Justin Wolfers

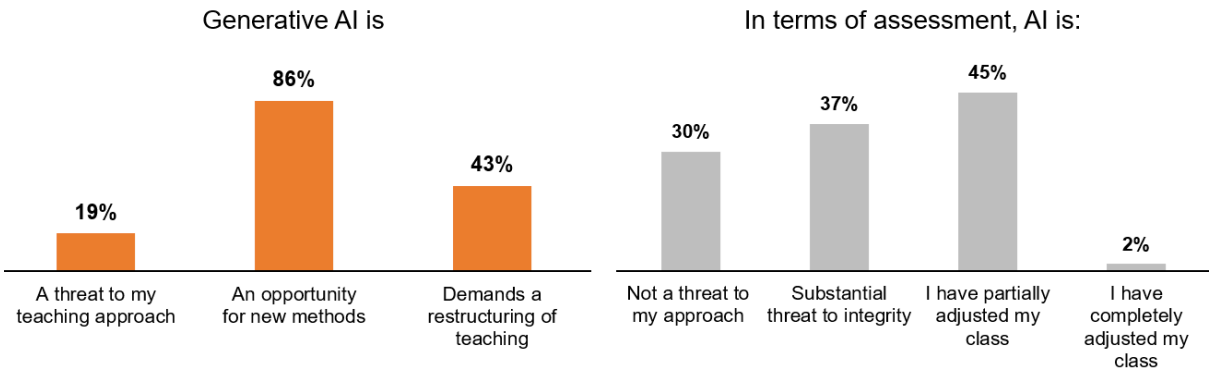
An Econ Educator's Guide to our AI-Powered Future

On Friday, October 11, Justin Wolfers joined Markus' Academy for a conversation on An Econ Educator's Guide to our AI-Powered Future. Justin Wolfers is a professor of public policy and economics at the University of Michigan and a visiting professor of economics at the University of Sydney.

A few highlights from the discussion.

- **A summary in three bullets**
  - Whereas universities tend to focus on the shortcomings of AI, students are focused on how to use it best (89% of them already do so)
  - Economists usually argue that, with a new technology, although some types of work disappear new types of even more productive work arise. We should also apply this to our own craft
  - The key way that AI can help in teaching is by achieving personalization at scale. Wolfers showed four possible applications of this idea: (1) a socratic tutor, (2) a practice exam coach, (3) a teaching collaborator, (4) a text aggregator

- **[0:00] Markus' introduction and poll questions**
  - With AI it will soon be possible to have conversations with Hayek or Keynes. There are already tools to do so with Marcus Aurelius. Will we talk to books in the future? Will the written word remain the main way we store knowledge?
  - Previous webinars (Bryan, Correia) explored AI in economic research—what about teaching? Could AI tutors lead to more equal opportunities, or will they underdeliver like online learning? With AI making it harder to effectively grade students, will assessments shift to oral exams?



- **[6:07] AI challenges and opportunities in teaching**
  - Economists are used to thinking about new technologies. Our typical view is that the Luddites are wrong: although some types of work disappear with a

new technology, new types of even more productive work arise. We should also apply this to our own craft
    - Students are already using chatGPT. Amongst all young people, 45% use it at least several times a week (KFF, 2024), while amongst students 89% have used it to help with homework assignments (study.com, 2023)
    - ChatGPT scores 100% in AP Micro and Macro, and 90% in the Bar exam. In part this is because there is a large quantity of training material for these kinds of exams. For doctoral-level courses performance is not as high
    - Universities often focus on AI's shortcomings, like its formulaic responses, hallucinations, match errors, outdated information, and limited reasoning ability. However this is ultimately a confirmation bias: where they search for things that AI cannot do
    - However students look for solutions for how to use it. A formulaic style can be improved by engaging the model ("Sharpen that essay"), while one can set temperature = 0 to prevent hallucinations and instruct it to use Python to prevent math mistakes. One can also use BingAI to get updated responses, while new models like GPT-4o1 are able to reason
    - Given ChatGPT's near-perfect performance on student tasks, high-stakes take-home assessments are no longer viable due to the risk of plagiarism
    - AI detection tools like GPTZero are also ineffective. Due to competition, model developers have no incentive to include "watermarks" that could identify AI-generated writing, as open-source models can always be offered without these watermarks
    - As a result we will move towards in-class exams: a second era for the blue book. Wolfers also had a webinar on assigning homework in a world with chatGPT
    - Adrian Wooldrige has argued that top US universities should adopt the Oxford/Cambridge tutorial system for grading, where for an hour the professor discusses the material with students to assess them
    - This requires having a lot of faculty, but the idea is right in that we need personalization at scale. Here is where generative AI can help
    - Wolfers showed four possible applications of this idea: (1) a socratic tutor, (2) a practice exam coach, (3) a teaching collaborator, (4) a text aggregator
    - When considering the use of AI in teaching, we should always account for the opportunity cost of doing so. While AI isn't perfect, it is likely as capable as your PhD students. In many cases, there's no alternative (e.g. no teaching assistants), so the opportunity cost is effectively zero

- **[30:02] A Socratic tutor**
    - The idea is to have a chatbot that can offer personalized homework help (but not the answer) to each student
    - Open ended chatbots have one ideal use case: Copy + paste = cheating. However the optimal use of AI is for it to complement humans' thinking. Students today mostly use it as a substitute, but the meta-skill we have to teach is how to use it as a complement
    - With chatGPT it takes 2 minutes to make an (economics-specific) online tutor. However these will be ineffective for teaching for three reasons: (1) it will directly give students the answers (2) it will not be trained on the specific

course materials, (3) it will be subject to the Dunning-Krueger effect, where students don't know what they don't know, will overestimate their abilities, and will only use the chatbot to ask it questions they can already ask Google
    - For students what is valuable is being able to identify gaps in their knowledge. While most chatbots have been developed as creating a window into knowledge, personalization at scale is about helping students identifying their knowledge gaps
    - The ideal teaching assistant is (1) smart, (2) adaptable to the course, (3) empathetic, and (4) available. AI models have already been shown to give higher quality advice than physicians, while also being more empathetic. They are also available in most languages and outside of working hours (unlike a teaching assistant)
    - Wolfers showed a demo of an AI Econ Tutor he has developed together with the publishers of his textbook, which is not only customized to his course but also will never give students the answer directly. However it requires a high amount of maintenance

- [49:24] **A practice exam coach**
    - This is something anyone can build with GPTs. Similar to NotebookLM, one can feed it the last 5 years of exams and the class slides. The coach will generate practice questions for students and answer their specific questions

- [53:06] **A teaching collaborator**
    - One can also use AI to develop teaching methods. Suppose we want to make an active learning activity for students. A good prompt to the model will provide it with (1) context, (2) instructions, and (3) a precise task. Here is an example:

Context: I am a faculty member who teaches introductory economics, and I am looking for ways to incorporate active learning into the class. The participants are mainly American-born freshmen and sophomores, and this is their first economics class. There are about five hundred students in my class, and they enjoy interacting with each other.

Instructions: I have attached a PowerPoint presentation describing tomorrow's class. Could you please look at these slides and suggest places in the class where I could insert an activity that would make students actively engage with the material and each other. These activities could include answering a poll for an important question that can help me check their understanding, or a class-wide exercise that aggregates answers using iClicker, or think-pair-share exercises, games, or even the opportunity to act out some economic ideas. I'm particularly interested in interactive exercises that highlight big ideas.

Task: Please provide me with five ideas for active learning opportunities to use in tomorrow's class. Each of your suggestions needs to be concrete, describing exactly what issue is to be discussed, or scenario is being presented. Describe the relevant scenarios in vivid detail, making them as realistic as possible. I need to give students clear and explicit instructions about what they're doing, and also highlight the link between the activity and the underlying economic ideas.

Ask questions: Please begin by asking me anything else you need to know to provide useful advice.

- [57:08] **Text aggregator**

    - Rather than reading through 500 student reviews of a class (unstructured text), one can ask the model to extract the key student feedback
    - You can also use iClicker to ask students for their views after a class, how the semester is going, or issues they would like the next class to cover, and then ask the model to extract the key points

- **[1:04:46] Q&A**
    - All of us should learn to use AI as a part of our usual workday flow. It is like learning how to use spreadsheets. Challenge yourself to use chatGPT in a different way each day. Good resources on how to integrate AI into your workflow and teaching are Mollick (2024) and Levy and Pérez Albertos (2024), respectively
    - Is it unclear whether teaching and research are complements in production, but it is clear that integrating AI in your teaching will be beneficial in your research career
    - Universities' centers for learning should acknowledge that AI is the biggest tech revolution in their lifetime (and possibly the history of higher education). They should either lead or get out of the way
    - Top universities should seek resources from their donors to teach at a global scale. This won't replace traditional professors, as human connections will remain decentralized, but these efforts will complement their teaching
    - Textbook publishers should be best positioned to develop AI educational tools, as they have the rights over the materials. Like other innovators, they need only plug in to the OpenAI models and modify them for their specific purposes
    - With AI traditional coding and writing jobs (such as paralegals, translator, or copy editors) will be automated. Given that AI is also highly empathetic and creative (for example at coming up with new product ideas), it is best to teach students science and critical thinking
    - History suggests it will take some time for AI to be widely adopted across the economy. For now only 5.4% of firms use it (U.S. Census Bureau, 2024)

Timestamps: