AI-Resistant Teaching

AI-resistant teaching strategies are designed to preserve the integrity of learning by minimizing or eliminating the effectiveness of AI-generated responses. Here are some ways to alter existing assignments to create more AI-resistant assignments for your courses.

Step 1: Set (and Communicate) Clear Learning Objectives

Students benefit from knowing WHY what they are studying is important as well as what they need to be able to do to be successful in the course. Be sure to create and communicate specific, measurable learning objectives that articulate what you expect students should be able to do by the time they complete your course. Spend time in class occasionally discussing why the skills students are learning are important to their future plans, including non-obvious applications to other areas of their lives. The CTLO provides resources for writing learning objectives (and connecting them to course activities) on our website (ctlo.caltech.edu).

Step 2: Encourage Effective Learning Strategies

Offer students guidance on effective learning strategies, such as retrieval practice, interleaving, and metacognition, as they may be unaware of these evidence-based learning techniques. For example, students often report feeling like they learn more from passive lectures than from participating actively in class, even though their performance is worse in the former condition (Deslauriers, et al., 2019).

Remind students that relying on AI tools may hinder their learning and development of fundamental skills that they'll need to use in the future. Students may be tempted to use shortcuts, including generative AI, to maximize efficiency or decrease time spent on assignments. Unsurprisingly, students who reported copying their homework did not perform as well on exams as those who reported doing their own work (Glass and Kang, 2022).

Step 3: Design AI-Resistant Assignments (Examples and Strategies)
Instead of relying on an AI ban or unreliable AI-detection tools, you might consider using any of the following strategies to make assessments less AI-vulnerable. Assume every assessment could be AI-assisted.

Strategy #1: Use Multi-Layered Assessments

> Breaking an assignment into multiple dependent stages allows instructors to identify AI-generated work early and guide students toward producing original content in later phases. This approach creates a "boomerang effect," where students who submit clearly AI-written work can be held accountable by being required to develop and build on that content in subsequent stages. Focus on the process, not just the product.

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Strategy #2: Reflect on Personal Experiences, or a Personal Project Related to the Course

Giving students the freedom to choose their assignment topic or inspiration fosters a sense of ownership and reduces the temptation to copy and paste AI-generated content. It also supports the "boomerang effect," allowing instructors to spot inconsistencies when students submit work that doesn't align with their original, personally chosen topic. This approach can be especially effective when assignments are rooted in local community or campus issues.

Sample Student Reflection Prompts:
- Explain why they chose the references and other source materials for their project.
- Describe their approach to solving a problem or completing a project, including identifying barriers or false starts along the way.
- Identify any lessons learned that can be applied to future contexts.
- Discuss how a concept relates to their own experience, if applicable, and how understanding the concept may influence their interpretation of the experience.

Strategy #3: Implement Grading Criteria Centered Around Specificity

AI-generated responses often rely on broad, surface-level generalizations. By grading students on the depth, detail, and specificity of their work, instructors can push students to demonstrate authentic understanding and reduce the effectiveness of AI-generated answers. This approach rewards original thought and encourages students to go beyond basic or generic responses. Focus on first-hand experiences and content that are unique to the course.

EXAMPLE
Learning Objective: Students in a software development course will evaluate and explain the significance of version control for software development.

AI-Vulnerable Assignment:	AI-Resistant Assignment:
Explain the benefits of version control in software development. **Grading Criteria:** • Accurate explanation • Complete sentences • Meets word count	Choose one specific code update you made during this project and explain: • What change you made • Why that change was important • How version control helped in resolving a bug or merge issue. Include a link or screenshot of the commit and describe the lesson you took away from that experience. **Grading Criteria:** • References a real commit or pull request • Explains the reasoning behind the change • Describes the impact on the project or collaboration • Includes a reflection or takeaway • Contains supporting evidence (screenshot or link)

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Strategy #4: Encourage Active, Experiential, and Collaborative Learning

Active learning engages students in the learning process, rather than passively listening to a lecture or reading a text. Use software like PollEverywhere to prompt students to respond to questions in real time. You may wish to intersperse your lecture with knowledge checks and opportunities for retrieval practice, or to assign students "exit tickets" prior to leaving class.

Experiential learning engages students through reflection on experiences, often outside the classroom, such as in field studies, lab work, and supervised internships. GAI models do not have direct access to students' experiences and are unable to make meaning from them.

Collaborative learning involves students working together to achieve a common goal. One subtype of collaborative learning, called project-based learning, where students collaborate on real-world projects, has been shown to positively impact student achievement (Chen and Yang, 2019). Students engaged in collaborative projects may be less likely to engage in the unethical use of AI, as they feel accountability not just to their instructors but also to their peers.

Strategy #5: Try New Assignment Mediums

Encourage students to move beyond traditional formats by having them submit assignments in creative, non-text-based forms such as flowcharts, infographics, graphic organizers, comic strips, videos, audio recordings, podcasts, posters, or drawings. Similarly, prompt them to use alternative sources for research beyond written media, such as social media clips, online videos, or personal interviews.

Strategy #6: Slow Down Reading

Easily producing reading summaries and "chatting with a text" using AI may help students initially encounter a difficult text, but it also may offer an illusory mastery of the material if used uncritically. Encourage students to slow down their reading of critical texts in your discipline by engaging with them meaningfully.

Tools to use:

- Social Annotation via Perusall

- Commonplacing: Have students record crucial quotes and interact with important passages in their own commonplace books or notes. Popular among writers and thinkers, from John Locke to the present day, commonplace books are typically organized by theme and include quotes, ideas, and observations that are often useful for future reference and reflection. This can be done on pen and paper, in Google Docs, or in more purpose-built tools like Microsoft OneNote and Notion.

- Concept Maps: Concept maps can be powerful tools for students to engage critically with texts, lectures, and other class activities. Students can create diagrams that show the relationships between ideas, with connecting lines and linking words visually and textually describing the relationships between concepts.

Strategy #7: Use AI, then Go Beyond It

If an assignment can be completed by copy-pasting or sending a screenshot to AI, students can easily do the same. To counter this, design tasks that require students to expand on, explain, or transform potential AI-generated responses into new formats or deeper insights. You might even develop an assessment that focuses on common misconceptions, so GAI produces the wrong answer or the wrong reason for the right answer.

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