

# EXPLORING GENERATIVE AI TOOLS IN CLASSROOMS

## OVERVIEW

On January 26, 2023, the Stanford d.school, the Stanford Institute for Human-Centered Artificial Intelligence, and the Stanford Accelerator for Learning convened more than 50 teachers online to share their ideas on the future of generative AI in education. OpenAI, the creator of the ChatGPT platform, also attended the event. This document is a summary of the questions, comments, challenges, and opportunities discussed during the 90 minute conversation.

## Opportunities for generative AI as identified by the convened teachers:

Support teachers in preparing materials

- Generate text for reading comprehension and quiz questions
- Compose example texts
- Generate text passages using new vocabulary in different contexts
- Translate materials into non-English languages

A tool for student writing, after appropriate steps are taken

- Brainstorm ideas for research and writing
- Generate sentences or sentence frames when they are “stuck”
- Accommodation for special needs
- Hold virtual “conversations” with AI-simulated historical figures
- Edit writing for grammar and conventions

## Concerns about generative AI:

A lack of guidance for ethical and responsible use of ChatGPT

- Student plagiarism, cheating, and learning loss.
- ChatGPT can produce biased and toxic content
- ChatGPT may accelerate the misinformation crisis

## Five big picture questions that emerged from teachers’ conversations:

- Why do we teach what we teach in the ways we currently teach it?
- How will AI tools like ChatGPT change the skills and knowledge students will need to be successful in life?
- How will AI tools like ChatGPT change what we assess, how we assess it, and why?
- What constitutes independent thought and writing?
- How will the availability of tools like ChatGPT change the profession of teaching?

**“ Oh my goodness,  
[with ChatGPT] I can differentiate  
so much more quickly.**

– High School Teacher

# EVENT SUMMARY

ChatGPT is a Generative Artificial Intelligence chatbot, capable of responding to human prompts to generate text in a wide range of styles and for different purposes. ChatGPT was launched by OpenAI as a prototype in late November 2022, and in two months it has been engaged by more than a hundred million users, making it one of the fastest adopted technology applications ever. While it was not initially built for education applications, teachers and students are increasingly using it in education settings. One recent estimate shows 30% of college students having used ChatGPT for written assignments.

In this context, the Stanford d.school, the Stanford Institute for Human-Centered Artificial Intelligence, and the Stanford Accelerator for Learning convened a group of more than 50 educators, from PreK-12, to discuss possibilities and concerns regarding classroom use of this emerging technology.

“ **On the cusp  
of a sea change.**

– High School Teacher

Educator voices are essential to anchor research and design of solutions with and for educators.

The event took place online January 26, 2023, and involved text chat, cloud document contributions (e.g., Google Docs), and small group discussion facilitated by staff and faculty, and full group discussions facilitated by Laura McBain (Stanford d.school) and Nereyda Salinas (Stanford Accelerator for Learning). Lama Ahmad, policy researcher at Open AI, the organization that invented ChatGPT, also joined the meeting and shared perspectives on ChatGPT risks and roadmap.

More than 50 teachers attended from eight U.S. states and two countries (Australia and Malaysia). The group included PreK-12 teachers, with a high concentration (70%) of high school teachers. About 44% had taught for more than 11 years. In a pre-meeting survey, 74% of the attending teachers indicated they had already tried ChatGPT.

## Teacher perspectives

Teachers expressed both nervousness and excitement about ChatGPT. At the beginning of the event, facilitators posed the question, “How are you feeling about ChatGPT, really?”

In the chat window, educators responded with words like “skeptical” or “curious” and emojis indicating pleasure, curiosity, and anxiety. One educator added an emoji with an exploding brain, or mind blown. Another wrote that they felt like they were “on the cusp of a sea change.” Still another quoted the adage popularized by Spider-Man, “With great power MUST come great responsibility.”

For most of the discussion, educators joined breakout groups organized by grade level and subject area. There were also breakout rooms available for participants in cross-disciplinary and non-instructional roles. Participants shared ideas about the possibilities and risks that ChatGPT poses in education.

Most of the educators had already used or tried ChatGPT for personal and professional use. They seemed to be experimenting with the tool’s capabilities without yet sharing it with students. A few teachers had already introduced ChatGPT to students, including one teacher who had already begun a mini-unit engaging students in conversations about the ethics, potential, and limits of AI for education.

 **Whose experiences are you modeling this [text] on?**

– High School Teacher

# POSSIBILITIES

Potential applications of ChatGPT fell into two broad categories:

## 01. Supporting teachers

How teachers could use the tool for planning, instruction, assessment, and communication with families and administrators

- **Differentiate Texts:** Modify texts for different levels of reading fluency. One teacher noted that ChatGPT can take a complex text and quickly create different versions of it for students at different reading levels.
- **Generate Conceptual Examples:** Generate contrasting case examples to help students develop criteria for processes and concepts. A math teacher, for example, proposed using ChatGPT to generate different ways to explain slope to students.
- **Generate Writing Examples:** Generate samples for students to use as models in their own composition.

**Let's say you have a vocabulary set of 15–20 words. [ChatGPT] can generate an infinite number of passages using those words in context.**

– High School History Teacher



- **Write Questions for Assessment:** Generate reading comprehension and quiz questions from text input.
- **Support Vocabulary Acquisition:** Compose passages that give students more practice with new vocabulary in different contexts. One teacher commented, “Let's say if you have a vocabulary set of 15–20 words. [ChatGPT] can generate an infinite number of passages using those words in context.”

# POSSIBILITIES

Some teachers stressed ChatGPT's swiftness in generating material. They saw ChatGPT as a time saver that allowed them to focus on other valuable activities, such as providing individualized feedback and strengthening relationships with students. Educators also underscored the potential for ChatGPT, currently a free tool, to broaden student access to individualized support, and thus be a lever for differentiated instruction.

Teachers were also interested in using ChatGPT for interactions outside of the classroom. Several noted the potential for ChatGPT to streamline and improve communications with families and administrators. One teacher said ChatGPT helped them generate phrasing for recommendation letters. Many stressed that ChatGPT could help them increase instruction time and facilitate learning as a result.



## **Using ChatGPT to personalize instruction:**

ChatGPT can help teachers offer students texts that are tailored to students' reading levels. One teacher compared this type of differentiation to the edtech solution Newsela, which offers leveled news content. The teacher added that Newsela only has a curated library of texts, while ChatGPT can differentiate any text. This capability could help all students to access developmentally appropriate texts and build crucial background knowledge.

# POSSIBILITIES

## 02. Supporting Students

How students themselves could eventually use ChatGPT to support their own learning\*

Teachers offered use cases that focused primarily on research and writing processes. ChatGPT could:

- **Help students overcome writer's block:** Generate suggestions for sentences or sentence frames when students are “stuck.”
- **Provide accommodations:** Serve as an accommodation for students with special needs. Students could use it to modify texts, summarize readings, or assist with writing.

**Students are already talking about it.  
Their parents are talking about it.** 

– Teacher in Middle/High School English and History Breakout Room

- **Translate:** Translate texts across different languages.
- **Hold imaginary dialogues:** Hold virtual “conversations” with historical figures or writers whose style ChatGPT could mimic.
- **Act as a tutor:** Act as a one-on-one writing tutor. Students could ask ChatGPT questions about texts or ask for feedback on their ideas or their writing.
- **Edit writing:** Serve as a more comprehensive alternative to current editing tools (e.g., spellcheck, Grammarly)

\*While not a focus for the discussion, it is important to note that OpenAI's policy restricts registration to individuals 18 or older, which means that at present, most K-12 students could not create their own accounts without a parent or guardian's permission and involvement. See also OpenAI's [Educator Resource](#).

# RISKS

Potential risks identified by educators fell into four main categories:

## Cheating and plagiarism

Unsurprisingly, cheating and plagiarism were at the front of many participants' minds. Educators were concerned that some students would use ChatGPT to complete their assignments. Teachers' concerns were compounded by the lack of a reliable text classification system that could differentiate between human and AI-generated content. One teacher raised concerns that students could prompt ChatGPT to make its outputs sound "smarter" or "dumber," thus making plagiarism even more difficult to detect.

## Missed learning opportunities

One teacher offered that ChatGPT might deprive students of the benefits of "productive struggle." Another cautioned against overreliance on the tool, stating that "reading and writing are muscles that atrophy when not used." Relatedly, because ChatGPT could blur the boundaries between what students produced and what ChatGPT produced, teachers worried that ChatGPT might "hide what students are or are not learning."

## Bias and toxic content

Teachers also raised concerns about harmfully biased and toxic content, a problem that has been well documented, not only with respect to ChatGPT but with AI more broadly. Because ChatGPT is largely trained on web-based language, it inherits the racist, sexist, transphobic, xenophobic, ableist, classist, and otherwise problematic biases and stereotypes of internet content.

## Misinformation

Another recurring concern among participants was ChatGPT's tendency to produce misinformation in convincing language. ChatGPT can return factual inaccuracies, including fabricated citations, quotes, statistics, and facts. Teachers expressed concerns that students would accept ChatGPT at face value and thus complicate the already difficult task of teaching students to assess source credibility. One breakout group wrote in their notes, "How will we make sure they know about the mistakes ChatGPT makes (like when you do a Google search and there is both reliable and unreliable information on a topic)?" One math teacher noted that ChatGPT has well-documented problems with mathematical proficiency, so its usefulness there may be limited. Another noted similar inaccuracies with some of ChatGPT's language translations.





### Understanding bias

Like other forms of AI, ChatGPT inherits the biases of its training data. During a breakout session, a secondary humanities teacher shared how they asked ChatGPT to write a love story and found that it defaulted to produce a story about a relationship between white, middle class, and heterosexual characters. When the teacher asked the bot to rewrite the story so it featured a Latino teenager, ChatGPT's output contained problematic stereotypes.

Educators may choose to address biased content in different ways, depending on the nature of the output. Some may choose to vet ChatGPT's outputs to prevent students from seeing harmful content. Others may choose to use biased content as artifacts for students to analyze and critique. Regardless, educators must be aware that ChatGPT can generate content that serves to perpetuate negative stereotypes.

## Broad Discussion Themes

01

### Collaboration

Participants were eager to work with one another in shaping the future of AI in education. Stakeholders across these areas acknowledged the importance of transparency, co-design, and partnership between schools, universities, and industry. Several teachers noted that relative to other fields, public education tends to be more reluctant to embrace change, especially technological change. One teacher said, "Education goes into fear mode when there's disruption. There's not the same fear mode in other sectors." Several participants expressed hope for future opportunities to engage in cross-domain dialogue.

02

### Teachers' roles

Participants also discussed teachers' role in shaping conversations around AI and education. Many emphasized the need to engage students not only with questions about the capabilities and limitations of AI, but about ethics, learning, and digital citizenship. Teachers agreed that educators must continue to develop innovative learning strategies as AI evolves, but they must also mitigate its potential harms. Teachers also surfaced a tension between "creativity and sustainability"; teachers are continually asked to innovate and do more with less under increasing demands. One teacher remarked, "There's creativity, and then there's sustainability. Right? I think those things could be at odds, because you can't force me to try to wear all these hats, be a techie within also."

## Broad Discussion Themes, continued

03

### Equity

Several teachers raised questions around whether tools like ChatGPT narrow or widen opportunity gaps. Some worried that their benefits would flow primarily to communities that are already tech-savvy and well-resourced, while others emphasized that ChatGPT, which is currently free, creates the possibility for individualized student support at a scale not possible in a pre-AI paradigm. One teacher noted that ChatGPT had the potential to add an additional layer of support for Special Education and English Learner students. She added, “At my school the ELD department is the most ‘all in [for ChatGPT].’ They’re like, ‘Oh my goodness, I can differentiate so much more quickly.” There was also a discussion about the potential equity issues raised by the introduction of a paid ChatGPT version.

**Reading and writing are muscles that atrophy when not used.**

– Teacher in Middle/High School English and History Breakout Room



## Big Picture Questions

**The following five “big picture” questions emerged from teachers’ conversations:**

- Why do we teach what we teach in the ways we currently teach it?
- How will AI tools like ChatGPT change the skills and knowledge students will need to be successful in life?
- How will AI tools like ChatGPT change what we assess, how we assess it, and why?
- What constitutes independent thought and writing?
- How will the availability of tools like ChatGPT change the profession of teaching?

These questions cut to the core of the purpose and role of education and learning in a rapidly changing society.

# ACKNOWLEDGEMENTS

This summary was prepared by Chris L. Mah, PhD student at Stanford Graduate School of Education, with support from faculty and staff from the Stanford d.school, the Stanford Institute for Human-Centered Artificial Intelligence, and the Stanford Accelerator for Learning.

This convening was only possible thanks to the 50+ educators who took time from their busy lives to share their ideas and questions in an online conversation. The educators' names, schools, and locations have been removed from this document out of consideration for their privacy. We also appreciate OpenAI's participation.

**This document is dedicated to PK-12 educators who work tirelessly every day to help shape the present and future of this world. May the voices here spark many continued conversations about the future of AI in education.**

## Convening Facilitators

Kristen Blair

Heidi Chang

Cathy Chase

Scott Doorley

Daniela Ganelin

Isabelle Hau

Paul Kim

Glenn Kleiman

Victor Lee

Sarah Levine

Chris Mah

Laura McBain

Ariam Mogos

Anna Queiroz

John Robichaux

Nereyda Salinas

Sam Seidel

Hari Subramonyam

Josh Weiss

## **The Hasso Plattner Institute of Design (The d.school)**

The d.school's mission is to help people unlock their creative abilities and apply them to the world. It reflects our foundational belief that design should be accessible to all, and that everyone is creative. Through our master's program on design impact, our undergraduate product design program and our public facing experiences for education, for-profit and nonprofit sectors we equip individuals with the skills from the field design which enables them to make a positive, equitable and tangible impact in the world.



## **The Stanford Accelerator for Learning**

The Stanford Accelerator for Learning seeks to accelerate solutions to the most pressing challenges facing learners. Housed at Stanford Graduate School of Education, the Stanford Accelerator for Learning is the first university-wide initiative connecting scholars across disciplines and with external partners to bridge research, innovation, practice, and policy, and bring quality scalable and equitable learning experiences to all learners, throughout the lifespan.



## **The Stanford Institute for Human-Centered Artificial Intelligence (HAI)**

The mission of HAI is to advance AI research, education, policy and practice to improve the human condition. Led by faculty from departments across Stanford, research focuses on developing AI technologies inspired by human intelligence; studying, forecasting and guiding the human and societal impact of AI; and designing and creating AI applications that augment human capabilities. Through the education work of the institute, students and leaders at all stages gain a range of AI fundamentals and perspectives. At the same time, the policy work of HAI fosters regional and national discussions that lead to direct legislative impact. The faculty and staff of HAI are engaging not only leading-edge scientists, but scholars trying to make sense of social movements, educators enhancing pedagogy, lawyers and legislators working to protect rights and improve institutions, and artists trying to bring a humanistic sensibility to the world in which we live. Together we're helping build the future of AI.

