please only use Caltech’s version of Copilot for this task.
- PLEASE DO NOT USE AI TO GRADE STUDENT WORK.

Using AI to enhance learning and engagement

Generative AI has terrific potential to help students learn course concepts and develop key skills. In some ways, generative AI’s shortcomings are its strengths in a teaching context – its penchant for inaccuracy makes it a great tool for prompting students to think critically. Instructors can also leverage AI’s generative capabilities to prompt students to analyze alternative scenarios, ask questions about information accuracy, and explore connections between concepts.

Below are just a few examples of how instructors might use AI to facilitate learning. Many of these examples familiarize students with AI-based tools, but also prompt critical examination of their value, accuracy, strengths, and shortcomings.

- **Think-pair-AI-share:** Students think (as individuals) about a question/concept, then pair up with a peer to discuss. The pair then plugs the question/concept into a generative AI tool and discusses or analyzes the output.
- **Evaluating AI output:** Co-develop a rubric with students that describes the components of an effective essay, lab report, précis, technical manual, blog post, etc. Students prompt an AI tool to generate three versions of the assignment on a given topic and then use the rubric to evaluate the quality of the AI-generated versions.
- **Improving upon/adapting AI-generated output:** Students use generative AI to draft text or code in response to an assignment prompt. Students must then improve upon the AI-generated output. When students turn in their assignment, they must include both the AI-generated text and their improved version.
- **Drafting analogous problems with AI:** Using a given example, students use generative AI to draft analogous problems in different fields (or with different themes) and validate AI-generated output. Students learn to generalize a single concept across multiple domains.
- **Debating with an AI opponent:** With suitable prompts, students can engage in a debate with AI, where they must evaluate the AI-generated output, develop prompts with improvements/corrections or counterarguments, and identify key points of contention.
- **Explaining the steps in an AI-generated solution:** Students use AI to solve a math problem. Working from the AI-generated solution, they then work in groups to explain or analyze the steps that the AI tool used to arrive at the solution.
- **Visualizing concepts with AI:** Students select a concept covered in lecture or course readings and then prompt an AI image generator to create an image that represents the connection between the concept and daily life. They must then explain how the AI-generated image conveys the concept and its relationship to daily life. Students might also analyze the strengths and shortcomings of AI image generators.
- **Exploring AI in your field:** Students explore current applications of AI in the discipline of the course or in their major. Within the context of the discipline (or their option), students examine both AI's advantages and limitations.

It is unrealistic and, perhaps, ill-advised to integrate AI into every assignment. Here are some strategies to help build student motivation for working on assignments without relying on generative AI.

- **Assess process as much as (or more than) product** – Lowering the stakes of individual assignments reduces students' motivation to seek out shortcuts or cheat. Low- or no-stakes formative assessments reinforce the notion that learning is a process, that practice is essential to learning, and that learning, not the grade, is what matters.
- **Design assignments that connect course content, class discussion, and students' lived experience.** It's harder for AI-based tools to effectively connect the dots between these sources of knowledge. An added benefit is that students often find assignments that draw on their experiences inherently more interesting and relevant.