Everyone Is Cheating Their Way Through College ChatGPT has unraveled the entire academic project.

By Jan

Why Even Basic A.I. Use Is So Bad for Students

Oct. 29, 2025

LLMs in CS Education

The future of learning: How AI is revolutionizing education 4.0

Sal Khan explains why GPT-4 is ready to be a tutor

The Professors Are Using ChatGPT, and Some Students Aren't Happy About It

Duolingo CEO says AI is a better teacher than humans—but schools will still exist 'because you still need childcare'

At the end of class!

Answering any questions about deliverables for the rest of the quarter

Large Language Models

Transformational Technology

The world will operate much differently in ways we may not be able to predict

Enabling Technology

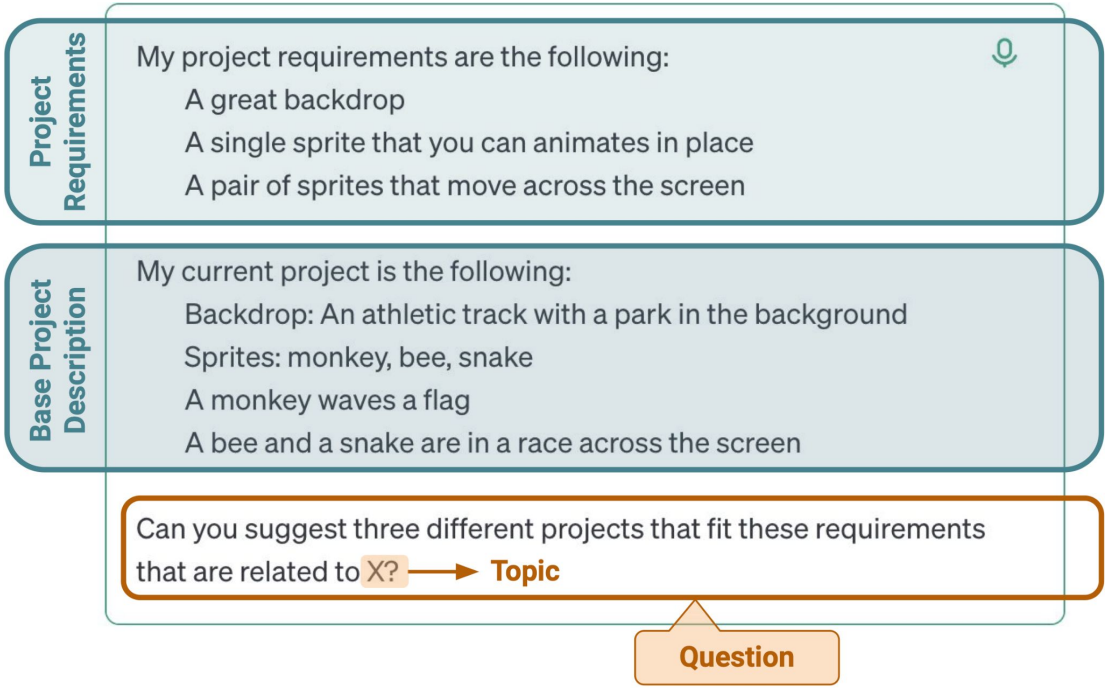
Make humans more efficient

Disruptive Technology

Replaces jobs

LLMs in CS Education

Last time: LLMs changing **how** we teach (project brainstorming, creating materials)



LLMs in CS Education

Last time: LLMs changing **how** we teach (project brainstorming, creating materials)

LLMs changing **what** we learn

LLMs changing **how** we learn (ITS)

Breakout #1

What AI policies have you come across in CS courses? How have you felt about these policies?

Have you had instructors who used AI? How did or would you feel?

Discuss with your neighbors and record on Gradescope.

How has **coding** changed?

Before LLMs

Writing code from scratch

After LLMs

Encouraged to use AI in industry

AI creates prototype from ideas

Human pass of AI created prototype

AI complete code from boilerplate

Sensitive or important code done by humans

Can code to personal interests

How has **coding** changed?

Before LLMs

Writing code from scratch

After LLMs

Outlining in pseudocode

Debugging LLM-written code

Testing LLM-written code

How might **teaching coding** change?

Before LLMs

Teaching students to write code from scratch

After LLMs

How might **teaching coding** change?

Before LLMs

Teaching students to write code from scratch

After LLMs

Emphasis on reading/comprehending code

Still a need for deep understanding that comes from implementing code

Teach prompt engineering for testing

Teacher can use LLMs as tutoring

LLMs can help with granular code explanation

How might **teaching coding** change?

Before LLMs

Teaching students to write code from scratch

After LLMs

Emphasis on design and testing

Tracing code & debugging code is as important as writing code

Teach how to use CoPilot

Academic integrity

AI tutoring

AI grading

Breakout #2

What would it look like to design an intro CS course that **embraced** LLMs as an enabling technology?

What **opportunities** and **risks** would this present?

Discuss with your neighbor(s) and record on Gradescope.

Breakout #2

What would it look like to design an intro CS course that **embraced** LLMs as an enabling technology?

What **opportunities** and **risks** would this present?

What **considerations** should be made for **students of varying backgrounds** in a course that embraced LLMs?

Discuss with your neighbor(s) and record on Gradescope.

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LLMs in Intro CS Education

Integrating Large Language Models and Evaluating Student Outcomes in an Introductory Computer Science Course

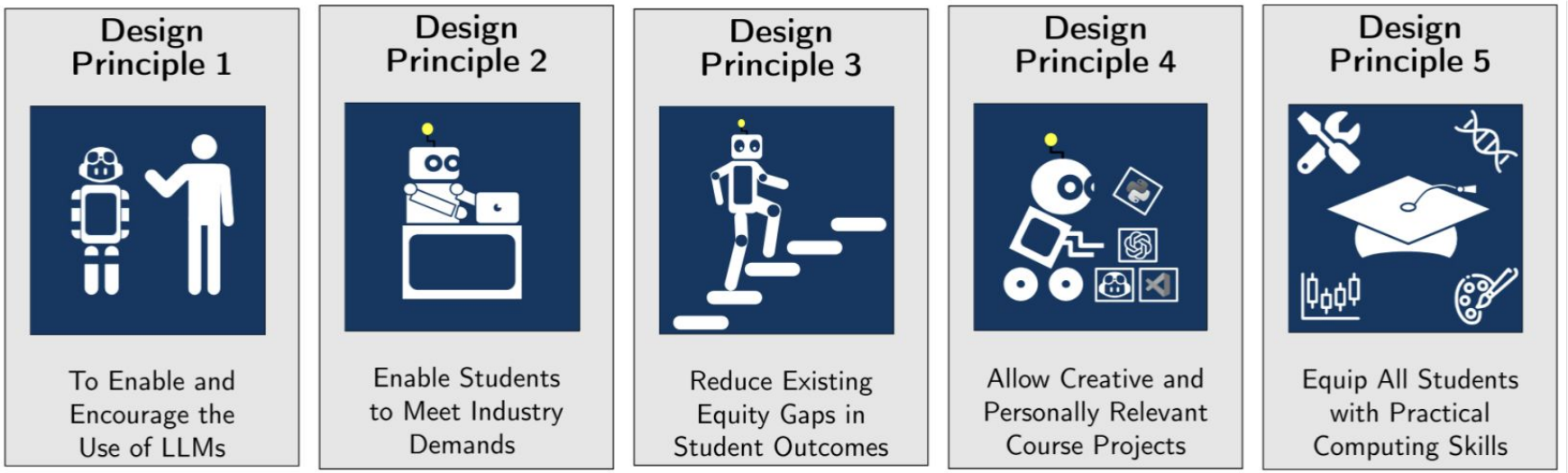

Figure 1: Design Principles for the course

Evaluated an LLM-based CS1 course in terms of student **performance**, student **perceptions**, and various student **populations**

LLMs in Intro CS Education

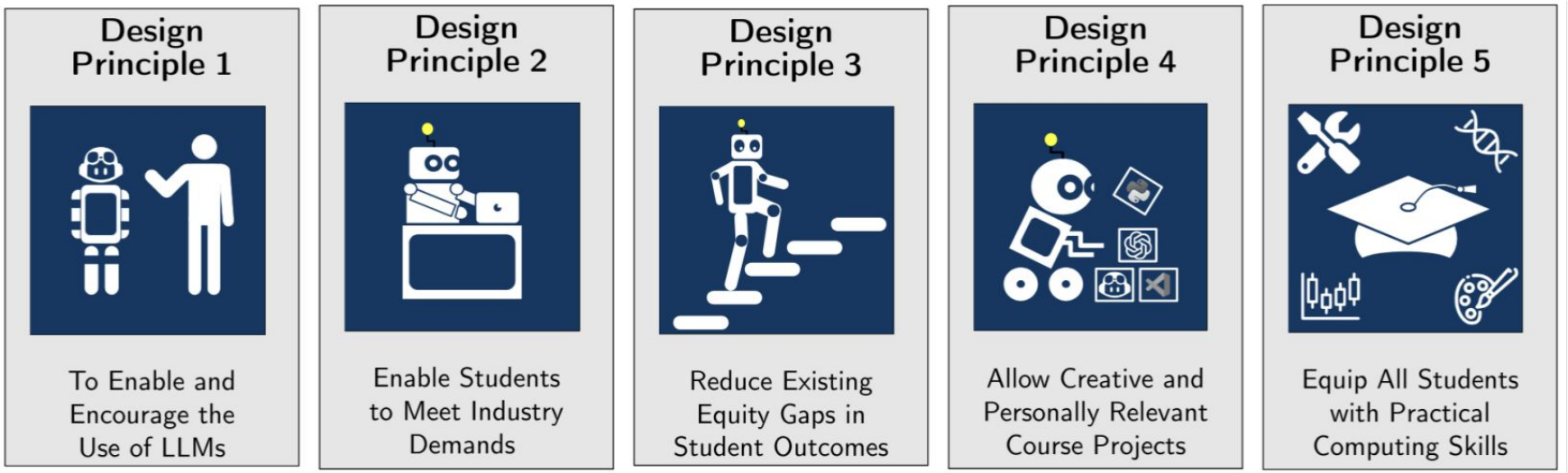

Figure 1: Design Principles for the course

- **Performance**: Students generally did not perform better or worse on exam questions compared to historical, non-LLM classes
- **Perceptions**: Students had mixed feelings about their own Copilot use
- **Populations**: Achievement gaps persisted on exams but not projects

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Intelligent Tutoring Systems (ITS)

A computer system that imitates human tutors to provide **immediate** and **customized instruction** or **feedback** to learners

Why need ITSs?

- Not enough human tutors to help students
- Personalize learning beyond the 30:1 ratios in classrooms

Components of ITS

Domain Model

skills, knowledge, strategies

Learner Model

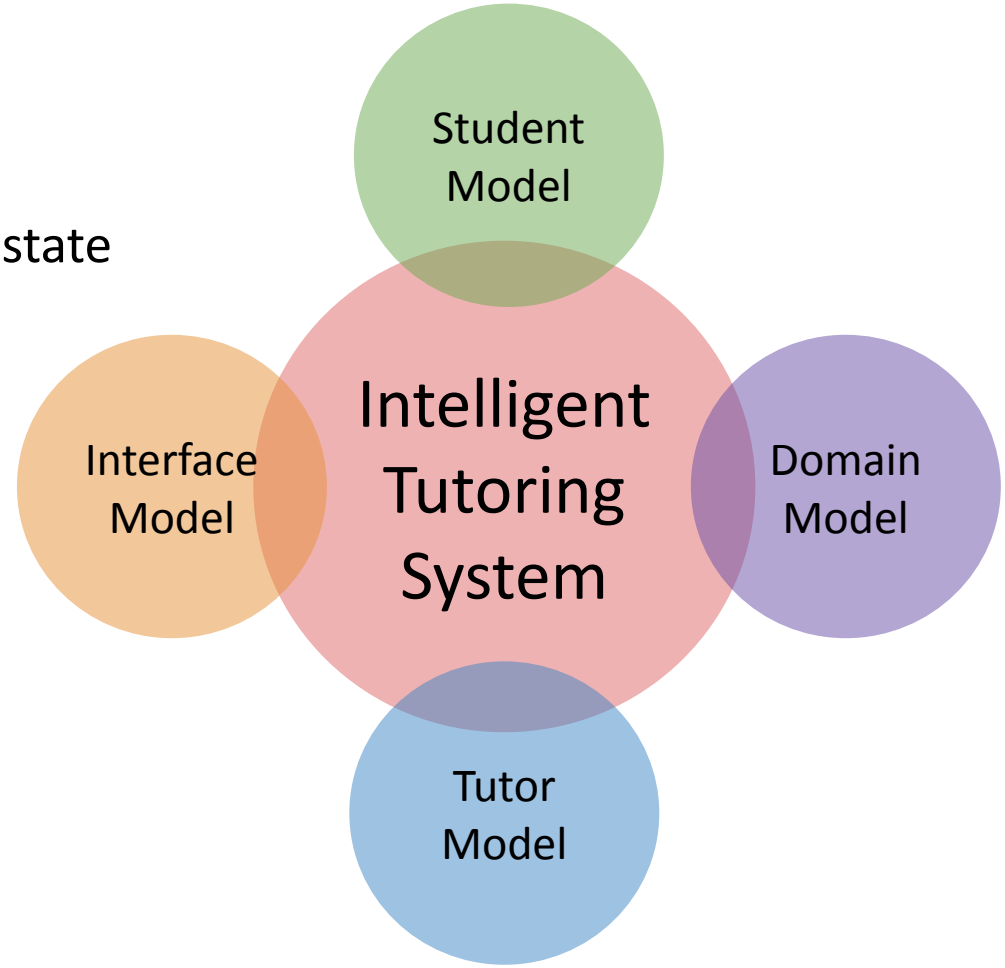
cognitive, affective, motivational state

Tutor Model

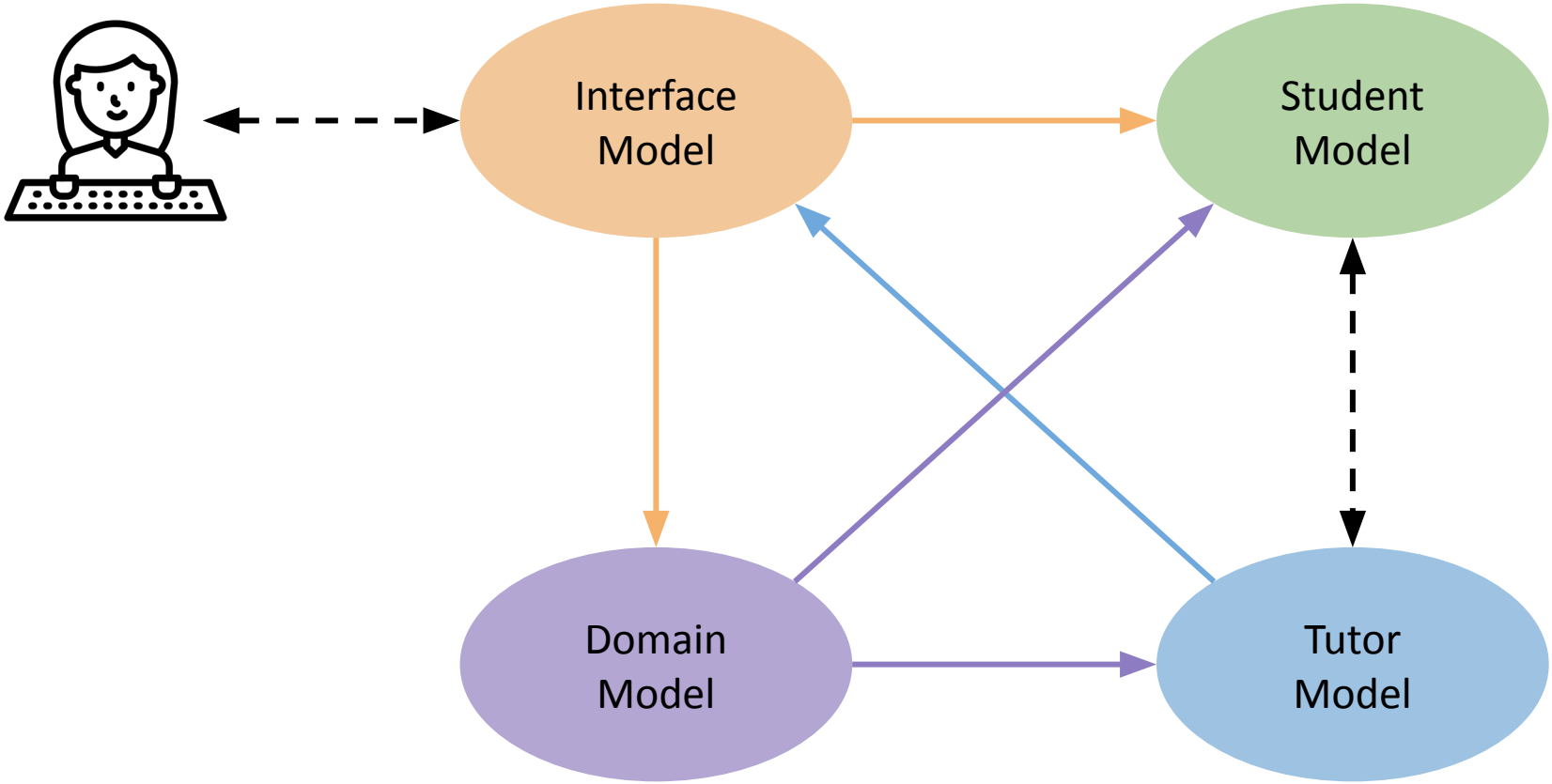
makes decisions on what help / problems to give next

User Interface

decides how to receive input / present information to learner



Archetypal 4-Component Tutoring System Design (plus Student)

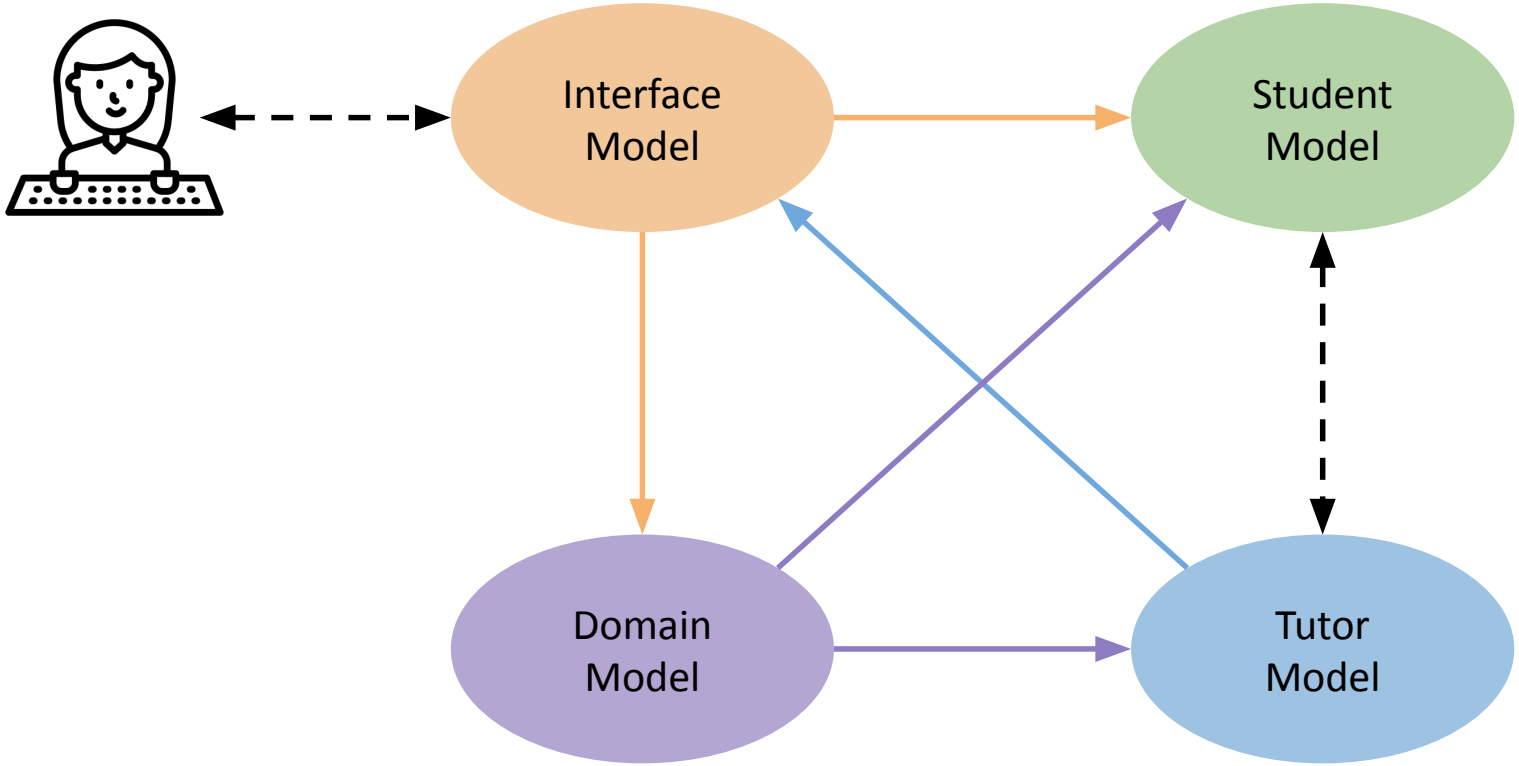


Breakout #3

Think about the four key components of ITS…

In what ways is ChatGPT **similar** to an ITS?
In what ways is ChatGPT **different than** an ITS?

Discuss with your neighbor(s) and record on Gradescope.



Domain Model

- skills, knowledge, concepts to be taught

Learner Model

- cognitive, affective, motivational state of student
- progress made by student

Tutor Model

- makes decisions on what help / problems to give next
- informed by pedagogical best practices

User Interface

decides how to receive input / present information to learner

Is ChatGPT an ITS?

Similarities

uses AI to interact with a user

can be used to solve a specific problem

Differences

less (no) specific pedagogical approach

very agreeable

could be missing expert knowledge

LLM-backed ITS in CS Education

Teaching CS50 with AI

Leveraging Generative Artificial Intelligence in Computer Science Education

Figure 1: The main page of CS50.ai, where students can chat with the CS50 Duck, an interactive "duck debugger" (ddb).

Teaching CS50 with AI

Leveraging Generative Artificial Intelligence in Computer Science Education

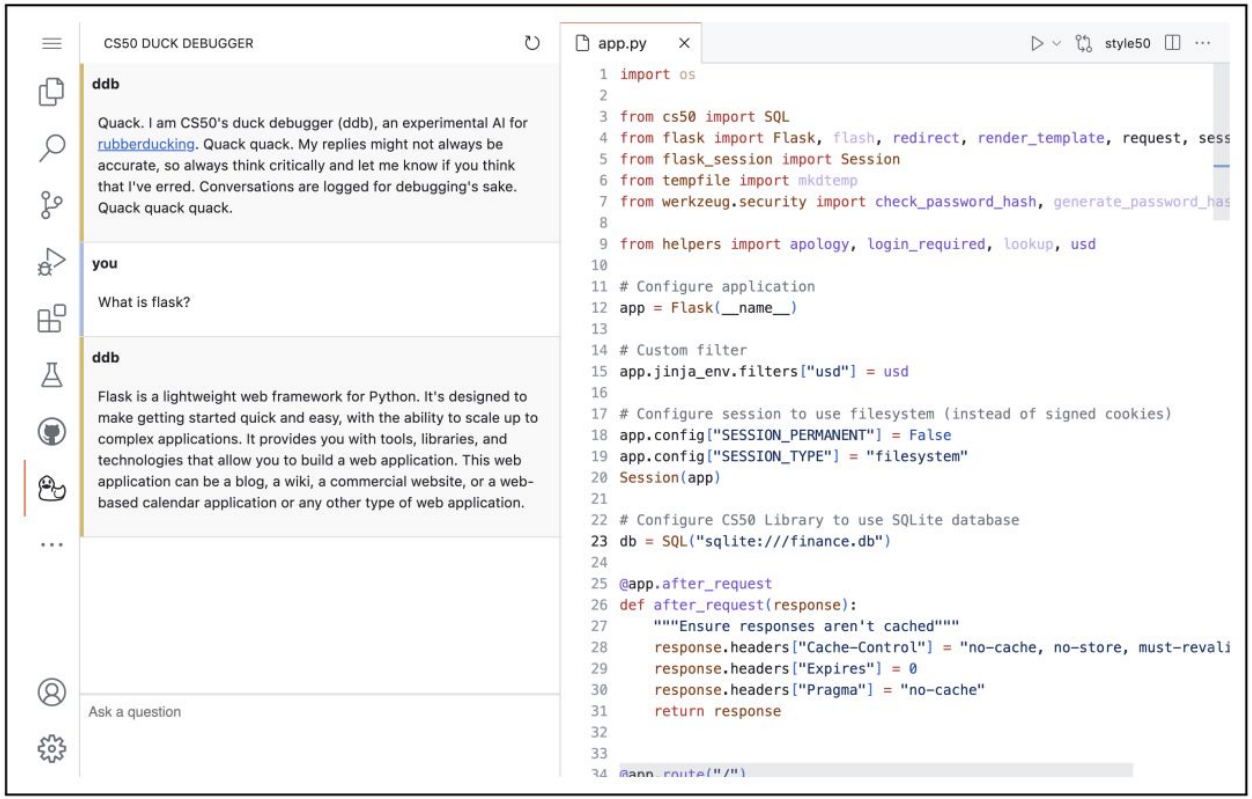


Figure 2: CS50 students can also access the CS50 Duck within VS Code to chat about CS-related topics, explain highlighted code, or suggest code style improvements.

Teaching CS50 with AI

Leveraging Generative Artificial Intelligence in Computer Science Education

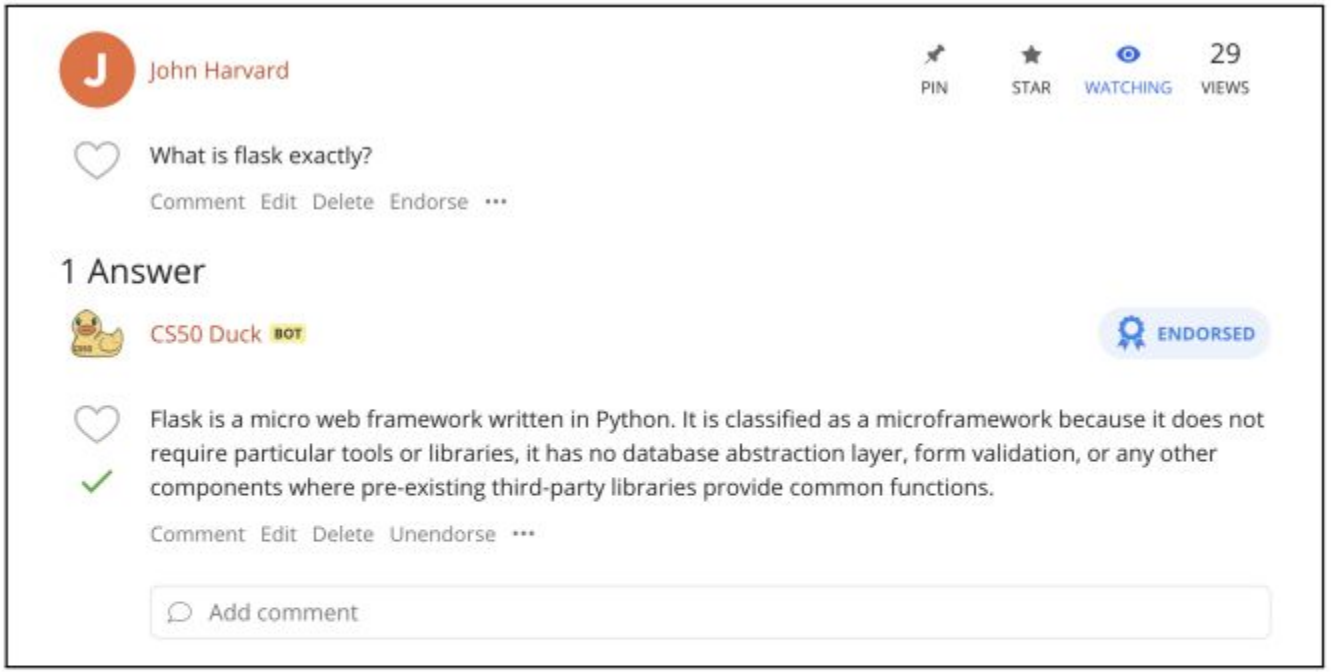


Figure 3: The CS50 Duck in action on Ed. A student asked a question, and the CS50 Duck replied with a succinct answer, which a human staff member endorsed as correct.

Breakout #4

ITS have the potential to support students with scalable, on-demand, one-on-one tutoring.

What are the **limitations** of an ITS? What parts of instruction can an ITS **not** replicate?

Discuss with your neighbor(s) and record on Gradescope.

Breakout #4

What parts of instruction can ITS **not** do?

- motivational interactions
- human communication
- body language, understanding physical cues
- understanding students holistically
- deeper understanding from built relationship with students
- requires some motivation/autonomy to even start!

LLMs disrupting (CS) Education?

Duolingo CEO says AI is a better teacher than humans—but schools will still exist 'because you still need childcare'

Talking to a real human makes a difference!

RESEARCH

Online schooling: Who is harmed and who is helped?

Susan M. Dynarski

Are online courses fulfilling their promise? In a June 2017 Evidence Speaks post, Eric Bettinger and Susanna Loeb of Stanford University showed that in a large, for-profit college, online courses are a poor option for the least prepared students.[2] Online students did substantially worse than students in the same face-to-face course: They earned lower grades, were less likely to succeed in subsequent courses, and more likely to drop out.

Overall, the body of research suggests that learning suffers with no face-to-face instruction. Students in blended courses appear to do about the same as those in fully face-to-face courses. If a blended course frees up teachers' time, that time can be transferred to additional courses, or to extra attention to students who are struggling.

Belonging is really, really, really powerful

A Brief Social-Belonging Intervention Improves Academic and Health Outcomes of Minority Students

Changing Social Contexts to Foster Equity in College Science Courses: An Ecological-Belonging Intervention

Effects: Academics

- Class exam score
- 1 and 4 year GPA
- Persistence in Major

Effects: Social

- Group diversity
- Perceived competence of (assigned) diverse groups
- Effect of attendance

Effects: Health

- Higher happiness
- Fewer doctor's visits
- Less major depression

Effects: 10 Years Later

- Career Satisfaction + Success
- Psychological well-being
- Community Involvement

LLMs in CS Education

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Today:

LLMs changing **what** we learn

LLMs changing **how** we learn (ITS)

Next time: LLMs in video games!

The rest of the quarter

Due tonight:

- Game Design revision (from Milestone 2)
  - Can only be parts in MVP, remaining parts for final
- MVP Description
  - Outline what you will implement

In-class 12/3 (Wednesday after Thanksgiving):

- Flash talks (short project presentations)

Due 12/10 (Wednesday of finals week):

- Game Design
  - Full document, revised according to feedback
- MVP Implementation
  - Demo in lab