



**Inside
Higher
Ed**

AI and Student Learning: What We Know (and What We Don't)

4.10.2024, 2 p.m. Eastern

Webcast | AI and Student Learning: What We Know (and What We Don't)

Hosts:

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Inside Higher Ed

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Mike Hale,
VitalSource

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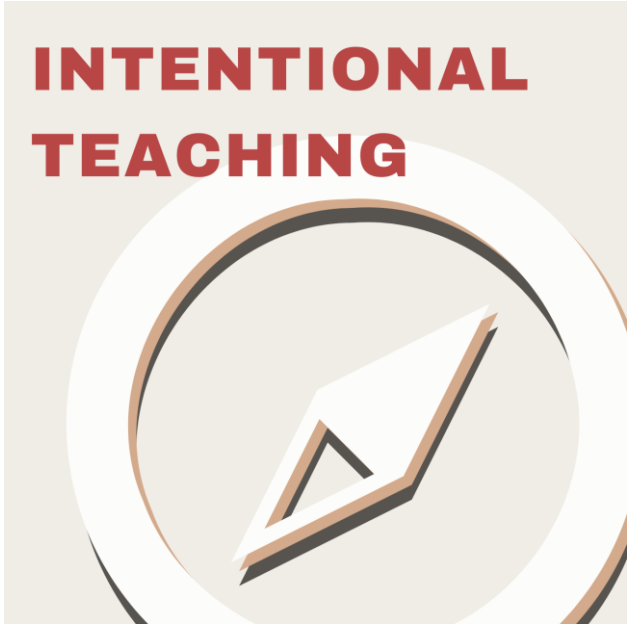
Derek Bruff,
Visiting Associate Director, Center
for Excellence in Teaching and
Learning, University of Mississippi

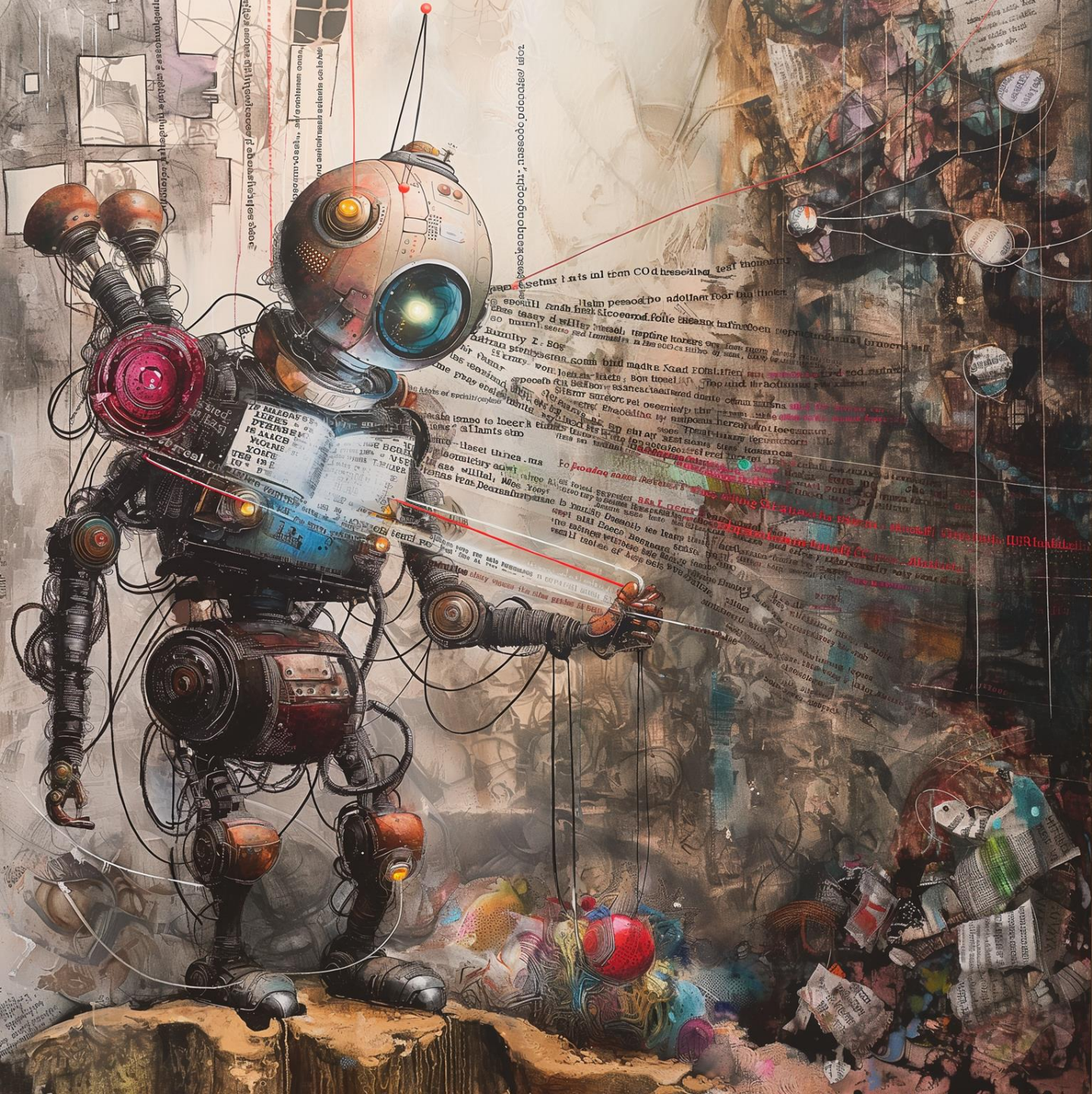
Danielle S. McNamara,
Executive Director, Learning
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University

Xu Wang,
Assistant Professor, Computer
Science and Engineering,
University of Michigan

Short Presentations

Derek Bruff



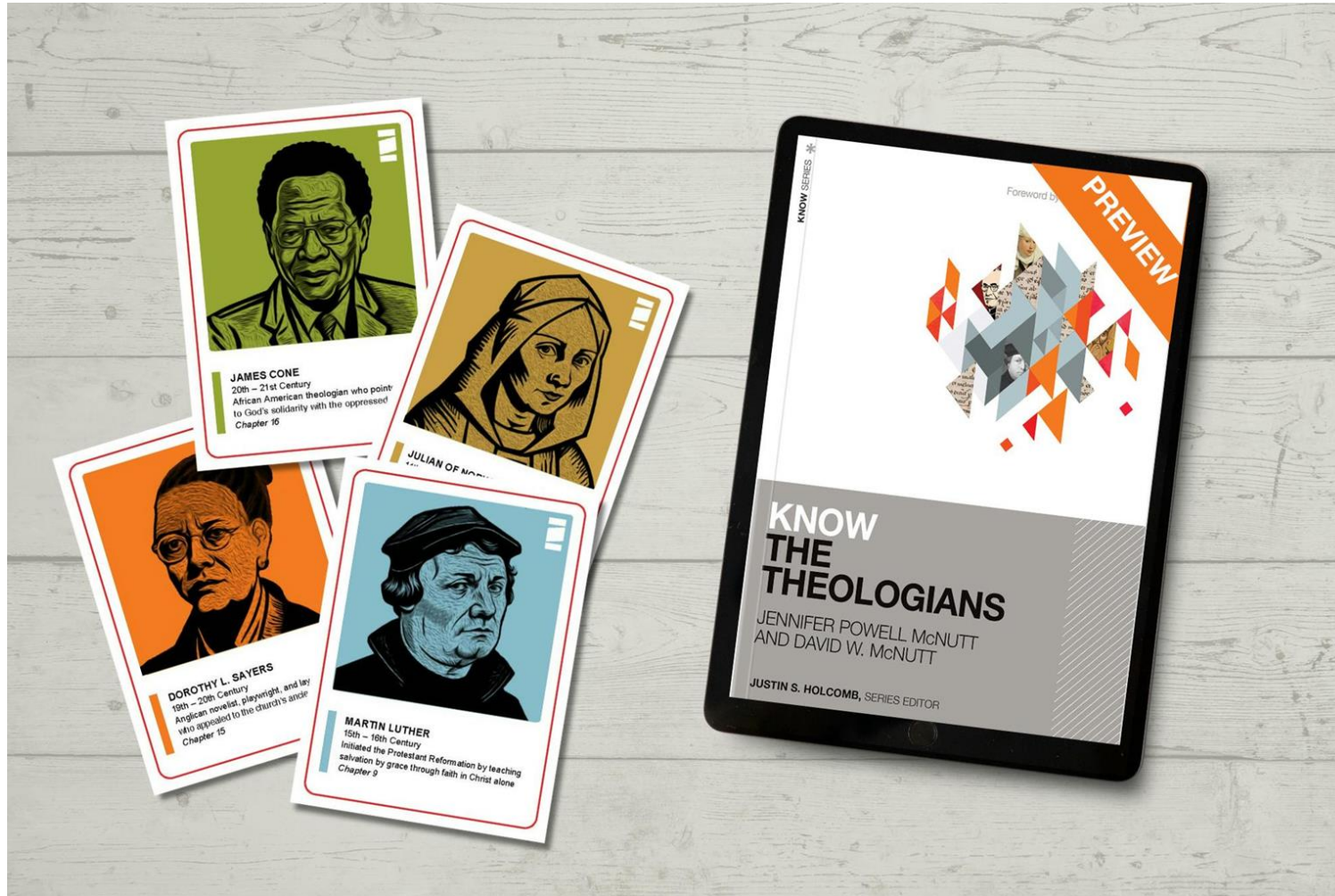


Tools like ChatGPT
speak but don't think.

These tools are
wordsmiths, not
oracles.

Image: “a robot weaving
together words like a giant
tapestry” via Midjourney

Expert AI use requires expertise.



“AI doesn’t think that women are theologians, apparently.”

Emily Bruff, 2/21/24

Might AI help students develop expertise?

“Evaluate the evidence used to support the main argument. Is the evidence relevant, sufficient, and effectively integrated into the argument?”

“How well does the paper analyze the implications of digital technology on academic integrity and authorship? What insights or unique perspectives does the paper offer?”





Generative AI at ASU



10 April 2024

Danielle S. McNamara
Executive Director, Learning Engineering Institute
Provost's Office

The ASU

Learning Engineering Institute



Contribute to work geared toward **enhancing students' learning experiences and well being.**

lei.asu.edu



Empower researchers to advance inclusion and equity-oriented research to benefit all students through inclusion of demographic data from a highly diverse population of students.



Convene and facilitate transdisciplinary teams to advance and apply best-in-class technologies and innovations in learning and instruction that empower inclusion, student engagement, learning, and success.

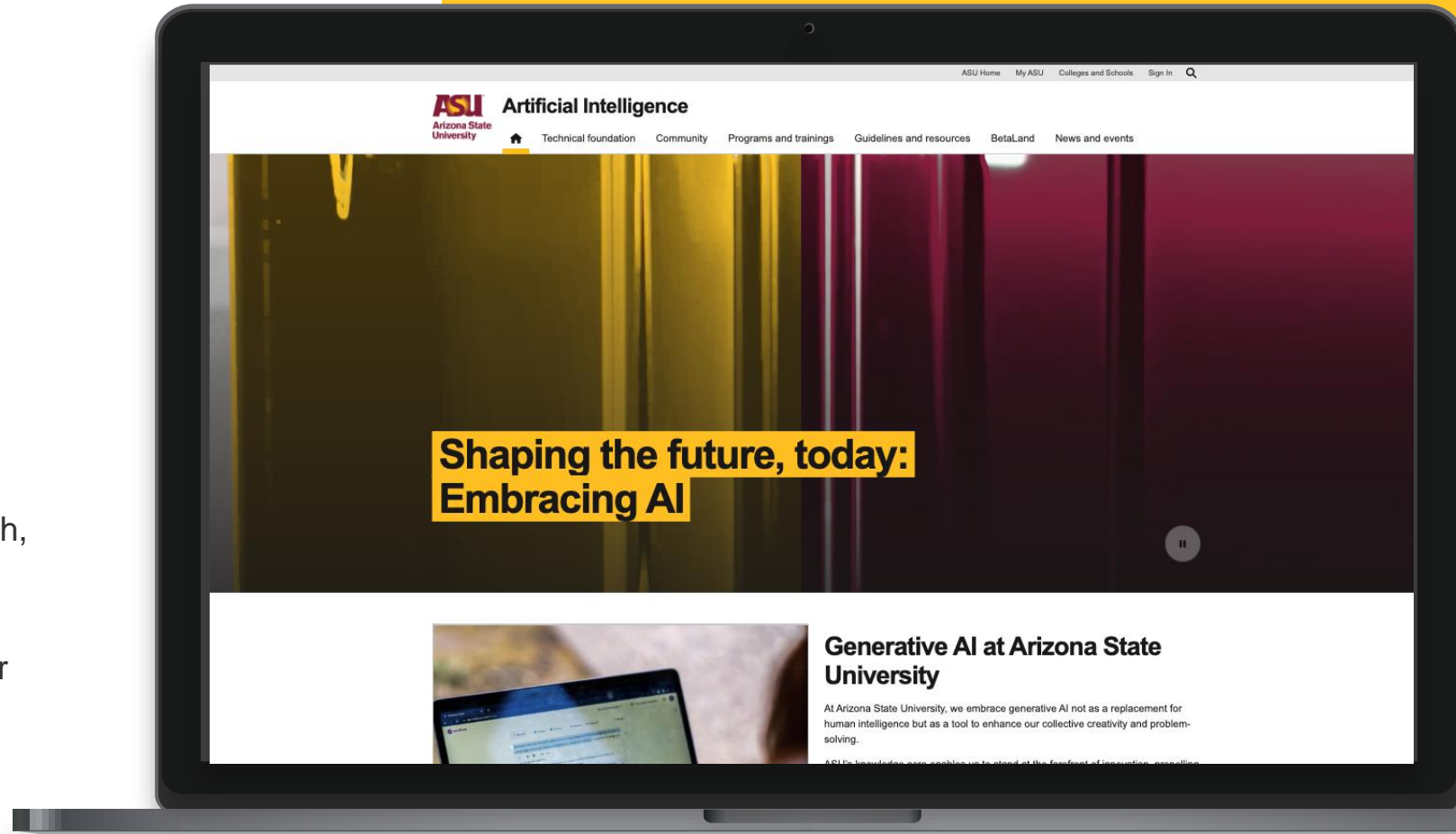
Guiding AI Tenets at ASU

- AI is a powerful technology and will be an **enduring part of the innovation landscape for the foreseeable future**
- Harnessing the power of AI brings the **responsibility to innovate in a principled way**, centering our charter and values of inclusion and access
- AI can support human intelligence and capabilities, rather than replace them, to **promote equal access to creativity and amplify potential**
- We have a **responsibility to our community** to keep pace with the rapid progression of AI
- This technology must be **easily accessible to people from diverse backgrounds**, aiming to bridge the accessibility gaps

The background of the slide is a dark blue field filled with a complex network of glowing white and light blue lines and nodes, resembling a digital or neural network. In the center, the letters 'AI' are rendered in a large, bold, blue font with a glowing, digital texture. The 'A' and 'I' are slightly offset from each other, and the overall aesthetic is futuristic and technological.

ai.asu.edu

This website serves as a showcase and central hub to highlight the multifaceted impact of augmented intelligence (AI) on learning, research, and work. Outlining the enterprise's holistic approach to AI, it provides compelling success stories, valuable resources, and opportunities for active participation.



Guidelines, Tools and Policies

Digital Trust Guidelines for Generative Artificial Intelligence Use

<https://ai.asu.edu/digital-trust-guidelines>

These guidelines have been reviewed and approved by Enterprise Technology Digital Trust, Cybersecurity, AI Acceleration, Learning Experience and the Office of General Council.

Generative AI Tools

<https://ai.asu.edu/generative-ai-tools>

View the generative AI tools that have completed the ASU VITRA process and are approved for use at the departmental level.

Academic Integrity: Syllabus Guidelines

<https://docs.google.com/document/d/1u9RGD8oU3e16XkdFNC6k8tgXIzYW2L7yZ2ELW5LfZqQ/edit>

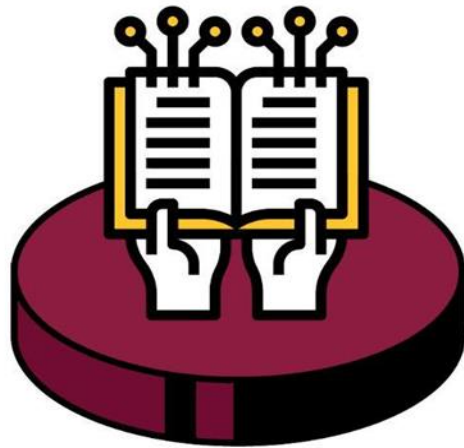
GenAI Literacy for Faculty

<https://ai.asu.edu/asu-programs>

>1700 **People Taking the Course**

49 **ASU Experts Contributing to the Course**

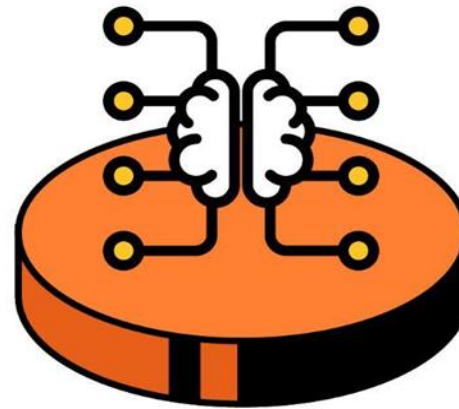
Level 1: Knowledge



Not familiar at all
(never used an AI tool)

Modules 1, 2, and 3

Level 2: Skill



Somewhat familiar
(used one or more AI tool(s))

Modules 4 and 5

Level 3: Application



Very familiar
(regularly use AI tools)

Module 6

Designed for faculty and staff with different levels of experience and time to engage.

AI Acceleration

Our mission is to use artificial intelligence and machine learning to revolutionize the student experience, advance research excellence, and expand ASU's impact on society. Through the lens of principled innovation we:

#1

**Build Enterprise
Platforms**



#2

Develop Products



We embrace AI not as a replacement for human intelligence but as an amplifier of human creativity and problem-solving to help unlock each learner's full potential.

**Arizona State
University has
created the first of
its kind AI fusion
team dedicated to
scaling and
transforming
higher education.**

Generative AI in Teaching and Learning



Proactive, Collaborative Response

Stakeholders from across the university, including faculty, staff, and researchers collaboratively assessed faculty and student needs and opportunities in GenAI.

Transdisciplinary communities of practice have supported:

- Research
- Pedagogical resources
- Technological Resources
- Instructional modules
- Guidelines
- Communication



Scaffolding Coursework with GenAI to Support Learning

Projects exploring how GenAI tools (e.g., ChatGPT, WordTune, AI Bots) can be successfully integrated into courses to support student success.

- GenAI in Writing
- Possibility Thinking Bot
- SyllaBot
- CourseBuilder Bot



Planning toward a Future with AI

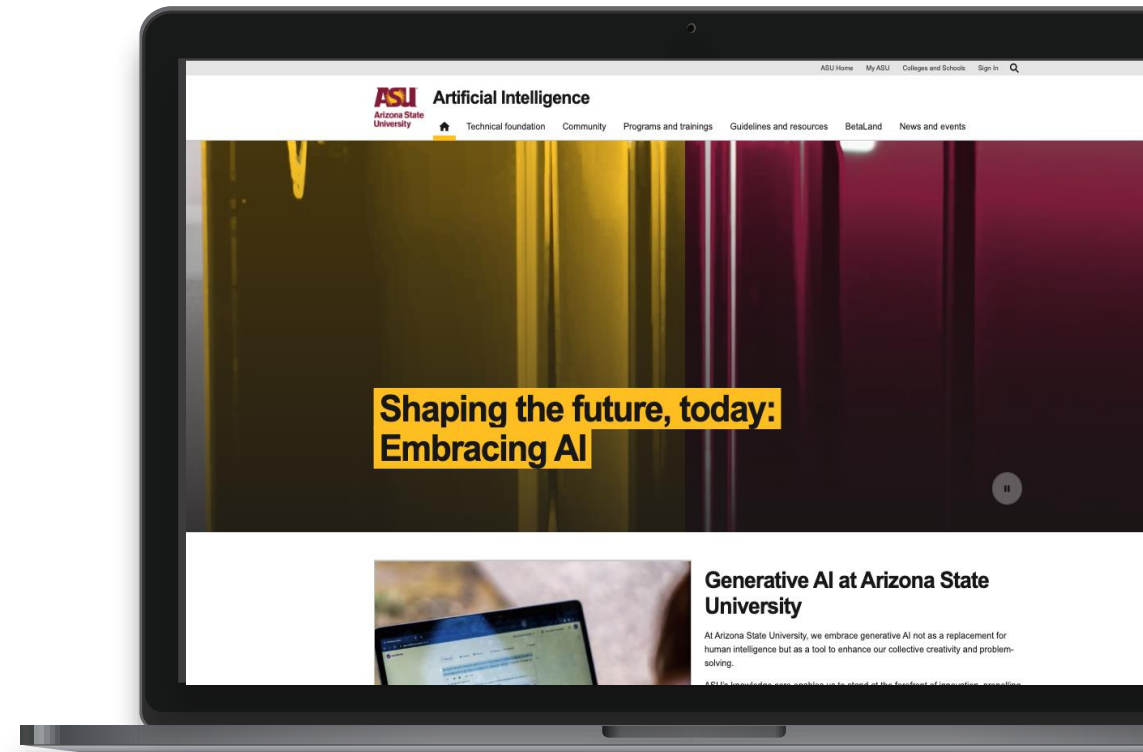
Collaboratively seeking opportunities to support educators and students to leverage GenAI in teaching and learning.

- Active L@S: Awarded IES Transformative Grant (\$3.75M for 3 years)
- Envisioning collaborative AI design tools that empower educators to create GenAI tools

ASU Faculty and staff at the forefront of discovery and implementation

Launched February 1, 2024, the AI Innovation Challenge at ASU invited faculty and staff to submit proposals for how they would harness **ChatGPT Enterprise** to actively shape the future of learning, research and work.

ai.asu.edu/AI-Innovation-Challenge



ChatGPT Enterprise offers enhanced capabilities



Increased levels of privacy

Any prompts the ASU community inputs into ChatGPT Enterprise remain private; meaning that OpenAI does not use this data for its training models



Unlimited access to ChatGPT-4

This is the most current version of ChatGPT available, offering higher-speeds than ever before.



Safeguards ASU's intellectual property

ChatGPT Enterprise offers a multi-tenant approach that ensures ASU data remain secure and private.

Submission highlights at a glance

175+

proposals submitted

105

proposals accepted in the first round

863

total licenses will be issued

Projects across three areas of impact

49

Advance innovations in teaching and learning

24

Enhance AI research with societal impact

32

Explore scaling the public enterprise

Thank you!

ai.asu.edu

 **ASU** Learning Engineering
Institute
Arizona State University

Visit our website at:
learningengineering.asu.edu/

Email us at:
learningengineering@asu.edu

Email me at:
dsmcnama@asu.edu

Teacher-AI Collaborative Interfaces to Create Tutoring Opportunities

Xu Wang

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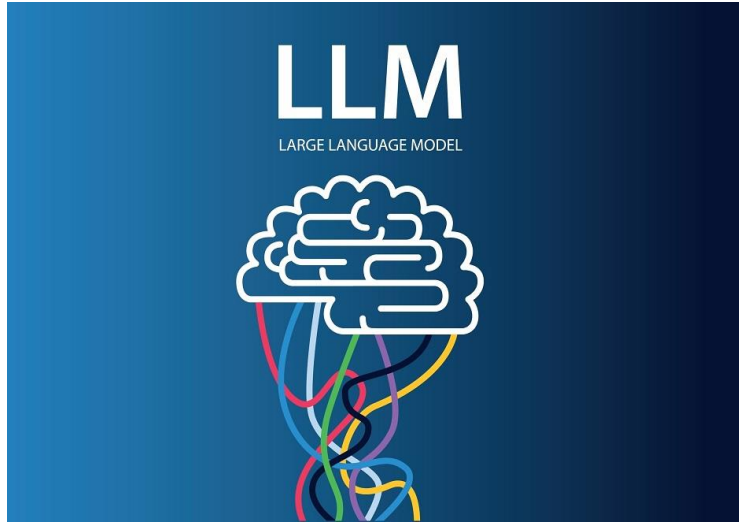
<https://web.eecs.umich.edu/~xwanghci/>



COLLEGE OF ENGINEERING

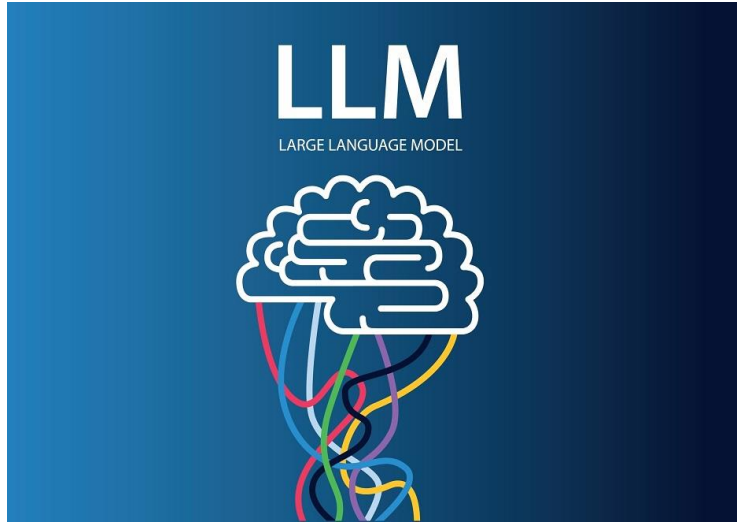
COMPUTER SCIENCE & ENGINEERING

UNIVERSITY OF MICHIGAN



How will LLMs impact teaching and learning?





How will LLMs impact teaching and learning?



Using GPT to give feedback to student answers



Student answer: We want to use asynchronous programming in Javascript because it allows the program to run more efficiently as it will run other tasks while waiting for a response from something else. The application can send, request, and receive data from a server without blocking the rest of the interface from loading.



GPT Feedback: The answer accurately mentions that asynchronous programming in Javascript allows the program to run more efficiently as it can wait for a response from something else while continuing to run other tasks. It also correctly identifies that the application can send, request and receive data from a server without blocking the rest of the interface from loading, which allows user interaction at any time. However, the answer does not mention that asynchronous programming can also allow rendering content on the webpage in real-time. Additionally, although the answer mentions that Javascript is single-threaded, it does not explain why this makes asynchronous programming necessary. Providing a bit more detail on this point would have been helpful.

Using GPT to give feedback to student answers



Student answer: We want to use asynchronous programming in Javascript because it allows the program to run more efficiently as it will run other tasks while waiting for a response from something else. The application can send, request, and receive data from a server without blocking the rest of the interface from loading.



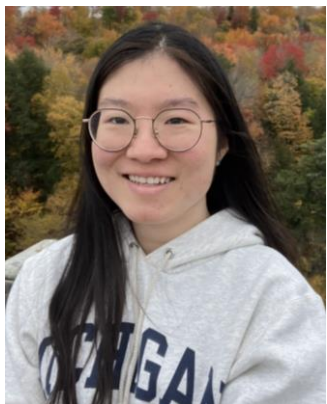
GPT Feedback: The answer accurately mentions that asynchronous programming in Javascript allows the program to run more efficiently as it can wait for a response from something else while continuing to run other tasks. It also correctly identifies that the application can send, request and receive data from a server without blocking the rest of the interface from loading, which allows us to use our time more efficiently. However, the answer does not mention that asynchronous programming also allow rendering content on the webpage in real-time. *Additionally, although the answer mentions that Javascript is single-threaded, it does not explain why this makes asynchronous programming necessary. Providing a bit more detail on this point would have been helpful.*

Incorrect information

Human input is needed but how?

How to enable teachers to steer LLMs to generate desirable inputs?

ReadingQuizMaker: A Human-NLP Collaborative System that Supports Instructors to Design High-Quality Reading Quiz Questions



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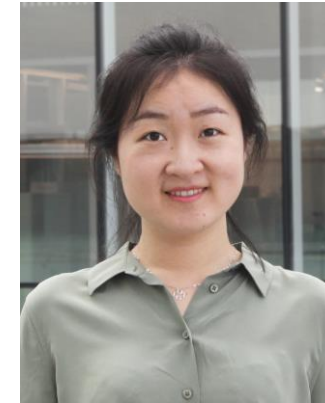
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Seeing Beyond Expert Blind Spots: Online Learning Design for Scale and Quality

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DOI: <https://doi.org/10.1145/3411764.3445045>

CHI '21: [CHI Conference on Human Factors in Computing Systems](#), Yokohama, Japan, May 2021

Maximizing system scalability and quality are sometimes at odds. This work provides an example showing scalability and quality can be achieved at the same time in instructional design, contrary to what instructors may believe or expect. We situate our study in the education of HCI methods, and provide suggestions to improve active learning within the HCI education community. While designing learning and assessment activities, many instructors face the choice of using open-ended or close-ended activities. Close-ended activities such as multiple-choice questions (MCQs) enable automated feedback to students. However, a survey with 22 HCI professors revealed a belief that MCQs are less valuable than open-ended questions, and thus, using them entails making a quality sacrifice in order to achieve scalability. A study with 178 students produced no evidence to support the teacher belief. This paper indicates more promise than concern in using MCQs for scalable instruction and assessment in at least some HCI domains.

CCS Concepts: • Applied computing → Computer-assisted instruction; • Applied computing → Interactive learning environments;

Keywords: HCI education; instructor belief; learning@scale; learning experience design; multiple-choice questions; matched assessment comparison

ACM Reference Format:

Xu Wang, Carolyn Rose, and Ken Koedinger. 2021. Seeing Beyond Expert Blind Spots: Online Learning Design for Scale and Quality. In *CHI Conference on Human Factors in Computing Systems (CHI '21)*, May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA 14 Pages.

<https://doi.org/10.1145/3411764.3445045>

ABSTRACT

– Question 1: ↗ ↖

Notes:

Question type:

Multiple Choice Question

Question Stem:

Neg



+ Question

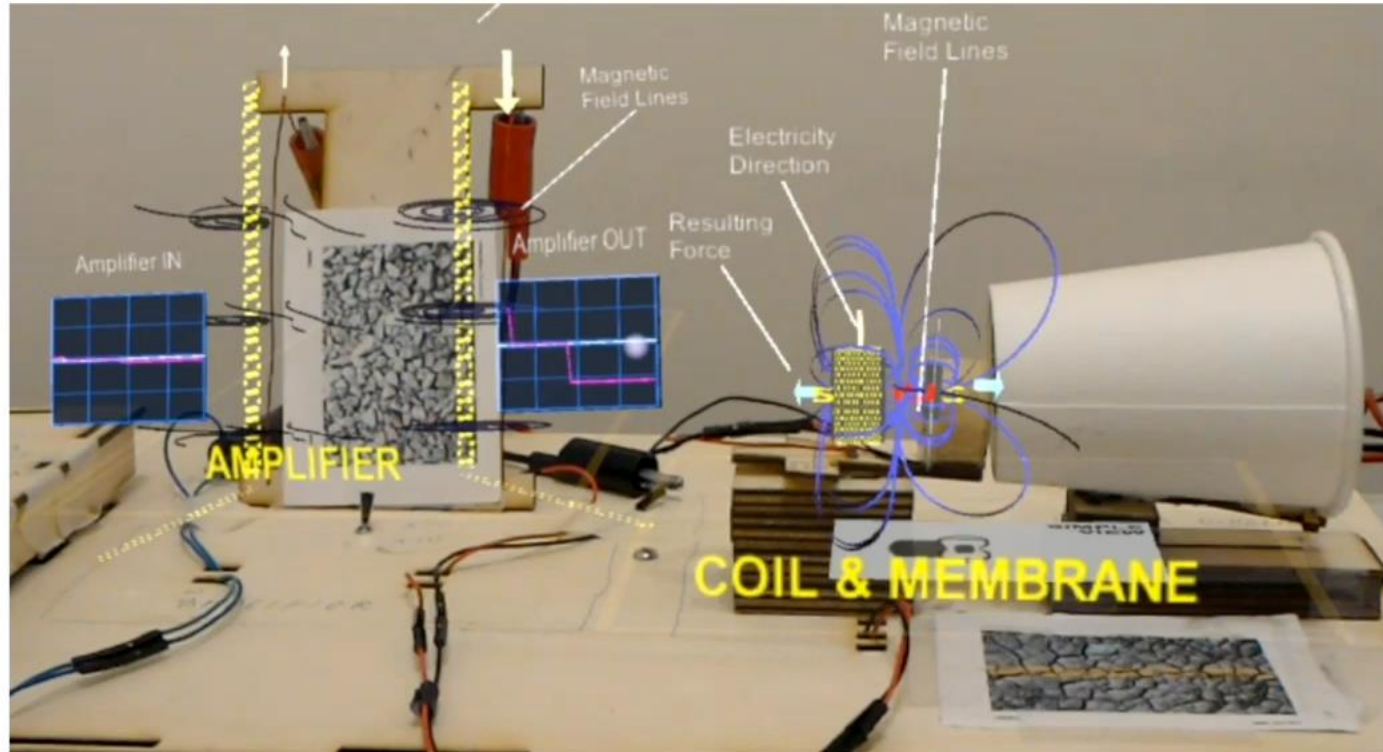
1 INTRODUCTION

+ Question

2 RELATED WORK



fields, and finally to sound waves. The physics teacher advisor (mentioned in point 2 above) indicated that, even after a few classroom sessions, students can build a working speaker but have trouble explaining how it works. This activity is especially suited for AR technology because it can provide contextualized visualizations of the underlying phenomena in physics.



Our final system consists of an interactive hardware system that replicates an audio speaker (Fig. 1). The system is composed of multiple HoloLens devices networked together. Physical electronic modules allow groups of learners to collaborate while observing 3D visualizations of invisible phenomena occurring in the physical space. Sound is produced by a diaphragm membrane with an attached magnet. The diaphragm is located next to a coil of wires, which receives amplified electric signals from a control board. Participants can push buttons on the control board to play music from a smartphone or send constant forward or backward current through the system. Participants can also control the placement of the diaphragm membrane, change the type of coil used, and adjust the amplification.

1 INTRODUCTION

- Question 1: ↗ ↖

Notes:

Question type:

Multiple Choice Question

Question Stem: Neg



+ Question

2 RELATED WORK

+ Question

3 SYSTEM DESIGN



concepts in physics). However, we also found that participants in conditions that did not contain AR educational content, learned some concepts better than other groups and became more curious about physics. We discuss learning and collaboration differences, as well as benefits and detriments of implementing augmented reality for unstructured learning activities.

KEYWORDS: Augmented Reality, Physics Education, Collaborative Learning

ACM Reference Format:

Iulian Radu and Bertrand Schneider. 2019. What Can We Learn from Augmented Reality (AR)?: Benefits and Drawbacks of AR for Inquiry-based Learning of Physics. In *Proceedings of CHI '19: CHI Conference on Human Factors in Computing Systems (CHI '19), May 04, 2019, Glasgow, Scotland UK*. ACM, New York, NY, USA, <https://doi.org/10.1145/3290605.3300774>

1 INTRODUCTION

Augmented reality (AR) is becoming affordable and popular and its increased adoption is generating a growing interest for educational use - both in formal and informal environments. In the formal space, teachers are increasingly using technology-enhanced hands-on learning activities to foster deep conceptual understanding, such as interactive simulations or activities involving sensors. In the informal space, we are currently witnessing the birth of the “maker” cultural movement where everyday people collaboratively tinker with physical and digital materials, in order to explore, modify or create physical artifacts. In such environments, people engage in self-driven inquiry-based learning, and are indirectly exposed to a variety of STEM concepts. We believe augmented reality has the potential to radically transform formal and informal education by making challenging concepts visible to novices.

In this research we critically investigate the benefits and drawbacks of augmented reality for inquiry-based learning. We focus on a collaborative activity that explores electromagnetism concepts, because electromagnetism is a topic that is often encountered in both maker spaces and traditional physics classrooms; it is one of the most difficult topics to master for students of all ages [1,2,5]. An activity typically taught in electromagnetism curriculums, and pursued in makerspaces, is the construction of speakers. Audio speakers involve different physical phenomena - such as flow of electric current, amplification and alternation of electricity, generation of magnetic fields from electricity, production of forces acting to

1 INTRODUCTION

− Question 2: ↗ ↖

Notes:

Question type:

Multiple Choice Question ▾

Question Stem: Neg



+ Question

2 RELATED WORK

+ Question

Increased adoption is generating a growing interest in formal space, teachers are increasingly using digital content to enhance their understanding, such as currently witnessing the integration of physical and digital materials in self-driven inquiry-based learning. AR has the potential to help novices.

Augmented reality for inquiry-based learning. We know that, because electromagnetism is a topic that is challenging for students; it is one of the most difficult topics to master in physics curricula, and pursued in makerspaces, where students explore phenomena - such as flow of electric current, magnetic fields, from electricity, production of forces acting to create motion, which is often invisible to the



Augmented reality (AR) is becoming affordable and popular and its increased adoption is generating a growing interest for educational use.

Open Transform Menu

- Load Original Text
- Par
- Neg
- Sum
- X

Augmented reality (AR) is becoming affordable and popular and its increased adoption is generating a growing interest for educational use.

using technology-enhanced hands-on learning activities to foster deep conceptual understanding.

Open Transform Menu

Question Option 6:

Evaluation Study

RQM | Seeing Beyond Expert Blind Spots: Online Learning Design for Scale and Quality

Seeing Beyond Expert Blind Spots: Online Learning Design for Scale and Quality

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DOI: <https://doi.org/10.1145/3411764.3445045>
CHI '21: CHI Conference on Human Factors in Computing Systems, Yokohama, Japan, May 2021

a Navigation bar

b User selections are highlighted

c Intent-triggered AI suggestions

d Mode switch

e Question review

f Question authoring panel

g More AI support

ABSTRACT

1 INTRODUCTION

Question 1: ...

Question 2: ...

Notes:

Question type: Multiple Choice Question

Question Stem: Neg

Question Option 1: Set this option as the correct answer

However, a survey with 22 HCI professors revealed a belief that MCQs are less valuable than open-ended questions, and thus, using them entails making a quality sacrifice in order to achieve scalability.

Open Transform Menu

Interactive learning

questioned assessment

sign for

The authors give suggestions to improve active learning within the HCI education community.

VS

RQM | NivaDuck - A Scalable Pipeline to Build a Database of Political Twitter Handles for India and the United States

4 COMPLETENESS AND SCOPE OF NIVADUCK

To estimate the completeness and scope of accounts caught by NivaDuck, we ran two experiments. For the first, we manually gathered the Twitter handles of elected members of the Indian parliament. For the USA, we compiled the list of all members of the California State Assembly and Senate as well as candidates that ran for those positions during the 2018 elections. We repeated the procedure for the San Diego city council. Our goal was to estimate what percentage of these handles could be caught by NivaDuck using the seed data we had provided.

To build the ground truth for this exercise, we used the list of elected representatives published by the Election Commission of India (ECI) and manually looked up the name of each MP on Twitter to find their Twitter handle. We found 424 Twitter handles for 545 MPs of the Lok Sabha. For the California set, we used data published by the Federal Election Commission (FEC) and state level official sources and candidate lists as per Ballot-o-pedia. We repeated the procedure for San Diego county. For each politician, we recorded their personal, official and campaign accounts, if any. As an example, Democratic Assemblywoman Cecilia Aguiar-Curry has two accounts - official handle @AsmAguiarCurry and personal handle @CeciliaAD4. Similarly, Republican State Senate candidate Rex Hime had one official handle @RexHime and one campaign handle @HimeForSenate during the 2018 elections. In all, we found 153 active handles for 171 accounts we looked up. Most CA politicians had only one Twitter handle. We repeated the procedure for San Diego County representatives and compiled 61 accounts for 56 politicians.

The rest of the experiment was set up as follows. To find the aforementioned handles automatically, NivaDuck would snowball on the seed data through Twitter friend and follower networks. It would then feed all accounts so found to its two-stage classification pipeline. The accounts found to be politicians would then indicate NivaDuck's ability to find elected representatives in India and the US.

For the India set, NivaDuck found 421 MPs using the friend and follower network, caught 401 of these handles in its high-recall primary classifier and predicted 284 MPs as potential politicians in its high-precision secondary classifier. This yields a overall recall score of 65 percent for the Indian MPs dataset. Using the same procedure for the US, we found that NivaDuck caught 68 percent of California State handles and 53 percent of

Multiple Choice Question

Question Stem: Neg

Which of the following is NOT correct according to the result?

Question Option 1:

Set this option as the correct answer

The list of all members of the California State Assembly and Senate was compiled by the authors.

Open Transform Menu

Question Option 2:

Set this option as the correct answer

Each politician's personal, official and campaign accounts were recorded by the authors.

Open Transform Menu

Question Option 3:

Set this option as the correct answer

The majority of CA politicians had a single handle on social media.

Open Transform Menu

Question Option 4:

Set this option as the correct answer

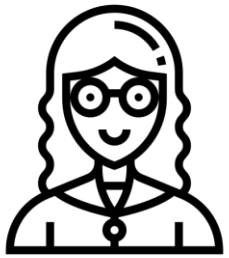
NivaDuck would use the seed data from the follower and friend networks to find the handles.

Human-AI Teaming Approach: teachers remain control and get assistance from AI.

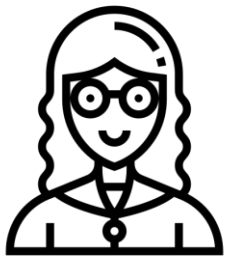
Baseline: questions are automatically generated and teachers can edit.

Findings #3 Participants strongly preferred the human-AI teaming approach offered by ReadingQuizMaker

- Having control is important



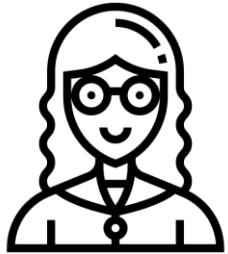
*P11 said “I would, again, prefer the first task rather than this one, because I would have **control over** what’s being generated.”.*



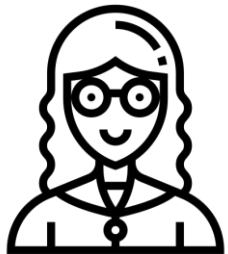
*P5: “it looks like I’m doing a little bit more on myself, but actually, that **meets my expectation.**”*

Findings #3 Participants strongly preferred the human-AI teaming approach offered by ReadingQuizMaker

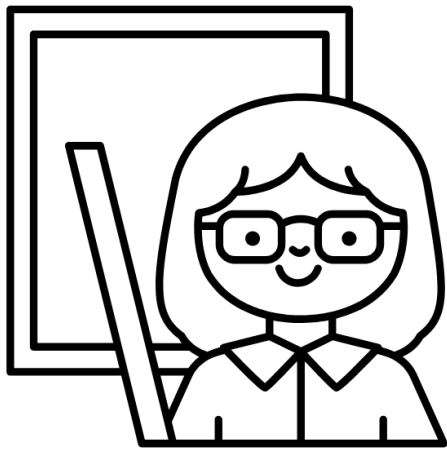
- The automatically generated questions are of lower quality



*P10: “I would, again, kind of look at this and say, for each of these it is representative of the text in there. But **does it make sense standing alone** as a question answer?”*



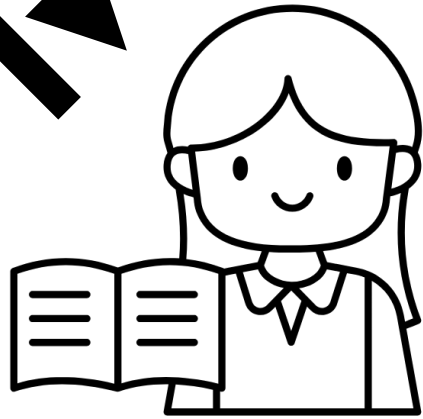
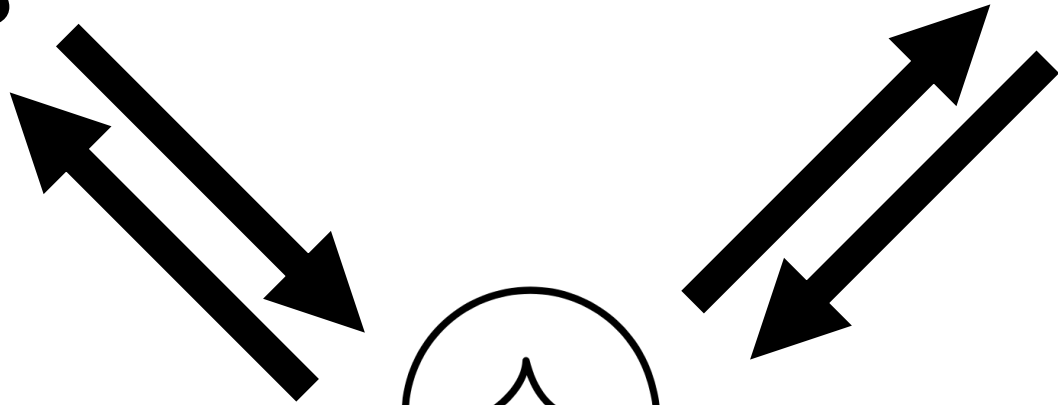
*P9: “I would not include such a question. There’s **no learning** that’s coming out of that. It’s just a story.”*



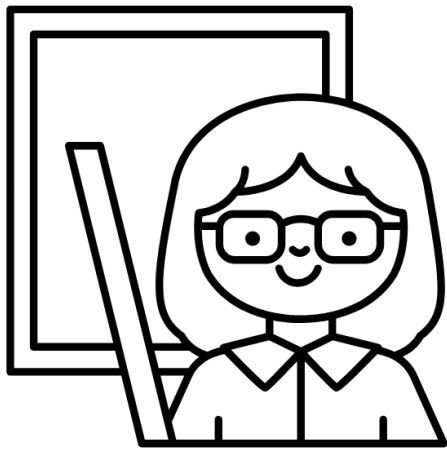
Teachers



AI



Students

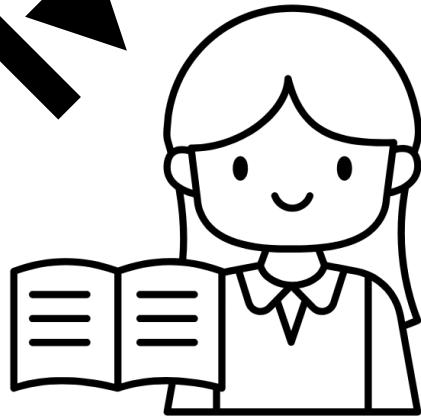
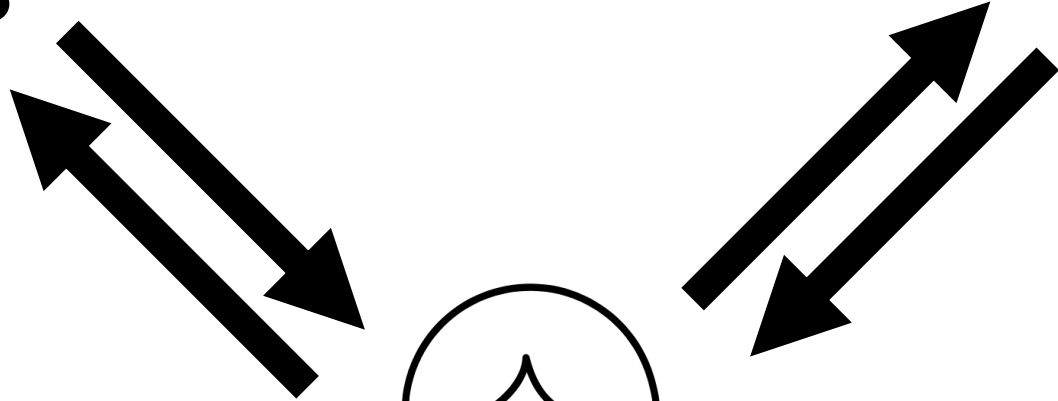


ReadingQuizMaker

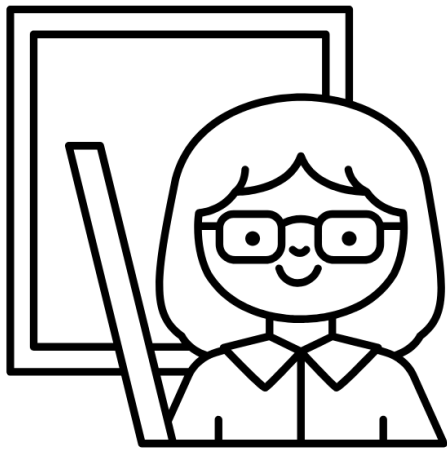


AI

Teachers



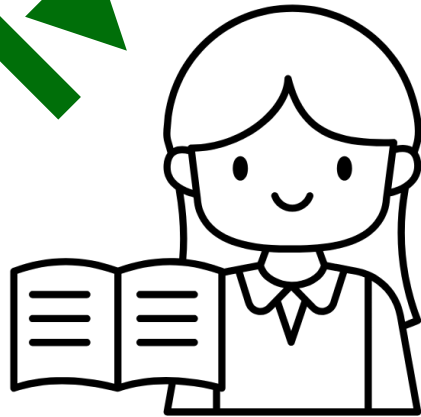
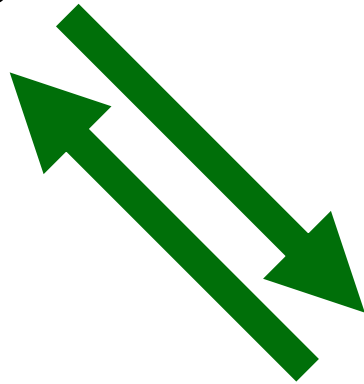
Students



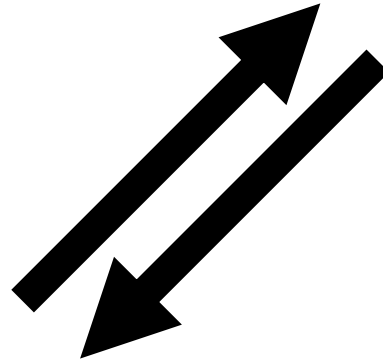
Teachers



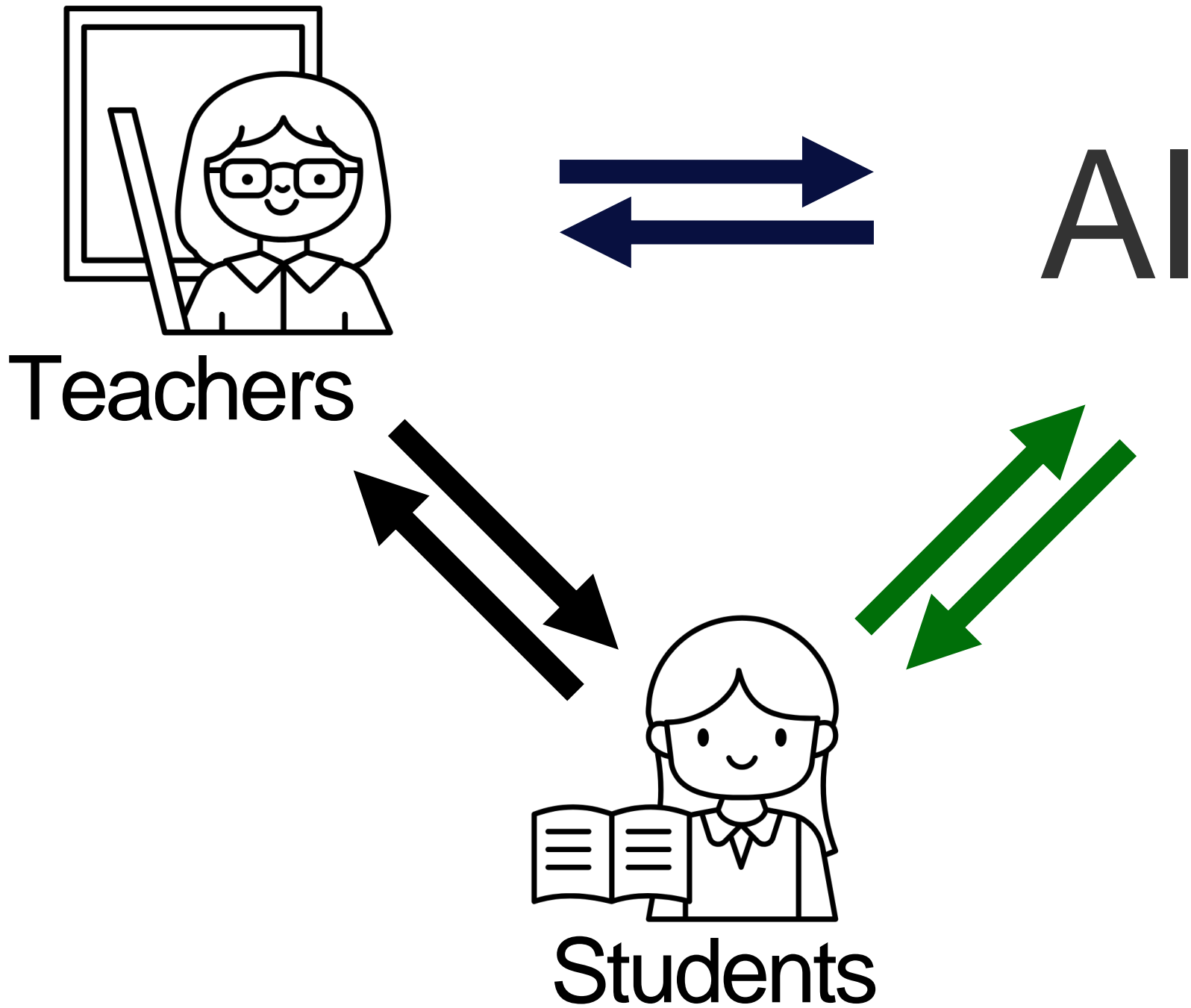
AI



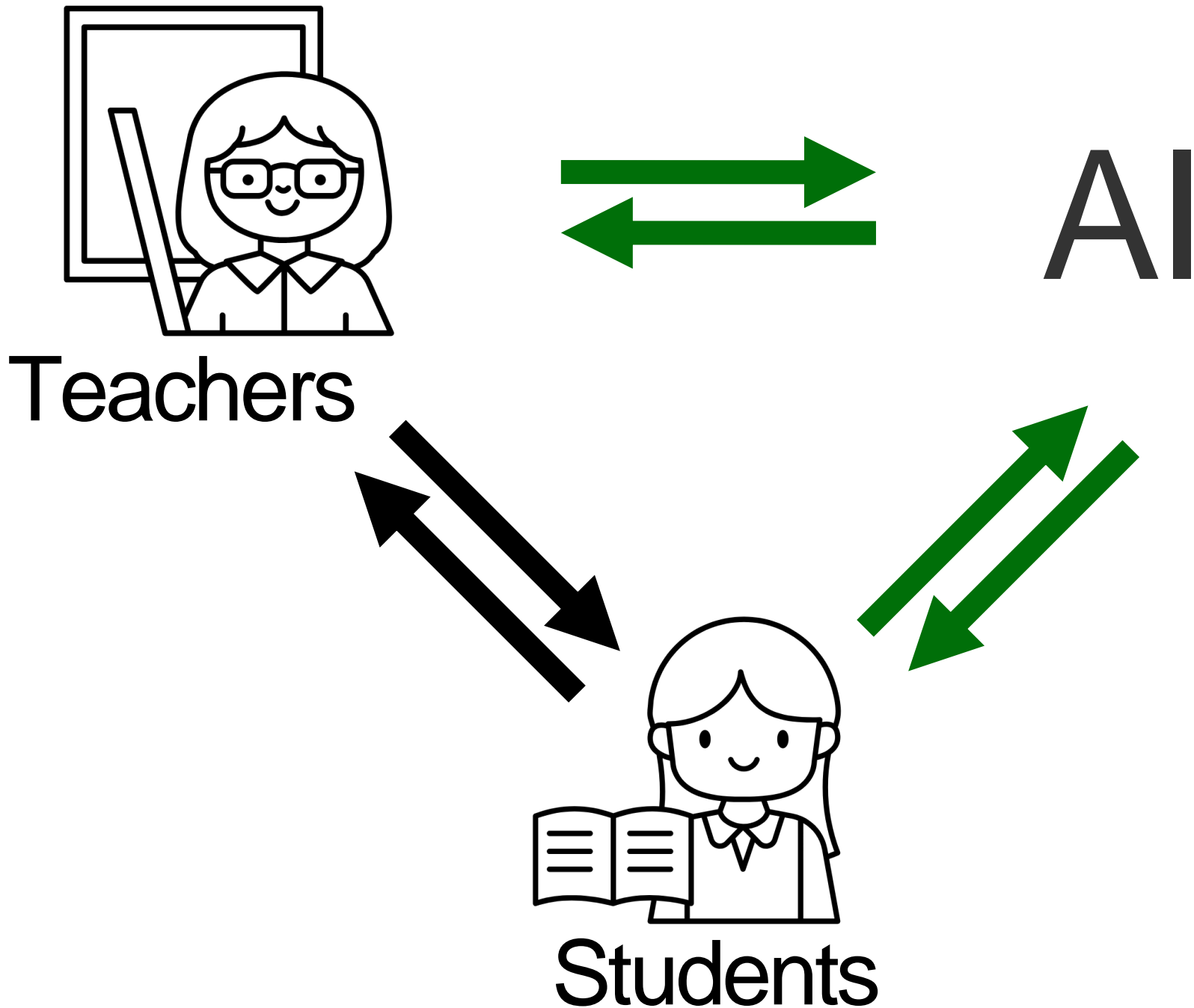
Students



AI can help teachers with repetitive work so that they can spend more meaningful 1-1 and mentoring time with their students.

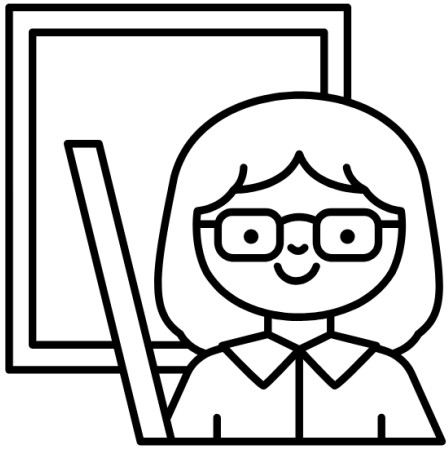


When student interact with AI, provide frictions and support so that students can use AI help more responsibly and learn from the interaction.



When student interact with AI, provide frictions and support so that students can use AI help more responsibly and learn from the interaction.

Have teachers configure the AI interaction experience.

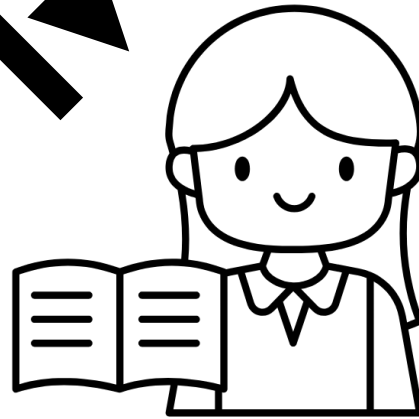
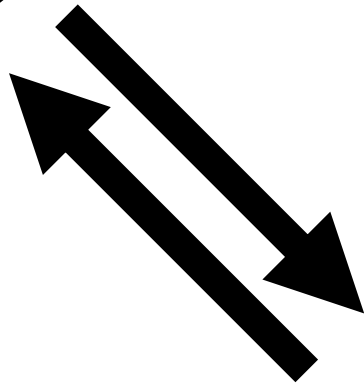


Teachers

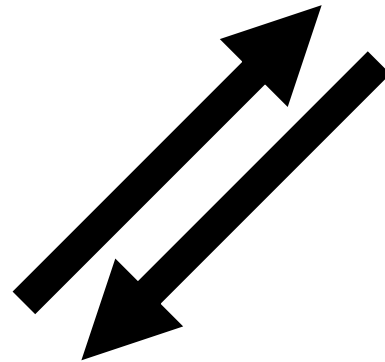


AI

It's an exciting time to research LLM+ education.



Students



Contact me:

xwanghci@umich.edu

Panel Discussion



Derek Bruff, Visiting Associate Director, Center for Excellence in Teaching and Learning, University of Mississippi



Danielle S. McNamara, Executive Director, Learning Engineering Institute, Arizona State University



Xu Wang, Assistant Professor, Computer Science and Engineering, University of Michigan

Sponsor Chat



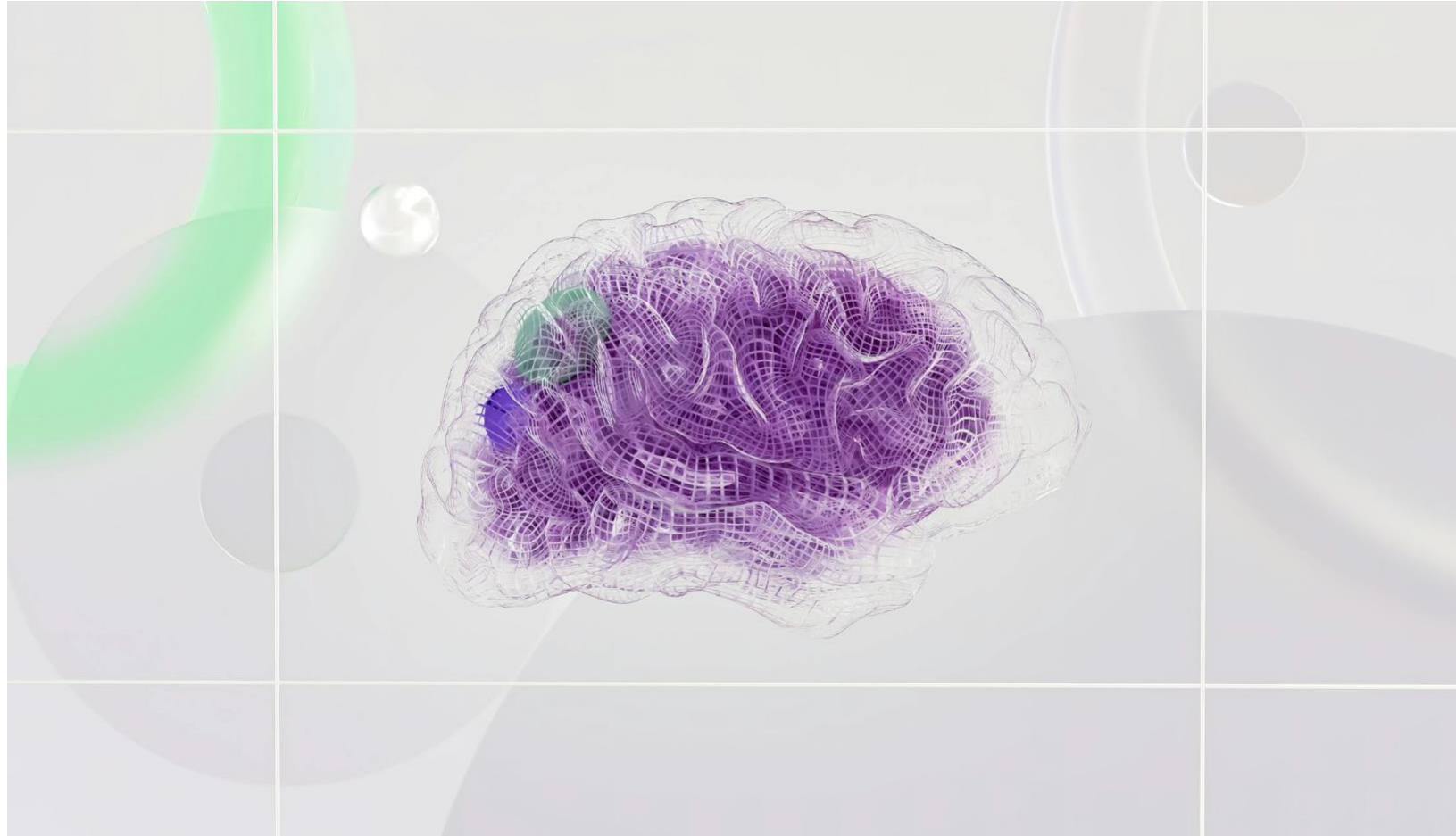
Mike Hale,
Chief Learning
Officer at
VitalSource



Doug Lederman,
Editor and Co-
Founder at
Inside Higher Ed

Audience Q & A

Thank you!



Helpful Links

<https://www.insidehighered.com/news/tech-innovation/artificial-intelligence/2024/03/21/universities-build-their-own-chatgpt-ai>

<https://www.insidehighered.com/news/student-success/life-after-college/2024/01/10/survey-college-students-thoughts-ai-and-careers>

<https://www.insidehighered.com/news/tech-innovation/teaching-learning/2024/03/26/colleges-adding-digital-literacy-graduation>

<https://www.insidehighered.com/news/global/2024/03/28/student-chatbot-use-could-be-increasing-loneliness>

<https://www.insidehighered.com/news/student-success/academic-life/2024/02/06/how-college-professors-are-using-generative-ai-teach>

<https://www.insidehighered.com/opinion/views/2024/02/28/next-step-higher-eds-approach-ai-opinion>

<https://www.insidehighered.com/opinion/career-advice/2023/12/01/advice-about-ai-classroom-coming-new-year-opinion>

<https://www.insidehighered.com/news/quick-takes/2024/01/19/arizona-state-joins-chatgpt-first-higher-ed-partnership>

Helpful Links Cont.

<https://www.insidehighered.com/news/tech-innovation/artificial-intelligence/2024/02/13/how-ai-has-begun-changing-university-roles>

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<https://www.insidehighered.com/news/tech-innovation/teaching-learning/2023/11/16/some-colleges-overlook-technologys-dark-side>