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How Generative AI Is Reshaping Education

Practical Applications for Using ChatGPT and Other LLMs

Contents

Foreword

It hasn't taken long for generative artificial intelligence (AI) to reshape the higher education landscape. Educators are actively experimenting with ChatGPT and other large language models (LLMs) to enhance their course preparation, elevate their teaching, and strengthen their research. They're also finding new ways generative AI can personalize the learning experience for students, helping them learn more deeply and more efficiently.

The technology itself will only improve over time. So, too, will its transformative effect on teaching and learning. To help our students use generative AI responsibly and think critically in a world where AI persists, we as educators need to embrace these tools with curious, innovative mindsets.

Whether you are an early adopter or have yet to integrate generative AI into your work and teaching, this collection of *Inspiring Minds* articles can spark your thinking. Written by generative AI super users, these articles explore AI's multifaceted capabilities and uncover the power of custom GPTs for education. They also challenge us to recalibrate our thinking around potential plagiarism and revolutionize academic research.

These topics demonstrate the profound potential of generative AI to help us create dynamic, personalized educational experiences for our students. And this is only the beginning. If you are using generative AI in creative ways, in either your teaching or other areas of your academic work, we want to hear about them. Email us at editorial@hbsp.harvard.edu.

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Education

4 Simple Ways to Integrate AI into Your Class

If You Haven't Started Teaching with ChatGPT Yet, It's OK—Here's How to Start

by the HBP editors

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Many educators have taken early, eager steps forward with generative AI over the last year, weighing the technology's benefits and challenges and experimenting with large language models (LLMs) to enhance and personalize student learning. Others have remained cautious, the path forward uncertain.

If you're among the cautious, it's OK. Perhaps you simply haven't had time to experiment with the technology yourself. Or you've dabbled with it, but you're just not sure how to effectively weave generative AI

into your course. Keeping AI at a distance may seem like a comfortable status quo, but classrooms that don't incorporate it risk being perceived as static or, worse, irrelevant.

The good news is that incorporating AI tools into your course doesn't have to disrupt your existing teaching methods or completely overhaul your syllabus. Here are four simple yet transformative ways you can incorporate AI in your classroom.

1. Ask students to critique AI's output

Rather than shy away from AI use for assignments, embrace it; ask students to prompt the AI to produce an essay on a topic of their choosing, suggest Ethan Mollick, associate professor at the Wharton School of the University of Pennsylvania, and Lilach Mollick, director of pedagogy at Wharton Interactive. Then, ask students to take a close look at what ChatGPT produced—have them critique the essay their bot created and steadily improve it by checking facts, adding new information, clarifying points, and layering in analysis and insight.

What students ultimately submit, then, is their improved essay and a write-up of their reflections on where generative AI excelled and where it fell short.

This exercise pushes students to think critically about the AI's output and clearly articulate their ideas for improvement. Likewise, it takes advantage of the AI's propensity to simplify complex topics, while using its lack of insightful analysis as a backdrop for students to provide deep evidence of understanding.

For more guidance on getting started with AI in your classroom, read Ethan Mollick and Lilach Mollick's full article, "Why All Our Classes Suddenly Became AI Classes."

2. Have students compare the results of different generative AI tools

To boost his students' AI fluency, Oguz A. Acar, professor of marketing and innovation at King's Business School, asks them to seek out, use, and then compare the results of a diverse set of generative AI tools: market research tools (like CleverX or AlphaSense), content creation tools (like OpenAI's ChatGPT or Anthropic's Claude), and visual design tools (like Midjourney or Adobe Firefly), for example. He has students document their overall search process, detailing not just the tools they chose, but also the ones they didn't—and why.

This process fuels a broader exploration of potential tools, he says. Plus, students discover which tools best suit a particular type of problem, encouraging a sense of curiosity and exploration that will serve them well in their future careers.

This exercise is part of Acar's four-part framework to develop students' generative AI skills, which he calls PAIR. For more details on the PAIR framework, read his full article, "Are Your Students Ready for AI?"

3. Encourage students to use AI as a study buddy

You can help your students be better prepared for discussions and assessments by showing them how to use AI tools for self-testing and self-study. Mitchell Weiss, the Richard L. Menschel Professor of Management Practice at Harvard Business School, suggests having students prompt ChatGPT to generate questions related to specific topics or to clarify areas of uncertainty.

Students can get fairly detailed in how they set up their self-assessments if they want to, Weiss says. He created a sample prompt that a business student might use to gauge their readiness for a class discussion. The student might write:

"I am having a bit of a hard time with concepts related to early-stage financing. Please test me on the following: pre-money valuation, post-

money valuation, investment size, and ownership stakes. I'd like you to ask me three questions in succession. Wait for my answer on each, and then assess my answer. Do not give me the answer, even if I ask. Instead, if I am struggling or get the wrong answer, please give me a hint. Start now with the first question."

According to Weiss, the more detailed the prompt is in explaining the basic goal and giving background information, the better the tool will be at delivering relevant and accurate results. Since the prompt instruction asks the AI not to provide the correct answer when students are incorrect, it will instead offer a hint that can be useful for the student trying to figure it out on their own.

Using AI in this way offers students a convenient tool to evaluate their understanding of course concepts, says Weiss, and is a helpful technique for students to better prepare for class discussions.

For more ways AI tools can enhance your students' learning potential, watch Weiss's full webinar, "How ChatGPT and Other AI Tools Can Maximize the Learning Potential of Your Case-Based Classes."

4. Use AI to create low-stakes quizzes

Low-stakes assessments like practice tests or study questions are useful learning tools—but they can be time-consuming to create and evaluate. Generative AI can help educators streamline the creation and grading of quizzes, advise Ethan Mollick and Lilach Mollick.

Here's a sample prompt you can use for creating a quiz:

"You are a quiz creator of highly diagnostic quizzes. You will make good, low-stakes tests and diagnostics. You will then ask me two questions: what, specifically, the quiz should test, and what audience the quiz is for. Once you have my answers you will construct several multiple-choice questions to quiz the audience on that topic. The questions should be highly relevant and go beyond just facts. Multiple-choice questions

should include plausible, competitive alternate responses and should not include an 'all of the above' option. At the end of the quiz, you will provide an answer key and explain the right answer."

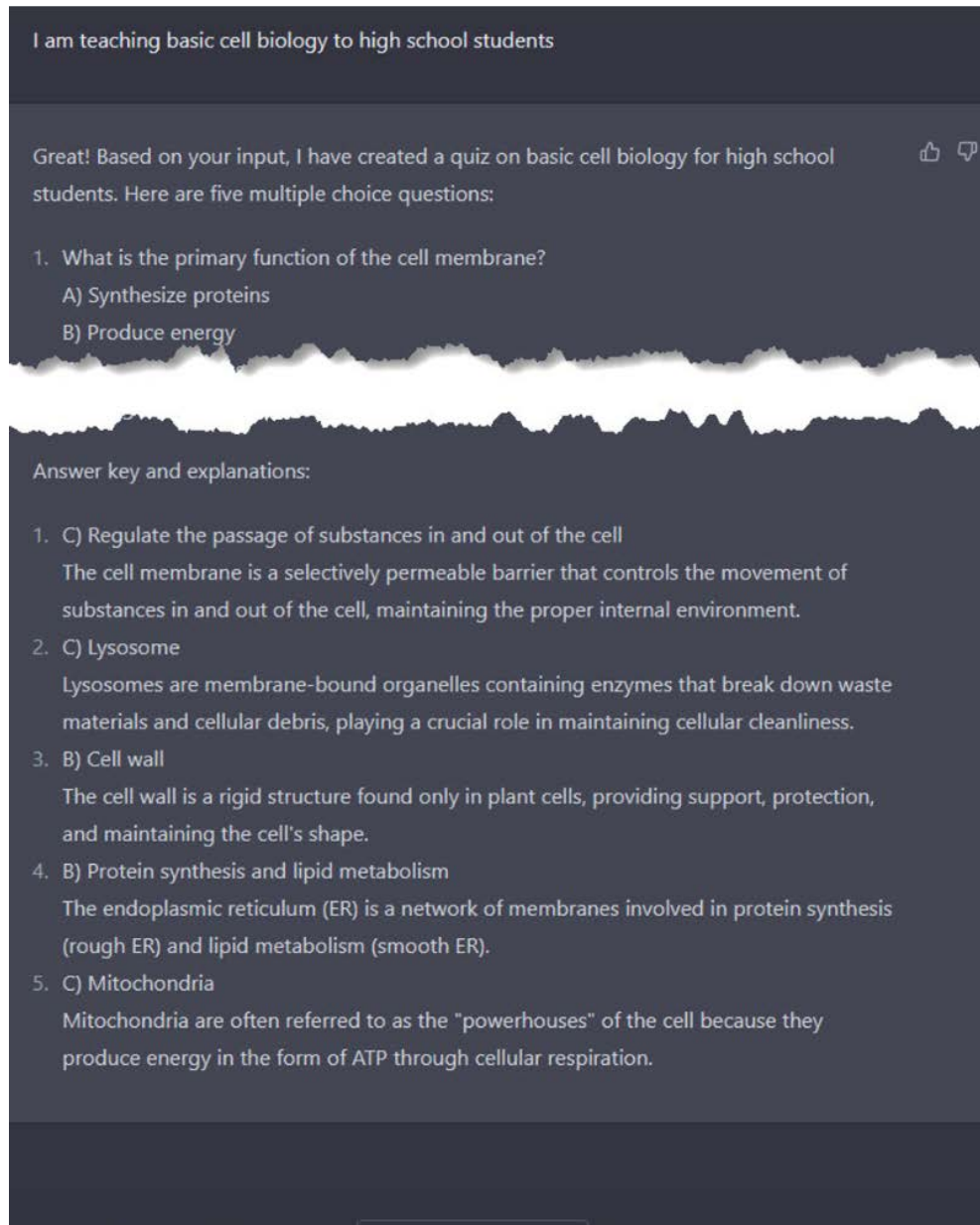Here's an example of what AI's response would look like:

Figure 1: The AI tool produces multiple-choice questions to use in quizzing students. (Written with ChatGPT.)

It's important to evaluate the AI's output; the quiz questions may not be reliable or at the right level for your students. If the output isn't suitable, Ethan Mollick and Lilach Mollick suggest working with the AI (i.e., having a conversation with it) to simplify complex topics, adding a variety of new examples, or modifying the quizzes it generates.

For additional strategies on using ChatGPT to help lighten your workload, read Ethan Mollick and Lilach Mollick's full article, "Let ChatGPT Be Your Teaching Assistant."

Start small—but start somewhere

Integrating AI into your teaching doesn't have to be overwhelming. Start by finding one small, impactful way to include AI in your assignments. And remember to also set your students up for success by providing guidelines that demonstrate the proper way to use AI tools. Doing this will ensure there's less ambiguity about what students can expect from the AI, from "hallucinations" to privacy concerns.

Generative AI tools are here to stay, and their capabilities are rapidly advancing, unlocking even more opportunities for higher ed. By embracing AI for activities like quiz generation and comparative analysis, educators are paving the way for a more dynamic and future-focused educational experience for their students. It's time to jump in.

Explore more

ARTIFICIAL INTELLIGENCE   **COURSE DESIGN**   **DIGITAL LEARNING TECHNOLOGY**

Ethan Mollick is an associate professor at the Wharton School of the University of Pennsylvania where he studies and teaches innovation and entrepreneurship. His papers have been published in top management journals and have won multiple awards. As the academic director of Wharton Interactive, he works to transform entrepreneurship education using games and simulations.

Lilach Mollick is the director of pedagogy at Wharton Interactive. There, she works to develop pedagogical strategies for interactive teaching, including innovative learning approaches through alternate reality games and simulations. Prior to Wharton Interactive, she worked in HR designing training programs for multiple technology and medical-device startups.

Oguz A. Acar is a professor of marketing and innovation at King's Business School, King's College London, and a research affiliate at Harvard University's Laboratory for Innovation Science. His research focuses on collective innovation, particularly on digital platforms, and the psychology of AI.

Mitchell Weiss is the Richard L. Menschel Professor of Management Practice and chair of the MBA Required Curriculum at Harvard Business School.
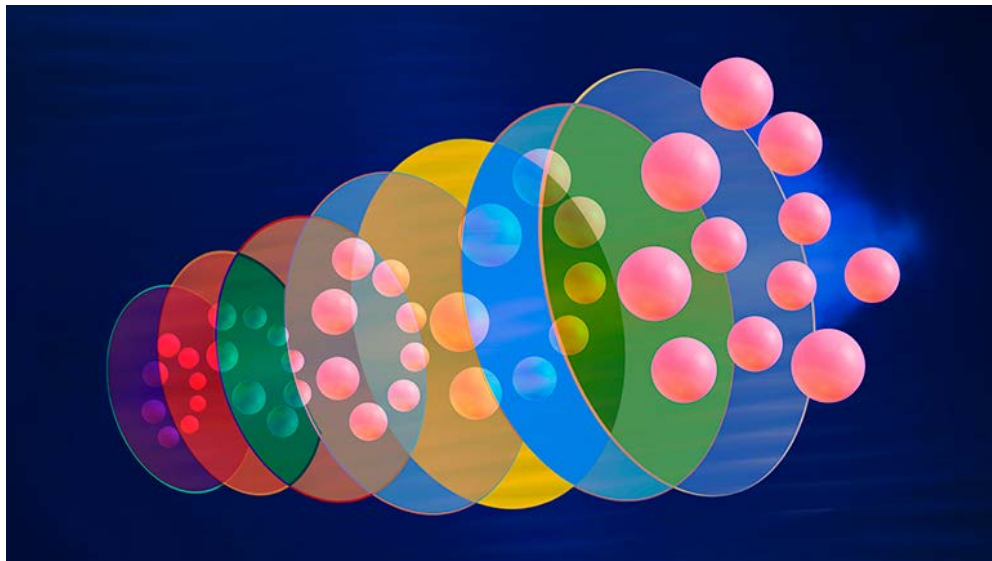
What ChatGPT's Voice and Image Capabilities Mean for Educators

4 Classroom Use Cases for Generative AI's Latest Advancements

by Haya Ajjan

Read Online

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When ChatGPT first burst onto the scene, its predominant capability was text generation. Now, ChatGPT-4 can also create images, interpret speech, produce audio responses, and browse the web. ChatGPT Plus subscribers can even develop their own GPTs, or custom-made chatbots.

These additional capabilities have expanded what it means to use generative AI in the classroom. As the co-lead of the generative AI implementation team at Elon University, I've been experimenting with

these new multimodal features and finding new ways to engage our students and personalize their education.

Here, I'll show you what I've learned, offering four specific use cases for generative AI that go beyond text. By trying out these ideas in your own classes, you can elevate your teaching and give students opportunities to practice the in-demand AI skills their future employers will surely seek.

RECENT WEBINAR: CHATGPT'S NEW CAPABILITIES IN ACTION

I delivered an HBP webinar entitled "What Happens to Learning When Generative AI Can See, Hear, and Speak," in which I took viewers through generative AI's newest multimodal capabilities and explored their potential uses for elevating teaching and learning. I've included links to clips from that webinar throughout this article. You can also watch the full recording to learn more.

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1. Engage AI as a dynamic role-play partner for students

To ensure students can apply the concepts we teach, we give them opportunities to step into the shoes of business professionals and practice making strategic decisions in real time. Role playing is an engaging way to work on these skills. And now that ChatGPT can both hear (interpret speech) and speak (produce audio responses), it can serve as an active conversational role-play partner for students.

In my recent HBP webinar, I demonstrate how a student might use ChatGPT to role play. I ask the student to pretend to be a family medical practice owner and to prompt the AI to act as a billing service company that is trying to sell their services to the business. (Access the webinar clip and transcript here.)

When I set this role play up for my students, I give them a chance to analyze the experience with a debrief of the exercise. Following the example in the clip, you could ask students the following questions:

- Did Joy recognize the needs of the customer?

- Did she respond suitably to Dr. Najib's questions by providing the appropriate data?

- What would you change the next time you engage in this role play?

You can also ask students to switch roles with the AI and try the exercise again. The possibilities ChatGPT provides as a role-play partner are extensive, and specific use cases can easily be adjusted to meet your course objectives.

2. Have students design a new product with AI's help

By the time students graduate, generative AI is likely to be integrated into many professional processes, including ideation and product development. To help students practice using AI to develop and refine concepts, I designed a class project that leverages ChatGPT's abilities to see and analyze images.

The project consists of three parts. First, students develop an idea for a new product. Then, they refine the product concept based on market research. And, finally, they design a website for the concept. Let's dig in deeper.

- **Develop an idea.** I ask students to gather a few unrelated objects as a jumping-off point for brainstorming. You can give your students a box of objects to pick through or you can ask them to do that on their own. Then they must take a photograph of their objects, upload it to ChatGPT, and prompt the bot to come up with three creative and new product ideas by drawing inspiration from the random items shown.

By asking ChatGPT to produce the ideas, students can practice their critical-thinking skills by evaluating the AI outputs and brainstorming ideas of their own before ultimately picking a venture to pursue.

I demonstrate this in this webinar clip: I upload a photograph of three random objects (a toy doll, a roll of tape, and a patterned card) to the ChatGPT mobile app. The AI-suggested ideas include a modular desk organizer, an educational storytelling kit, and action figure accessories. To examine each idea more thoroughly, students can ask ChatGPT to produce a visual of what one of its proposed products might look like—a feature enabled by ChatGPT's recent integration with the AI image generator DALL-E, which allows the AI to generate images as well as words. Here, acting as the student, I ask for an image of the educational storytelling kit.

- **Refine the concept.** Next, students can develop their idea in earnest by using ChatGPT's web-browsing capabilities to research things like the product's potential market value, how it could be manufactured, and more. The quality of questions the students ask the AI will of course determine the usefulness of its answers, so this is a good opportunity for educators to help students hone their prompt-engineering skills.

- **Develop a website.** Finally, students can use ChatGPT's visual capabilities to help them design a webpage for the product. When I completed this step in my example, the initial output was a bland white page with black text, which isn't good enough for a final submission. A disappointing output like this is a good opportunity for students to practice engaging in the "human-AI loop," in which the user iteratively evaluates AI outputs and refines their inputs. This loop reminds us to always keep human insight at the center of the process; when we coach and direct the AI, the resulting output is far stronger.

In this webinar clip, I show how a student can develop a more specific prompt that's likely to result in a webpage appropriate for their product. Instead of just asking for a webpage, the student can instruct the AI to create a page design based on one of the product images it had generated earlier in the process. ChatGPT can "see" the elements of the image it produced and use it to create another visual that's more engaging and closer to a final result.

USING GENERATIVE AI ETHICALLY AND RESPONSIBLY

When using ChatGPT in the classroom, we must always consider how to do so ethically and responsibly. If the technology is used carelessly, its risks can be as great as its potential rewards.

If your university doesn't yet have established guidelines for how students and faculty should incorporate generative AI into the classroom, now is the time to develop them. You can read the statement I helped write for Elon University as an example, as well as a white paper that explains its underlying principles.

Of course, you don't have to wait for an institution-wide policy to learn how to use AI responsibly in your classroom and establish guidelines for your students. The advent of AI is an excellent opportunity for all of us to think carefully about academic integrity and understand what a successful human-AI partnership looks like for our students—and ourselves.

Developing your own AI literacy is also key, and I encourage you to seek out professional development resources at your institution or online (like this one from DeepLearning.AI or this one from Auburn's Biggio Center), in addition to experimenting with the technology on your own to get a feel for what it can and can't do. Learning about the risks of ChatGPT, such as hallucinations and data privacy concerns, is just as important as learning about its features.

3. Create more engaging class visuals and slides

You can use ChatGPT's image-producing capabilities to generate visuals for your classes. While ChatGPT can't yet produce presentations, it can create descriptions of slides that you can use as a starting point. You can

try this out by uploading images of your own lecture notes to ChatGPT-4 and prompting it to "see" the images and create a summary of a lecture that is specifically focused on your unique learning goals.

When I tried this, I reminded the bot that I wanted something experiential and engaging. It not only produced a summary of the lecture structure, but it also suggested different parts for the lecture and how much time I should spend on each section.

I then uploaded the AI-generated lecture summary and section descriptions into a tool called beautiful.ai to get a draft slide deck, which I then edited to suit my style and teaching goals. You can take this a step further by prompting ChatGPT to suggest additional materials for your course, such as discussion questions.

ChatGPT's audio output capabilities can also be tapped to produce a five-minute podcast episode about the content. This could be a useful way to help students review the information on your slides in an engaging, unique format.

4. Connect students to your course through custom GPTs

One of the most compelling capabilities ChatGPT has rolled out is the ability for users to create their own unique chatbot, called a GPT, based on inputs they provide. This means educators can easily create a personalized chatbot (without needing any coding skills) for students to use to answer questions relevant to their specific course.

For example, you could upload your syllabus to create a custom GPT that can answer students' questions about your course. Custom GPTs can also use ChatGPT's existing translation capabilities, so international students can ask clarifying questions about your course in their native language.

In this webinar clip, I model how a student might use a custom GPT trained on your syllabus.

This capability allows students to get questions answered about your course at any time. This not only saves you time and helps better connect students to your course, but it can also improve accessibility for students who may struggle to learn solely by reading.

AI's multimodal abilities offer a new way to teach and learn

Education will always be people-centered. But generative AI offers a unique opportunity to rethink the role that technology can play in how we teach, how we learn, and how we think about the very nature of education.

AI compels us to think critically about how we can help students nurture the skills they will need in a workforce that's embracing these emerging digital technologies—skills like decision-making, complex problem solving, critical thinking, and more. However, I truly believe that if we harness the power of AI successfully, we can shape the educational landscape to become more inclusive, dynamic, and impactful for our students now and into the future.

Explore more

ARTIFICIAL INTELLIGENCE   **COURSE DESIGN**   **DIGITAL LEARNING**
STUDENT ENGAGEMENT   **TECHNOLOGY**

Haya Ajjan is a professor of management information systems, associate dean of the Martha and Spencer Love School of Business, and the Sheldon and Christine Gordon Professor in Entrepreneurship at Elon University in North Carolina, where she also co-leads the generative AI implementation team. She was named one of the Top 50 Undergraduate Business Professors in the United States by *Poets&Quants*. Her research focuses on better understanding the impact of technology use on individuals and organizations and has been published in journals such as *Journal of Business Research* and *European Journal of Operational Research*.
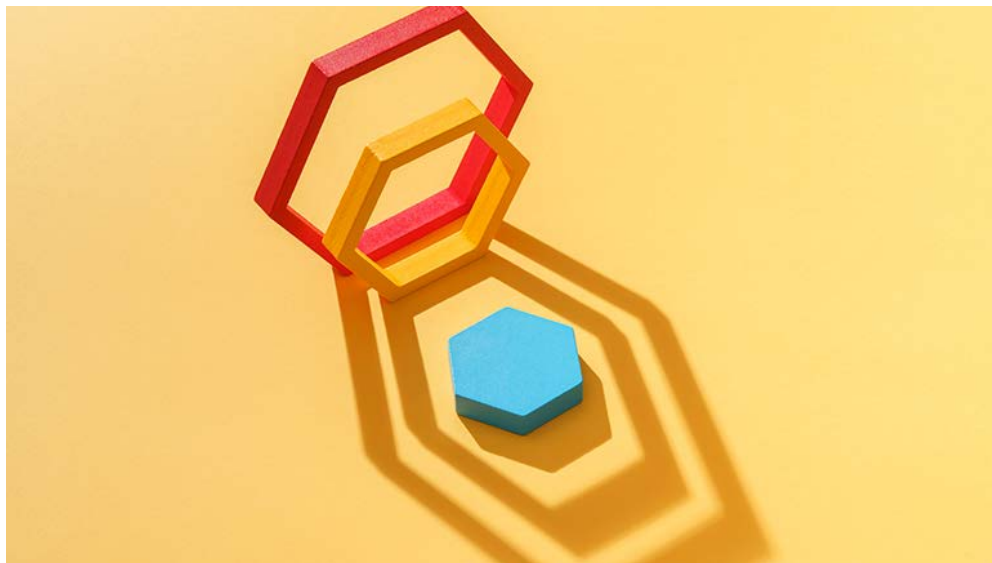
Stop Focusing on Plagiarism, Even Though ChatGPT Is Here

Create a Culture of Academic Integrity Instead

by Martine Peters

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Javier Zayas Photography / Getty Images

With the emergence of generative AI tools like OpenAI's ChatGPT, students now have widespread access to technology that can facilitate plagiarism. If a student chooses to prompt an AI tool to generate part or all of the text within an assignment, and then passes that work off as their own, that's a problem.

But not all applications of these tools inherently threaten academic integrity. Using AI to help complete an assignment, for example, is not automatically plagiarism. We may allow (or even require) our students

to use generative AI tools to research ideas, build an outline, or help with syntax—and that's OK.

Instead of spending time trying to meticulously identify inappropriate uses of generative AI in our classrooms, we should strive to foster a culture of academic integrity.

As a professor in the educational sciences department at my university and the director of the Partnership on University Plagiarism Prevention, I believe these new AI innovations offer us a perfect opportunity to prevent plagiarism by modeling academic integrity, adapting our teaching pedagogies and activities, and, most importantly, encouraging deep learning for our students while engaging them in the process.

To foster a culture of academic integrity in your own classes, here are five suggestions to try.

1. Openly discuss academic integrity with your students

Most of us include our institution's plagiarism policies in our course syllabi and expect our students to read them. Unfortunately, most students don't.

I have found that talking with students directly about academic integrity helps them understand why it's important. Early in a new term, I explain my university's plagiarism and evaluation policies and the consequences of violating them. I bring up these policies often during the semester so that students remember what they are and why I stress their importance.

> **Instead of spending time trying to meticulously identify inappropriate uses of generative AI in our classrooms, we should strive to foster a culture of academic integrity.**

It's also imperative that we inform students about our institution's policies, or our own, when it comes to the use of AI. Students need to know how to use large language models (LLMs) honestly and what the specific policies are around their use—if, when, and for which purposes they are allowed, for example. This is important to establish before any misunderstanding occurs.

A good place to start is to teach students the six values of academic integrity: honesty, trust, fairness, respect, responsibility, and courage. I do this with my students by explaining that the habits they develop during their studies will influence how they'll work in their future careers. If they study with integrity now, they will grow to be reliable professionals and responsible individuals once they graduate.

ENCOURAGE YOUR UNIVERSITY TO HOLD AN INSTITUTIONAL AWARENESS CAMPAIGN

Classrooms aren't the only place educators can promote academic integrity values. Universities can also host institutional awareness campaigns, through which students can learn about these values.

In my university, we organized a contest in which students prepared posters to promote our integrity values. It was a huge success—the posters hung in the hallways of our school for two years, reminding students of the importance of academic integrity.

2. Promote integrity by modeling it yourself

We need to show students that we respect the values of academic integrity. This means that we must be a model of integrity in our presentations, in our handouts, and in our actions.

When I teach, I'm very careful to include references in my PowerPoint slides to all images and ideas that I have found on the internet or in

books. This makes me a good ambassador for academic integrity, and my hope is that when students see this, they understand its importance and will mimic my actions in their own assignments.

Similarly, we should also model how and when we use AI. Last semester, I used ChatGPT to find information for my assignment instructions. I told my students about this by writing at the bottom of my course outline that I had help from AI to produce it. I didn't need to actually reference the AI because it was not a coauthor. But acknowledging that I got help with my work was essential and ethical. Hopefully, my students follow my example.

3. Teach the skills students need to avoid plagiarism

Through my research, my colleague and I found that one of the reasons students plagiarize is because they do not have the knowledge or the skills necessary to avoid it. Therefore, to minimize plagiarism, we must help students develop their information literacy skills, their writing skills, and their referencing skills.

More specifically, today's students need to learn how to use LLMs like ChatGPT, write good prompts, and even use AI to generate a bibliography. To help, steer students toward resources that contribute to their skill building, such as your institution's library and writing center or websites like Project Information Literacy. These services can support students in cultivating their information literacy by providing activities that teach them how to properly paraphrase and quote authors in their assignments.

> **I have found that talking with students about academic integrity helps them understand why it's important.**

It's also important to systematically integrate some of these skills into your teaching. In my undergraduate class, I ask students to use AI (Grammarly or QuillBot, for example) to revise their texts. It's not any different from asking a friend or family member to review their work, and learning to revise a text is a valuable skill students will need and use throughout their professional lives.

4. Plan your lessons to prevent plagiarism

Students who are engaged in their studies are less likely to plagiarize. We can better engage students by properly training them to use AI and modifying our assignments to encourage creativity—and make plagiarism more difficult.

For example, asking students who are very early in their disciplines to produce something wholly original is unrealistic. Ubiquitous access to others' ideas, texts, and videos makes it very tempting to plagiarize.

So rather than ask students to be original, have them find different sources and remix them to produce something new. This can be done from texts found on the internet or even by using LLMs. For example, I used to have my first-year students write an essay about their vision of education. But given the amount of similar statements available online, I now ask them to use LLMs to generate four different versions of a vision statement and explain which parts of the statements resonate with their personal experiences as students.

While students aren't starting with original text, they are creating something new and unique to them—and something that holds personal meaning. They are using AI to get ideas, but they are engaging in the writing process and using their personal experiences as they do.

I've shared some additional assignment framing and modification ideas in the sidebar on the next page.

7 STEPS TO PREVENT PLAGIARISM THROUGH THOUGHTFUL, ENGAGING ASSIGNMENTS

To begin thinking differently about your assignments, I propose a system to **PREVENT** plagiarism: Propose, Relay, Elaborate, Verify, Evaluate, Negotiate, and Testify. Here's how:

1. **Propose** authentic tasks to students by making assignments relevant to their current or planned profession. This will help them make the link explicit between what they will learn in your class and how they will use the skills and knowledge in the workforce. Authentic tasks can be case studies, debates, interviews, data analysis, problem-solving tasks, role playing, and more. In my classes, I very often get my students to prepare lessons and teach them to the rest of the class, exactly as they will do when they become teachers.

2. **Relay** clear instructions and make sure students understand them. These instructions must be explicit, with all the details of the assignment, including evaluation criteria. It's also helpful to read and explain instructions multiple times to be sure students understand. Too often, just giving students instructions does not necessarily mean they realize what is expected of them. The extra time spent explaining how to do the assignment will give students confidence, making them less likely to plagiarize. Don't forget to include the AI tools they are allowed to use and when, and outline what usage is forbidden.

3. **Elaborate** and enrich your assignments and instructions to make the task more difficult to plagiarize. Choose assignment topics that are unusual, demand specific sources (two scientific journal articles, one professional article, one blog, etc.), or reference a theory or reading discussed in class. At this time, certain AI tools have a hard time giving proper references. Make sure to tell students to use their critical thinking skills to check the facts and references given by AI. For example, I could ask my students to prepare lessons that are specific to our education curriculum, making it more difficult for them to use AI.

4. **Verify** if students have written their own work by adding an oral presentation or an interview with you. Students who have not composed their essays will find answering your questions difficult. I ask my students to present the lessons they

created to their classmates. At the end of their presentations, they must answer questions and show a deep understanding of the topic.

5. **Evaluate** integrity by having criteria that clearly show you value it. Rather than take away points if the references are not there or the bibliography is not up to standard, reward students who do these properly. For instance, on an assignment, give two points if all references are indicated properly and two more points for a complete bibliography. In my lesson plan assignment, for instance, I also give one point to students who acknowledge the help they got from AI.

6. **Negotiate** various dates for handing in assignments. Being flexible will lessen the pressure on students, who often have multiple assignments due on the same dates. When planning your course, you may also consider dividing an assignment into sections to be handed in at different times of the semester, lightening the cognitive load for students. Having three assignments worth 10 percent is a lot less stressful than having one worth 30 percent, even if students eventually hand in the same amount of work. In my class, students must hand in their lesson plans two weeks before they do their oral presentations. This gives them a chance to work on the assignment at two different times, rather than all at once.

7. Ask students to **Testify** that they are solely responsible for their assignment by submitting a declaration of authenticity (see an example here) with their assignments in which they state that the work was completed on their own, without outside help. Students will be less likely to plagiarize if they must sign this type of document.

5. Detect and report plagiarism in your students' assignments

Most people do not associate detection of plagiarism with prevention. However, students talk among themselves, and if the teachers at your institution do not detect and report cases of plagiarism, students will know. They will be aware there are no consequences and will be more

inclined to cheat. On the other hand, if students know your school takes plagiarism cases seriously, there will be less temptation.

Unfortunately, at this point, it is very difficult to detect plagiarism in a text generated by AI. While detection tools are unreliable, you can search for clues that a text has been written by AI—long sentences, vocabulary that is too developed for your students' level, or poor or non-existent references, for example.

Focus on nurturing meaningful experiences

To embrace the changes that AI brings to education, we must take a proactive approach to modifying our teaching and evaluation practices and work to become integrity ambassadors. Then we can nurture a robust culture of academic integrity in our institutions.

With a concerted effort by all of us—teachers, students, administrators, and support staff—we can not only prevent plagiarism, but also foster deep and meaningful experiences for our students.

Explore more

ARTIFICIAL INTELLIGENCE   CLASSROOM MANAGEMENT   DIGITAL LEARNING TECHNOLOGY

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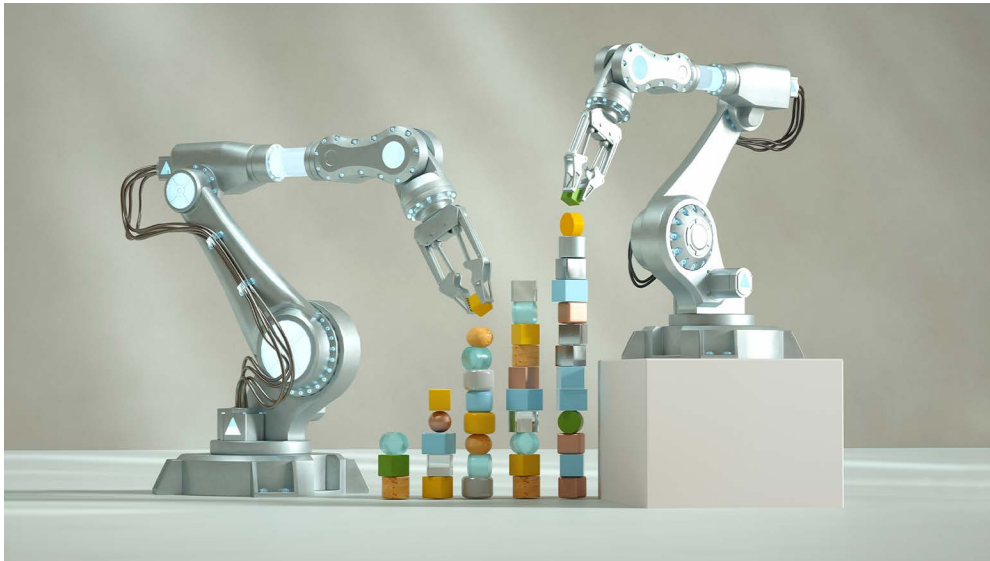
What Custom GPTs Unlock for Higher Ed

3 Value-Driving Generative AI Use Cases for Universities

by Vijay Govindarajan and Mahesh Sriram

Article published on hbsp.harvard.edu / December 7, 2023

Read Online

Andriy Onufriyenko / Getty Images

Customized learning at scale and speed has long been management education's elusive holy grail. How can we deliver personalized, relevant business knowledge to solve the unique problems leaders face anytime, anywhere in the world? It requires that we provide relevant educational content that is both customized to each learner and accessible to many students simultaneously.

Conventional educational methods—books, cases, articles, lectures, and videos—haven't been able to deliver on both. A residential program

can offer a fair amount of customization by applying concepts and ideas to participants' own companies, but the physical infrastructure limits its scale. An online program can reach more students, but instructors can each handle only a limited number of them, which inhibits customization.

And this personalization is critical; as educationalist Benjamin Bloom found, one-on-one tutoring results in a performance improvement of two standard deviations—a shift from, say, a C-plus grade to a B grade. However, it isn't possible to assign a physical person as a tutor to each student, especially in MBA education. It's way too expensive, and there aren't enough tutors to go around.

That all changes now. Customizable generative AI tools, such as Open AI's GPT-4 Turbo and the GPT Store, could provide a solution to this dilemma, benefitting not only educators and their students, but also their universities and the companies for which their students will one day work. Let's explore what this new custom GPT capability is—and what value it unlocks for higher ed.

An important note before we do: Great education is the result of great teachers leveraging great technology. Yet no matter how advanced the technology, it is not a substitute for educators. The key is to discover the many ways technology can *augment* education delivery.

What are custom GPTs, and why should academic leaders take notice?

Educators and students have already been experimenting with use cases for ChatGPT and other generative AI tools—as a personal tutor or coach, for example. But we can think bigger. What if educators could upload their course materials into ChatGPT to make a customized instructor that answers students' questions about their specific course? Or what if your department could create a customized coach by uploading all

the school's information on a specific topic, such as fusion strategy, so the tool doesn't just answer questions, but also helps students learn by asking them questions about the topic?

Instead of just using a generic AI tool like ChatGPT, universities can now create their own personal, fully customized GPTs that are dedicated to a particular task or subject matter. Users can control what data this bot ingests and can better ensure the accuracy of the output, a common worry many have about out-of-the-box ChatGPT.

> **Great education is the result of great teachers leveraging great technology. Yet no matter how advanced the technology, it is not a substitute for educators.**

Personalized GPTs are trained on custom datasets—unique ideas developed by an educator, for instance. That custom dataset then informs the bot how to respond to requests. It may sound complex, but there is little to no coding involved; you don't need to be a machine learning engineer to build a custom GPT. It's very easy to build and use.

The tool allows the creator to set limits or create boundaries using text, such as "Never answer X type of questions" or "Always cite your responses with links." The creator can also add in layers of rules to make sure it does what one wants it to do.

For higher ed, a custom GPT's key benefit is that it can be built around the specific content and use cases business schools want to deliver. These new custom GPTs have also turned OpenAI into a platform in much the same way the App Store did for the iPhone by enabling a variety of third-party apps. Meaning these universities could potentially turn a profit on these custom bots if other schools buy them.

Three value-generating use cases GPTs can unlock for higher ed

To create their own custom GPTs tailored to their institution's content, business schools need to invest in paid versions of generative AI, then commit resources to train and support faculty on how to use them.

Here are three reasons—in the form of previously untenable use cases—why that investment is so critical.

1. Connecting students directly with the experts and extending the reach of faculty ideas

Consider a foundational business topic, such as the concept of reverse innovation. Over the last 15 years, a vast amount of quantitative and qualitative data on the topic has become available, ranging from case studies, articles, books, and videos to media coverage, customer interviews, executive conversations, data on emerging markets, and so on.

By feeding a custom generative AI algorithm all that data, we developed an AI-powered chatbot devoted to the topic. We were careful to only use our own published works and other materials free of copyright. After fine-tuning, our Reverse Innovation Gen AI (RI-GAI) chatbot can act as a personal tutor and enable any number of people around the world to learn about reverse innovation at the same time. Not only does this help connect students directly to the experts—it's as if the students are having a direct conversation with the author of a case or paper—but it also extends the global reach of ideas created by business school faculty thought leaders.

In the case of our RI-GAI, a participant can ask the bot any question to understand the theory and practice of reverse innovation, from the fundamentals (*What is reverse innovation? How is it different*

from innovation? What are the most striking examples of reverse innovation today?) to more complex questions (*What are the challenges multinationals face in developing reverse innovations? What are the payoffs? What should my company do differently to successfully develop a reverse innovation?*).

After analyzing all the available data, the AI generates in-depth answers and becomes smarter as it answers more questions. It is as though the concept's creator is discussing the idea with each participant in a way that is tailored to their specific needs.

Although RI-GAI is rudimentary at present, the results from the experiment are encouraging; our students receive up-to-date knowledge in real time as if they are talking to the author themselves, demonstrating a customized and augmented delivery of education.

2. Training executive learners at cost and speed

When companies send their top leaders to an executive education program, the learning typically stops once they return to the C-suite. But what if these leaders could bring the learning with them, and even extend it? Not only could they revisit the content themselves to help solve on-the-job problems, but they could also share the knowledge with their fellow managers and leaders.

Let's stay with the reverse innovation example and imagine a business school offering a week-long program on the topic for the top leaders of a 300,000-employee company. With a custom GPT, the school can extend the course's reach by sending leaders away with a sophisticated AI chatbot that can assist those executives in identifying and executing reverse innovation projects and be available to train the rest of the company's employees, too.

> ## For higher ed, a custom GPT's key benefit is that it can be built around the specific content and use cases business schools want to deliver.

For example, executives can ask the bot to help them identify unmet customer problems in emerging markets and generate novel business models to solve them. At every step, executives must interpret the results, modify them, and make final decisions. The business school can also organize on-campus interventions in which faculty experts work with senior executives to identify bottlenecks and make recommendations to accelerate implementation.

By educating almost all its employees in a key concept and conducting reverse innovation projects at scale, the organization is bound to benefit in financial and organizational terms. Moreover, the generative AI–enabled effort will produce better outcomes at a cost that's lower and a pace that's more rapid than engaging a consulting firm to do so.

The business school will benefit, too. In addition to charging for the on-campus program for the company's leaders, it can charge a fee every time an employee uses the school's homegrown chatbots. Additional revenue will also be generated as faculty members coach executives and teams during the project implementation phase. Crucially, faculty will have the opportunity to use their firsthand experiences to identify new research problems and create fresh knowledge.

3. Combining generative AI and VR to generate greater insights

Business schools typically mount global travel expeditions every year, through which they send teams of students and faculty members to different countries to partner with local companies and understand customers in their natural environments. These trips are incredible and rewarding, but they're far from scalable and accessible.

Combining generative AI with augmented reality (AR) and virtual reality (VR) could be a game changer here, exposing students to different countries through VR360 videos, which provide every learner a realistic virtual experience. A customized chatbot can then be provided to help students contextualize the VR360 videos and answer questions that may arise from the VR experience. Not only will this greatly help students—especially in understanding foreign markets— but it could also be a real differentiator for business schools, as they can expose students to multiple countries without incurring the cost and time required for global travel.

> **The generative AI-enabled effort will produce better outcomes at a cost that's lower and a pace that's more rapid than engaging a consulting firm to do so.**

Beyond offering a compelling learning experience, the VR360 videos can also drive additional value when paired with AI, namely knowledge modeling and personalized experiences for students. Institutions can upload any recorded discussions with consumers and business leaders to a custom GPT, which can then analyze all that data—realizing patterns and synthesizing thoughts—to identify unmet customer problems, for instance. Students can then develop business models to solve those customer problems.

Generative AI is a win-win for all

Using generative AI is bound to result in a win-win-win for companies, business schools, and consumers the world over. It's time for academics, executives, and digital experts to come together and start experimenting to transform management education.

Business schools have two core competencies, which are to create ideas and develop pedagogy to deliver those ideas. We suggest business

schools extend their core competencies through AI with this three-step process:

1. Develop a "moonshot," or a lofty goal, for the year 2030 around how your institution will use digital technologies (especially AI and 3D computing) to augment education delivery.

2. Select an AI startup to partner with to combine your school's thought leadership with the startup's complementary capabilities in technology knowledge and marketing.

3. Start pilot experiments with the AI startup, learn from those experiments, and then scale.

The AI space is moving rapidly. This is the time for business schools to act. They must think big, start small, and scale up fast.

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ARTIFICIAL INTELLIGENCE   DIGITAL LEARNING   EDUCATION STRATEGY   PERSPECTIVES   TECHNOLOGY

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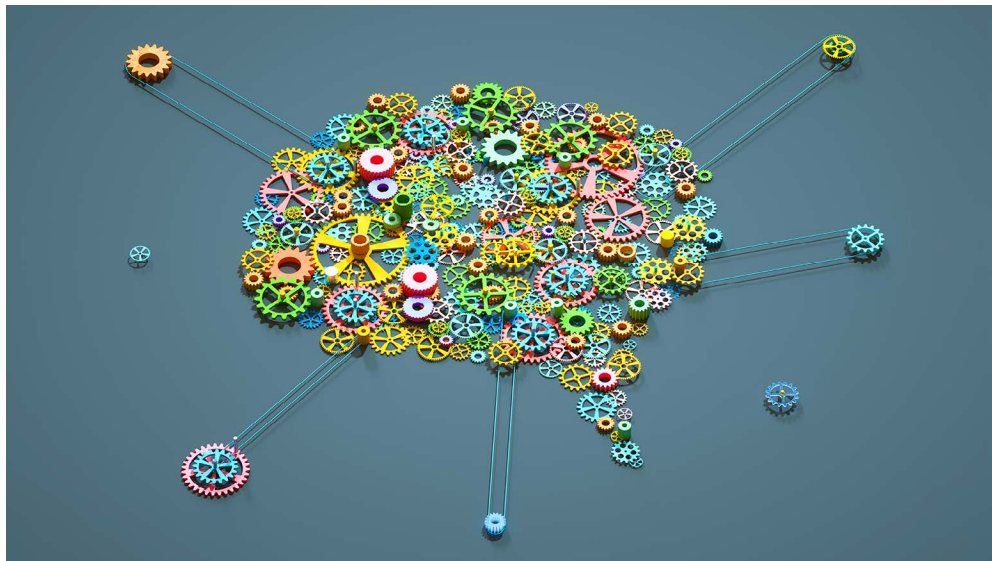
Generative AI Can Supercharge Your Academic Research

But Remember: LLMs Are Your Partner—Not Your Replacement

by David Maslach

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Read Online

Andriy Onufriyenko / Getty Images

Conducting relevant scholarly research can be a struggle. Educators must employ innovative research methods, carefully analyze complex data, and then master the art of writing clearly, all while keeping the interest of a broad audience in mind.

Generative AI is revolutionizing this sometimes tedious aspect of academia by providing sophisticated tools to help educators navigate and elevate their research. But there are concerns, too. AI's capabilities

are rapidly expanding into areas that were once considered exclusive to humans, like creativity and ingenuity. This could lead to improved productivity, but it also raises questions about originality, data manipulation, and credibility in research. With a simple prompt, AI can easily generate falsified datasets, mimic others' research, and avoid plagiarism detection.

As someone who uses generative AI in my daily work, both in academia and beyond, I have spent a lot of time thinking about these potential benefits and challenges—from my popular video to the symposium I organized this year, both of which discuss the impact of AI on research careers. While AI can excel in certain tasks, it still cannot replicate the passion and individuality that motivate educators; however, what it can do is help spark our genius.

Below, I offer several ways AI can inspire your research, elevating the way you brainstorm, analyze data, verify findings, and shape your academic papers.

1. Use AI to help you brainstorm

ChatGPT-4, OpenAI's latest and paid version of the large language model (LLM), plays a vital role in enhancing my daily research process; it has the capacity to write, create graphics, analyze data, and browse the internet, seemingly as a human would. Rather than using predefined prompts, I conduct generative AI research in a natural and conversational manner, using prompts that are highly specific to the context.

To use ChatGPT-4 as a valuable resource for brainstorming, I ask it prompts such as, "*I am thinking about [insert topic], but this is not a very novel idea. Can you help me find innovative papers and research from the last 10 years that has discussed [insert topic]?*" and "*What current topics are being discussed in the business press?*" or "*Can you create a table*

of methods that have and have not been used related to [insert topic] in recent management research?"

The goal is not to have a single sufficient prompt, but to hone the AI's output into robust and reliable results, validating each step along the way as a good scholar would. Perhaps the AI sparks an idea that I can then pursue, or perhaps it does not help me at all. But sometimes just asking the questions furthers my own process of getting "unstuck" with hard research problems.

There is still a lot of work to be done after using these prompts, but having an AI research companion helps me quickly get to a better answer. For example, the prompt *"Explore uncharted areas in organizational behavior and strategy research"* led to the discovery of promising niches for future research projects. You might think that this will result in redundant projects, but all you have to do is write, *"I don't like that, suggest more novel ideas"* or *"I like the second point, suggest 10 ideas related to it and make them more unique"* to come up with some interesting projects.

ETHICAL ISSUES TO CONSIDER

AI's potential impact on research, while transformative, does heighten ethical and existential concerns about originality and academic credibility. In addition to scrutiny around data manipulation and idea plagiarism, educators using AI may face questions about the style, or even the value, of their research.

However, what truly matters in academic research is not the tools used, but educators' approach in arriving at their findings. Transparency, integrity, intellectual curiosity, and a willingness to question and challenge one's previous beliefs and actions should underpin this approach.

Despite potentially compounding these issues, generative AI can also play a pivotal role in addressing them. For instance, a significant problem in research is the reliance on patterns and correlations without understanding the "why" behind them. We can now ask AI to help us understand causality and mechanisms that are most

likely. For example, one could inquire, "*What are the causal explanations behind these correlations? What are the primary factors contributing to spurious correlations in this data? How can we design tests to limit spurious correlations?*"

AI has the potential to revolutionize research validation, ensuring the reliability of findings and bolstering the scientific community's credibility. AI's ability to process massive amounts of data efficiently makes it ideal for generating replication studies. Instructions such as "*Suggest a replication study design and provide detailed instructions for independent replication*," or "*Provide precise guidance for configuring a chatbot to independently replicate these research findings*" can guide educators in replicating and verifying study results.

2. Use AI to gather and analyze data

Although the AI is far from perfect, iterative feedback can help its output become more robust and valuable. It is like an intelligent sounding board that adds clarity to your own ideas. I do not necessarily have a set of similar prompts that I always use to gather data, but I have been able to leverage ChatGPT-4's capabilities to assist in programming tasks, including writing and debugging code in various programming languages.

Additionally, I have used ChatGPT-4 to craft programs designed for web scraping and data extraction. The tool generates code snippets that are easy to understand and helps find and fix errors, which makes it useful for these tasks. Prior to AI, I would spend far more time debugging software programs than I did writing. Now, I simply ask, "*What is the best way to collect data on [insert topic]? What is the best software to use for this? Can you help get that data? How do I build the code to get this data? What is the best way to analyze this data? If you were a skeptical reviewer, what would you also control for with this analysis?*"

> **While the initial results may not be on point, starting from scratch without AI is still more difficult.**

When the AI generates poor responses, I ask, "*That did not work. Here is my code, can you help me find the problem? Can you help me debug this code? Why did that not work?*" or "*No, that is incorrect. Can you suggest two alternative ways to generate the result?*" There have been many occasions when the AI suggests that data will exist; however, like inspiration in the absence of AI, the data is not practically accessible or useful upon further examination. In those situations, I write, "*That data is too difficult to get, can you suggest good substitutes?*" or "*That is not real data, can you suggest more novel data or a data source where I can find the proper data?*"

While the initial results may not be on point, starting from scratch without AI is still more difficult. By incorporating AI into this data gathering and analysis process, researchers can gain valuable insights and solve difficult problems that often have ambiguous and equivocal solutions. For instance, learning how to program more succinctly or think of different data sources can help discovery. It also makes the process much less frustrating and more effective.

3. Use AI to help verify your findings and enhance transparency

AI tools can document the evolution of research ideas, effectively serving as a digital audit trail. This trail is a detailed record of a research process, including queries, critical decision points, alternative hypotheses, and refinements throughout the entire research study creation process. One of the most significant benefits of maintaining a digital audit trail is the ability to provide clear and traceable evidence of the research process. This transparency adds credibility to research findings by demonstrating the methodical steps taken to reach conclusions.

For example, when I was writing some code to download data from an external server, I asked, "*Can you find any bugs or flaws in this software*

program?" and "*What will the software program's output be?*" One of the problems I ran into was that the code was inefficient and required too much memory, taking several days to complete. When I asked, "*Could you write it in simpler and more efficient code?*" the generated code provided an alternative method for increasing data efficiency, significantly reducing the time it took.

> ## Prior to AI, I would spend far more time debugging software programs than I did writing.

What excites me the most is the possibility of making it easier for other researchers to replicate what I did. Because writing up these iterations takes time, many researchers skip this step. With generative AI, we can ask it to simplify many of these steps so that others can understand them. For example, I might ask the following:

- Can you write summarized notations of this program or of the previous steps so that others can understand what I did here?

- Can we reproduce these findings using a different statistical technique?

- Can you generate a point-by-point summary diary of what I did in the previous month from this calendar?

- Can you create a step-by-step representation of the workflow I used in this study?

- Can you help generate an appendix of the parameters, tests, and configuration settings for this analysis?

In terms of qualitative data, I might ask, "*Can you identify places in this text where this idea was discussed? Please put it in an easy-to-understand*

table" or "*Can you find text that would negate these findings? What conditions do you believe generated these counterfactual examples?*"

You could even request that the AI create a database of all the prompts you gave it in order for it to generate the results and data. With the advent of AI-generated images and videos, we may soon be able to ask it to generate simple video instructions for recreating the findings or to highlight key moments in a screen recording of researchers performing their analyses. This not only aids validation but also improves the overall reliability and credibility of the research. Furthermore, because researchers incur little cost in terms of time and resources, such demands for video instructions may eventually be quite reasonable.

4. Use AI to predict and then parse reviewer feedback

I try to anticipate reviewer concerns before submitting research papers by asking the AI, "*As a skeptical reviewer who is inclined to reject papers, what potential flaws in my paper do you see? How can I minimize those flaws?*" The results help me think through areas where my logic or analysis may be flawed, and what I might want to refine before submitting my paper to a skeptical scientific audience. The early detection of problems in a competitive scientific arena with high time pressure can be effective and time saving.

Once I receive reviewer feedback, I also like to use ChatGPT to better understand what reviewers expect of me as an author. I'll ask, "*Help me identify key points in this review, listing them from the easiest and quickest comments to address up to the most challenging and time-consuming reviewer comments.*" It's surprising how much more enjoyable the review process becomes once I have a more holistic understanding of what the reviewer or editor is asking.

Balancing AI's strengths and weaknesses to improve academic research

As educators, we must learn to coexist and co-create with these technological tools. LLMs have the potential to accelerate and improve research, resulting in ground-breaking ideas that push the limits of current possibilities.

But we must be careful. When used incorrectly, AI can speed up the process of achieving surface-level learning outcomes at the expense of a deeper understanding. Educators should approach generative AI with skepticism and curiosity, like they would with any other promising tool.

AI can also democratize research by making it accessible to people of all abilities and levels of expertise. This only makes our human essence— passions, interests, and complexities—even more important. After all, AI might be great at certain tasks, but the one thing it can't take away is what makes you, well, you.

Explore more

ARTIFICIAL INTELLIGENCE   **PERSPECTIVES**   **TECHNOLOGY**

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