

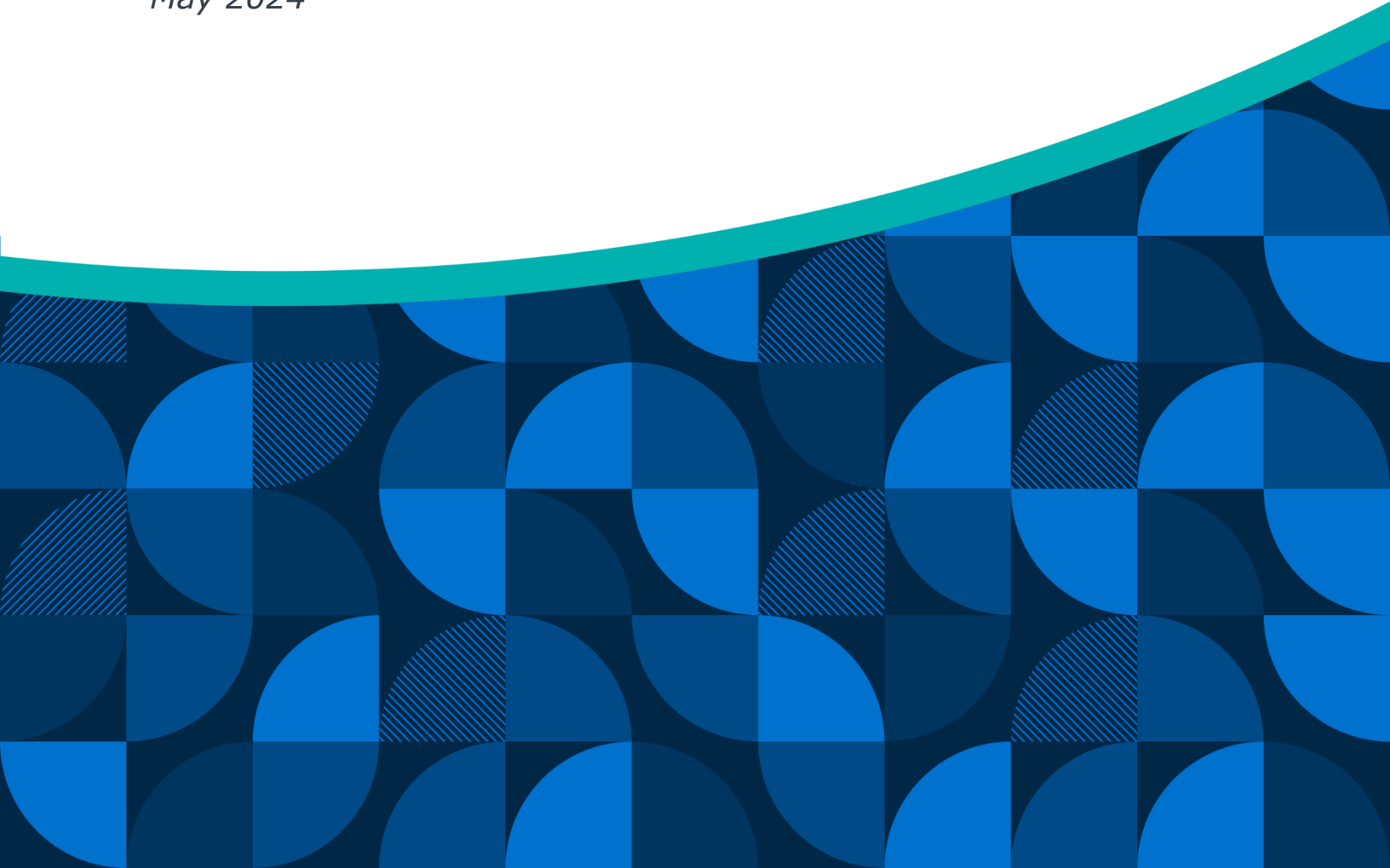


EXECUTIVE BRIEFING

# Generative AI in K-12 Public Schools

7 Critical Discussions to Have About AI  
Among District Leadership Teams

*May 2024*



# How to Use This Briefing

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Generative AI is not just an emerging technology—it is a societal shift in how people communicate, work, and learn. District leadership teams must recognize each active component of how generative AI is impacting K-12 schools and society.

**Use this executive briefing to guide these critical conversations with your leadership team or AI task force.** First, review the pre-reading content to gain background knowledge on generative AI. Then, review the Critical Discussions pages and engage with your district leadership team or AI task force to **discuss the essential questions in the blue box at the bottom of each page.** Use the results of your discussion to inform steps taken in each section of the [AI Playbook for District Leaders](#).

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### A note on the rapid pace of AI evolution:

This Executive Briefing attempts to highlight evergreen insights from reputable sources, but the fast-changing nature of this topic could render information and analysis outdated. Before making decisions based on the contents of this Briefing, leadership teams should verify how the K-12 AI landscape has changed since May 2024.

**Access links on page 3 for news and updates on AI.**



# Discussion Pre-Reading: GenAI 101

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**This section answers the following questions:**

- What is generative AI, and how does it differ from other forms of AI?
- Why is everyone talking about generative AI?
- How will this technology develop across the next decade?
- How will districts need to respond?
- In broad terms, how should district leaders assess generative AI apps?

**Want the most up-to-date newsfeed on generative AI?**

Visit the following resources for news on AI advancements and ethics concerns:



[Latest AI News & Articles](#)



[@professorcasey](#)

[AI Ethics & Policy News](#)

# The Building Blocks of Generative AI

## What is artificial intelligence (AI)?

Artificial intelligence is a broad term referring to technology that enables machines to simulate human intelligence and capabilities by processing and analyzing existing information. The term has been in use since the 1950s.

## What is generative AI (genAI)?

Unlike traditional AI, which analyzes and responds to input with pre-defined actions or recommendations, generative AI generates unique content specific to the user's request. This could include anything from writing text and generating images to composing music and simulating realistic conversations. GenAI uses probability to predict and "print" the next word in a sentence or the next pixel in a piece of graphic art.

Researchers and developers have been working with generative AI [since the 1960s-70s](#), but advances in computing power, the availability of larger and higher-quality data on which to train models, and the development of new training methods and architectures in the 2010s enabled the creation of the foundational models that more closely resemble popular apps like ChatGPT.<sup>1</sup>

## How does genAI work?

The graphic below describes the primary underlying technologies that make up generative AI.

### Underlying technologies of generative AI:

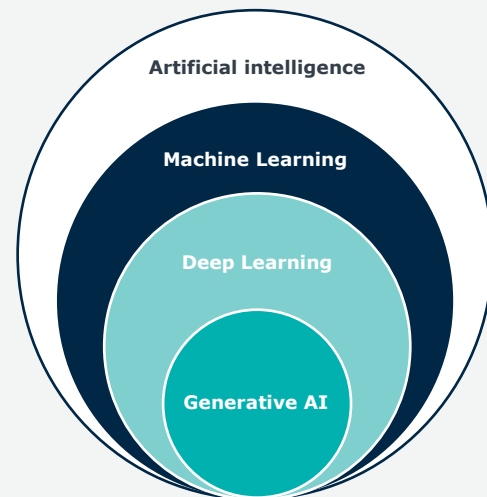
**Neural networks:** Algorithms modeled after the human brain. These networks can process and recognize complex patterns in data, "learning" from the training datasets.

**Machine learning:** This encompasses a wide range of algorithms, including neural networks, enabling computers to learn from data. Generative AI uses a sophisticated subset of machine learning called deep learning.

**Deep Learning:** A method that employs neural networks with many layers (hence "deep") to analyze data. These layers can identify features and patterns at different levels of abstraction, making deep learning exceptionally powerful for tasks like image recognition, natural language processing, and generating new content based on learned patterns.

**Large Language Models (LLMs):** These are a specific type of AI that use deep learning techniques to understand and generate human language. They power applications capable of writing coherent and contextually relevant text, engaging in dialogue, and even generating code.

*Visualization of GenAI Building Blocks<sup>2</sup>*



For a more complete list of definitions, see Appendix on pages 17-18

# Why Is Everyone Talking About GenAI?

ChatGPT and other recent forms of genAI have **6 key ingredients** that have substantially shifted how the public, including in education, uses AI.

## 1. Easy to Use

You don't need a degree in computer science or extensive knowledge of AI to use generative AI. This is because the tools can process natural language. You can talk to it, and it will talk back.

## 2. Highly Proficient

Popular genAI tools are incredibly proficient because they've been trained on an extensive knowledge base. These models can quickly generate content based on billions of web pages, books, articles, and other media.

## 3. Increasingly "Human"

Humans often, and increasingly, cannot distinguish AI-generated from human-generated content. AI detection software has proven unreliable. Even OpenAI scrapped its own detection platform due to poor performance.<sup>3</sup>

## 4. Accessible

GenAI tools are highly accessible. You only need an internet-connected device to use free tools like ChatGPT, Claude 3, and Perplexity.

## 5. Rapidly Adopted

In large part due to the factors listed above, genAI tools have quickly become ubiquitous, continuing the long-term trend of an increasing rate of adoption.<sup>4</sup>

Within five months of ChatGPT's release, 14% of U.S. adults surveyed by Pew Research Center had tried ChatGPT\*.<sup>5</sup>

## 6. Widely Applicable

Generative AI can be used in a diverse and growing range of tasks, roles, and modalities.

Image Creation



Coding



Translation



Video Production



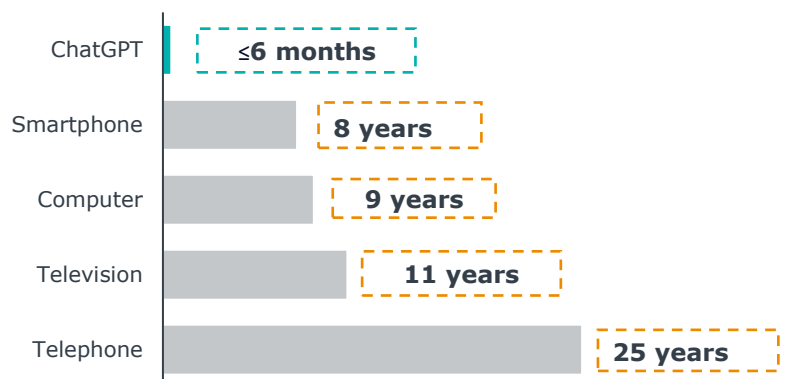
Design



Teacher prep



Time to 10% market penetration



\*This ChatGPT statistic provides a helpful proxy for how quickly the tech has spread to US households, even though it is not the same as the "market penetration" pictured for the other technologies.

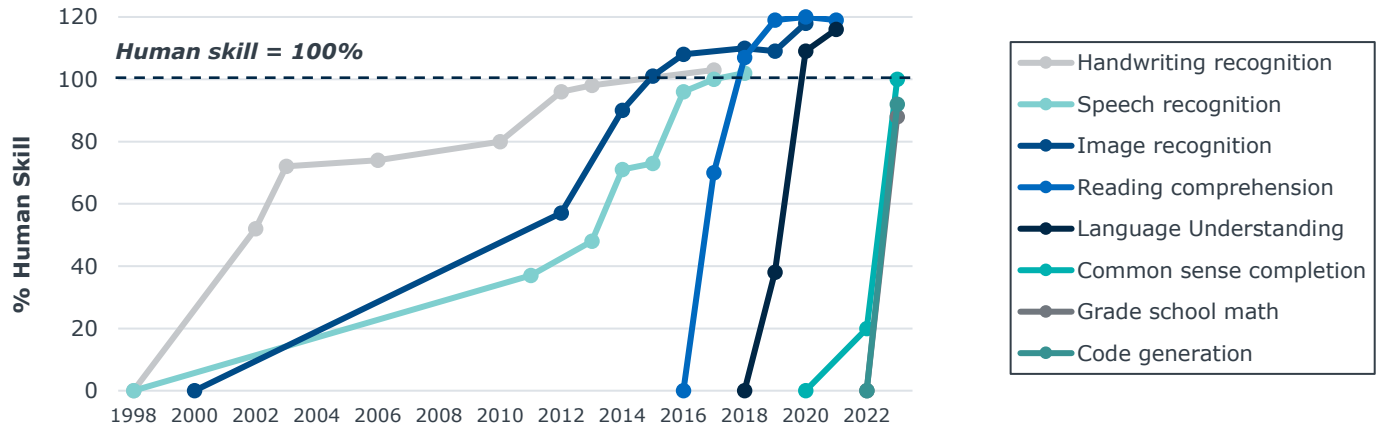
# Two Trends Shaping the Near Future of AI in K-12

Two recent and ongoing developments will likely make genAI apps more reliable and safer for educational settings.

## Trend 1: GenAI models are getting better.

One way to track genAI evolution is by looking at the benchmarks for “human-level performance” that genAI models meet. As the graph below shows, genAI is meeting and surpassing these benchmarks in a range of fields.

### GenAI models are meeting human-level performance benchmarks at a growing rate.<sup>6</sup>



For each benchmark pictured above, the maximally performing baseline reported in the original benchmark study is taken as the “starting point,” which is set at 0%. The human performance number is set at 100%.

Like standardized tests (a growing number of which GPT-4 can pass<sup>7</sup>), these benchmarks are designed to be approximations for comparison (e.g., they do not account for the ways users interact with AI and their outputs).

## Trend 2: GenAI apps are getting safer.

GenAI models may soon be safer for school districts to use. The development of enterprise genAI systems that both use and protect proprietary data promise to mitigate some of the risks district leaders are most worried about.

### Licensed Tools Are Less Risky Than Public AI Tools

	Public AI <i>Public access tools for individual users (e.g., ChatGPT)</i>	Business AI <i>Licensed use of genAI tools through vendor (e.g., Microsoft 365 Copilot)</i>
<b>Security</b>	No visibility into security protocols	Negotiated security agreements with vendors
<b>Privacy</b>	Inputted data trains model and may be shared, often by default	Inputted data not used to train public models
<b>Intellectual Property</b>	IP trains model and may be shared, by default	Vendor integrates guardrails to reduce likelihood of producing infringing content
<b>Bias</b>	Model exhibits bias compounded from inputted training data	Institutions and vendors fine-tune models to mitigate bias
<b>Inaccuracy/Hallucinations<sup>1</sup></b>	May generate inaccurate to hallucinatory responses	Institutional data provides context, producing more accurate responses

**AI Security Risk Mitigation is Similar to Other Tech**

- ▶ User education on safe data practices

- ▶ Vendor agreements and management

# Districts Must Respond, But Avoid Pitfalls Along the Way

## Districts – and society at large – cannot avoid AI...

Most AI researchers, developers, and other experts agree AI will have a major impact on all aspects of society, for better or worse. Emerging research finds genAI improving at tasks and arguably outperforming humans in fields typically seen as outside the realm of tech.

### AI Milestones in the Last 1-2 Years



Outperformed humans on (subjective) divergent thinking<sup>8</sup> and creativity<sup>9</sup> assessments



Solved “protein folding problem” by predicting structure of almost all known proteins<sup>10</sup>



Capable of completing software engineering tasks autonomously<sup>11</sup>

### AI Predictions in 5 Years

On average, 2,700+ AI researchers give a

## 50% chance

of AI systems achieving human-level performance on all tasks by 2028.<sup>12</sup>

- 68.3% of researchers thought good outcomes from superhuman AI are more likely than bad.
- Between 37.8% and 51.4% of respondents gave at least a 10% chance to advanced AI leading to outcomes as bad as human extinction

## ...but predictions about AI’s future impact on K-12 education vary widely.

Sal Khan, founder and CEO of Khan Academy (developer of the genAI-powered Khanmigo tutor bot), believes “we’re at the cusp of using AI for probably the biggest positive transformation that education has ever seen.”<sup>13</sup>

Dan Meyer, Director of Research at Amplify, offers a more sobering take: “AI will not transform education inside of the next five years, and I’d guess much longer.”<sup>14</sup>

**What everyone can agree on is that genAI is already here, and districts need to grapple with it.**

## There are three pitfalls districts need to avoid in their AI response.

1

### Launching large tech overhauls without significant systems change

Research shows that massive leaps in the technology used in schools historically have not caused major improvements in student learning, and in some cases tech dependence has hindered students’ development. Districts that implement new technology in schools without changing the adaptive components (e.g., teaching practices) will fail to achieve the positive potential of that tech.<sup>15</sup>

2

### Passively allowing unequal access and usage of tech across classrooms

In many cases, the development of powerful new technology has widened the divide between well- and poorly resourced students. As the National Educational Technology Plan recently summarized, historically marginalized students tend to experience edtech as passive users and rote memorizers, even when they have greater access to technology in school than their well-resourced peers.<sup>16</sup>

3

### Assuming tech evolution and district integration follow a predictable, linear progression.

Districts should not approach AI integration as a linear roadmap with one-and-done boxes to check. Given AI’s fast rate and unpredictable direction of development, districts should consistently reassess how AI is and should be used in schools, and iterate their points of view, guidelines, training, curricula, and pedagogy accordingly.

# General Criteria for Assessing GenAI Apps

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Existing edtech vetting processes are a starting point for evaluating genAI apps, but leaders should consider the five broad criteria below when assessing the unique attributes of genAI. Further, as with any technology, teaching stakeholders how to use genAI apps safely, ethically, and effectively is as important as choosing the right tool.

## Criteria to Consider When Assessing GenAI Apps<sup>17</sup>

### Transparency

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Vendors should be able to explain how their genAI models (or the genAI model their app runs on) work so that educators who use the apps can explain to students and families how the technology produces feedback, analysis, and other content. When assessing a genAI app, check if Stanford's [transparency index](#) has information on the genAI model that the app in question runs on. Many educational genAI apps run on a small number of genAI models, meaning the models' capabilities will greatly influence the apps in question. However, keep in mind many edtech apps are separately fine-tuned beyond the base genAI model to be better at specific tasks.

### Accuracy & Representation

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GenAI tools sometimes produce information that is false, incomplete, or misleading.<sup>18</sup> An educational app that exhibits these tendencies could harm students (e.g., cause them to internalize racial stereotypes) or hinder their learning (e.g., confuse them with the wrong answers to practice questions).<sup>19</sup> See Vectara's [Hallucination Leaderboard](#) to determine the accuracy of the genAI model that powers the app you are considering. Determining bias is less straightforward, but continually gathering feedback from a diverse range of stakeholders can help districts understand how different users are interacting with and being affected by the tech in question.

### Privacy & Security

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Many genAI developers train and improve their models with user input and data, presenting a significant risk of compromising student personal identifying information and running afoul of data privacy protection laws. Work with legal counsel, tech experts, and privacy consortia to determine an app's compliance with privacy laws (e.g., FERPA). Proactively request or require vendors notify the district when they add AI features or functions, including background solutions. Consider creating contract language that binds vendors to uniform data-sharing agreements across districts.<sup>20</sup>

### Purpose & Fit

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Like any edtech, genAI apps have greater potential to address some areas of practice more than others. District leaders should lead conversations with stakeholders around educational goals and needs rather than novel tech capabilities. Consult curriculum & instruction staff to determine if an AI tool meets an educational need. Identify existing resources (digital or non-digital) that serve the same purpose as the AI tool in question. Ask how the AI tool is better equipped to serve that purpose, if at all. Use tool-to-purpose compendiums to identify AI apps that could address an unmet need (e.g., Ditch That Textbook's "[30 AI tools for the classroom](#)").

### Age & Educational Appropriateness

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Many AI tools designed for education are created by individuals without educational backgrounds or are not intended for educational purposes. Apps that prioritize grabbing users' attention are likely to impede students' development and academic performance. Conversely, technology that empowers students to take control of their learning and integrates real-world experiences offers the greatest potential for enhancing learning outcomes.<sup>21</sup> With this in mind, avoid apps that use addictive or attention-grabbing features and ensure students receive developmentally appropriate AI literacy instruction (e.g., CSM's "[AI Literacy Lessons for Grades 6–12](#)," aiEDU's "[AI Snapshots](#)" for grades 7-12).





# 7 Critical Discussions for District Leadership Teams

## How Relevant District Stakeholders Are Responding to AI

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This section covers early attitudes and actions of the following institutions and stakeholder groups:

- Employers
- Colleges and universities
- Education technology companies
- Governmental and non-profit orgs
- Teachers
- Students
- Parents and guardians

The following sources informed this section:

- Results from public surveys of key stakeholders, favoring reliable sources disclosing rigorous methodologies
- 90+ private interviews with administrators, staff, and teachers from both the central office and building levels
- EAB's research on genAI in higher education
- Other public information (e.g., news, press releases, analyses, research)

# Employer Response to AI



**Employers are investing heavily in AI tech and talent, transforming the jobs students will hold in the near and far future.**

**Employers expect genAI to play a major role in their enterprise and are prioritizing hiring employees with AI competencies and skills.**

**75%** of companies plan to adopt AI or AI-adapted technologies across 2023-2028<sup>22</sup>

**73%** of employers say it's a high priority to hire AI talent, although 75% are having trouble doing so, Nov 2023<sup>23</sup>

**AI is creating more jobs than it is destroying, impacting students' career prospects.<sup>24</sup>**

**~2/3** of US occupations are exposed to some degree of automation, Aug 2023<sup>25</sup>

**30%** of hours currently worked in the US could be automated by 2030

## Diverse career outcomes arise as various jobs are...

...made redundant by AI



### Accelerated Losses

- Accounting clerks
- Customer service agents
- Data entry workers
- Media writers and journalists

### New Eliminations

- Administrative secretaries
- Budget/financial analysts
- Technical writers
- Coders

...transformed by AI



### Qualifications & Skills in 2023 Job Postings on Indeed.com

- **Graphic Designer:** "Familiarity with AI and ChatGPT"
- **Protein Sciences Research Scientist:** "Experience in AI protein design, SAR, or related biological applications"
- **Content Writer, Editor, and Researcher:** "Proficiency in prompting and navigating AI tools such as ChatGPT"

...created by AI



### Common AI Job Postings and Salary Information

- Head of Artificial Intelligence (\$200,000)
- Senior Creative Evangelist (\$200,000)
- Natural Language Processor (\$190,000)
- AI Consultant (\$100/hour)
- AI Prompt Engineering Creator (\$100/five prompts)

The two examples below<sup>26 27</sup> (and additional examples from PwC<sup>28</sup> and Dukaan<sup>29</sup>) show how companies are already using genAI to both enhance the work of their employees and automate roles.

## Morgan Stanley

- ▶ Morgan Stanley trained GPT-4 on 100,000 of its bank and research documents for its financial advisors (FAs).
- ▶ FAs can now ask the AI bot anything from general business queries to investment strategy recommendations.

## IBM

- ▶ CEO announced company plans to replace nearly 8,000 jobs with AI across the next five years.
- ▶ Starting with back-office functions, but could replace up to 30% of noncustomer-facing roles (e.g., finance, HR).

## Critical Questions for District Leaders:

- How do our Portrait of a Graduate knowledge, skills, and competencies align to AI's impact on the workforce?
- How are our career prep programs, including non-STEAM programs, teaching AI-responsive skills?
- How are we working with industry partners to understand AI's short-term impact on workforce needs?

# Higher Education Institutions' Response to AI



Higher education institutions' immediate concern is to upskill faculty and prepare students for the workforce, but some colleges are using proprietary genAI for a range of operations.

Institutions are making dedicated efforts to improve AI literacy and encourage AI-responsive teaching. Strategies range from piecemeal changes to complete overhaul.

In response to increasing genAI usage by students and lagging (but rising) adoption by faculty, many higher ed institutions took formal steps to educate students on safe, ethical, and effective use while training faculty to account for genAI in their teaching.

Examples of institutions integrating AI into teaching and learning:

## USF Added ChatGPT Session to Student Orientation



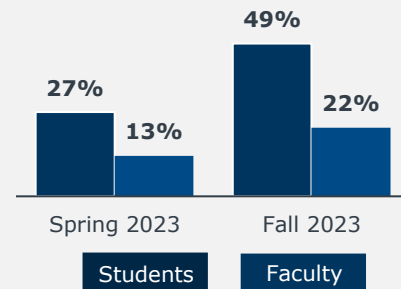
Created ChatGPT orientation session for incoming students, focused on pros, cons, & ethics of using AI for schoolwork<sup>30</sup>

## Auburn Offers Faculty AI Literacy Course



Auburn offers a hands-on "Teaching with AI" course; around 600 faculty have enrolled<sup>31</sup>

% who used genAI writing tools at least once per month<sup>32</sup>



## University of Florida AI Initiative Prioritizes AI Integration Across Pedagogy, Curriculum, Career Preparation, and Faculty Hiring<sup>33</sup>



- Hired 100 faculty with AI backgrounds, at least one per college.
- Offers 230 AI courses across disciplines and degree levels.
- Career center teaches students about the use of AI in the job recruitment process.

Colleges and universities are developing genAI solutions to advance strategic initiatives beyond teaching and learning, some of which started before Fall 2022.



### Student Support

The University of Michigan created a general AI assistant and personalized proprietary AI tool, used by 15K users for a range of support services.<sup>34</sup>



### Faculty Productivity

At the University of Surrey<sup>35</sup> and the University of Birmingham,<sup>36</sup> research projects turned into internally-developed AI-enabled grading and feedback tools.



### Research & Innovation

NVIDIA and the University of Florida Health's neural network, SynGatorTron, generates synthetic clinical data that mimics real populations without the risk or privacy concerns of human data.<sup>37</sup>

## Critical Questions for District Leaders:

- How are we preparing students to safely, ethically, and effectively use genAI applications that are increasingly ubiquitous in higher education?
- How could restricting and punishing student AI usage hinder their postsecondary success?

# EdTech Companies' Response to AI



**EdTech vendors are increasingly marketing and integrating genAI, making the tech increasingly hard for districts to avoid. However, financial and privacy barriers could hinder wider adoption.**

## Old and new players are racing to offer genAI to districts and individual users.

More than 280 edtech tools were incorporating genAI as a core engine of their product as of September 2023,<sup>38</sup> accompanied by a \$21 billion increase in investment in AI in the global education market by 2028 (entire edtech market is \$142B).<sup>39</sup>

### ▶ Market Leaders



[PowerSchool](#) announces integration with Azure OpenAI Services and AI assistant, Powerbuddy.



Google announces spate of new AI tools and features (e.g., [DuetAI](#), [Practice Sets](#)).

### ▶ New Faces



[MagicSchool's](#) 1.5M users can access 60+ tools. New AI users find the scaffolded format easier to use.



[Diffit](#) is popular for generating course materials in any format, scaling the reading level of assigned texts.

**Unanswered data privacy questions leave districts more hesitant to use both free and paid apps.**



- Parental permission required for students who are under 13 to use tools that collect student PII.<sup>40</sup>
- Some state laws (e.g., [SOPPA](#)) create stricter standards for data-sharing agreements, parental permission.
- National and state consortia (e.g., [CITE](#)) working to craft genAI-specific contract language.

## Some educational genAI tools are designed to automate or improve a range of educator tasks.

*Common Types of Educational GenAI Tools*

### Teacher Support & Content Creation

- For: generating exams and assignments, often customized to student needs and preferences
- E.g., [MagicSchool](#), [Diffit](#), [Curipod](#),

### Student Support & Personalized Learning

- For: studying and practicing content, mental health support
- E.g., [Khanmigo](#), [SchoolAI](#), [SchoolJoy](#), [MagicStudent](#)

### Research & Information Gathering

- For: building background content knowledge, summarizing research
- E.g., [StretchAI](#), [DWW](#), [ChatGPT](#)

## The cost of the most in-demand genAI tools are rising as district funding is dwindling.

Even if these costs are not exorbitant in themselves, leaders struggle to justify redirecting dollars from more pressing issues, like chronic absenteeism, student misbehavior, and unfinished learning.<sup>41</sup>

*"The features my teachers are really interested in are only available with the paid version."*

Tech Director, Midwestern School District

**\$7-10/student**

Estimated annual cost of district license for standalone educational genAI tools (e.g., [MagicSchool](#))<sup>42</sup>

**-\$1,000**

Average single-year reduction in per-student spending after ESSER funds run out<sup>43</sup>

### Critical Questions for District Leaders:

- Which genAI tools (if any) could address our existing priorities, and how will we evaluate impact over time?
- Should we allocate funding for these tools (or divert funding from existing budget lines)?
- How can we work with our legal council, tech experts, and consortia to ensure we are protecting students' data?

# Government & Non-Profit Response to AI



**Dept. of Ed has released one report on genAI while just eight states have produced any kind of AI guidance. Non-profits and industry groups have filled in the gap left open by state and federal governments.**

## ED has moved slowly on genAI and offered few actionable resources.

### Executive Order

- Gives ED roughly one year to develop more resources addressing non-discriminatory uses of AI<sup>44</sup>

### Education Department Report<sup>45</sup>

- Outlines strengths, weaknesses, opportunities risks of AI in education
- Provides broad recs for various stakeholders

### Toolkit Planned for Spring 2024<sup>46</sup>

- Aims to help schools implement recs outlined in report
- Will include recs for “designing AI systems to enhance trust and safety and align with privacy-related laws and regulations.”

## State guidance and support is largely vague and uncomprehensive despite early steps by a handful of states.<sup>47</sup>

Contents of guidance and resources released by seven states as of April 2024

State	AI 101/ Principles	Risks & opportunities	Actionable resources	List of AI tools
<a href="#">California</a>	Yes	Yes	No	No
<a href="#">Kentucky</a>	Yes	No	No	No
<a href="#">Ohio</a>	Yes	No	Yes	No
<a href="#">Oregon</a>	Yes	Yes	Yes	Yes
<a href="#">North Carolina</a>	Yes	Yes	Yes	No
<a href="#">Virginia</a>	Yes	No	No	No
<a href="#">Washington</a>	Yes	Yes	No	No
<a href="#">West Virginia</a>	Yes	Yes	Yes	Yes

## Many of the reports above reference or explicitly direct districts to national and state-level education organizations offering tailored guidance, expertise, and resources.

Resources and support offered by various bodies (not an exhaustive list)



- [AI Guidance for Schools Toolkit](#)



- [AI Readiness Checklist](#)
- [AI privacy guide](#)



- [Bringing AI to School](#)
- [Others](#) (incl. PD and guides for educators)



- [Resources on student impact](#) (e.g., tool reviews, AI literacy)



- [Teacher-focused resources](#)

### AI for Education

- [Distributable one-pagers](#)
- [AI literacy resources](#)
- [Implementation, strategy guidance](#)



- [Curricular integration, AI literacy resources](#)



- [AI integration & planning guidance](#)
- [PD for educators](#)
- [Others](#) (e.g., AI tools)



- [Blueprint for Understanding, Embracing, and Integrating AI](#)

## Critical Questions for District Leaders:

- If our state has produced laws or guidance, does our district strategy, policy, and guidance align with it?
- (Regardless of state guidance) Which educational industry group/non-profit offers resources most attuned to the gaps in our knowledge?

# How Teachers Are Thinking About & Using AI



**Teachers are increasingly using AI. While many are worried about cheating, teachers are more likely to say insufficient time and support prevent them understanding AI and teaching AI literacy to students.**

## A growing percentage of teachers are using genAI, especially for planning and preparation.

While exact estimates of teacher genAI usage vary widely, surveys typically indicate teacher AI use is growing. Among teachers who use AI, most do not yet use the tech for direct instruction to students.<sup>48</sup>

*Rising usage of genAI apps among teachers*



*Most common uses of genAI among teachers<sup>49</sup>*

- Lesson planning
- Creating assignments/assessments
- Differentiating instructional content
- Building content knowledge
- Administrative tasks

## Most teachers acknowledge the potential benefits of AI and agree students need to understand the new technology.

**35-pt**

margin between percentage of teachers who say “ChatGPT will likely have legitimate educational uses that we cannot ignore” (59%) vs. “ChatGPT will likely only be useful for students to cheat” (24%), Jun-Jul 2023<sup>50</sup>

**2/3**

of educators agree “students will need knowledge of AI because the technology already features so heavily in... their daily lives,” Nov-Dec 2023<sup>51</sup>

## Teachers—including current AI users—cite practical, pedagogical, philosophical, and technical concerns as main barriers to using AI for their job.

These barriers are not mutually exclusive (e.g., concerns about the bias of models can reinforce pedagogical concerns), nor do most teacher surveys distinguish between using AI in student-facing or purely teacher-facing ways.

*Primary barriers to teachers using AI in their jobs (student-facing and non-student-facing)<sup>52</sup>*



### Lacking time or access to use AI

Teachers are too preoccupied with other priorities to spend time learning about AI and/or they lack access to AI tools.



### Insufficient AI info and skills; unclear purpose of AI

Teachers cite a lack of AI training, guidance/policies, or general skills/knowledge. Many do not believe AI can support their instruction or are unsure how it can.



### Negative impact on teaching and learning, equity

Teachers fear AI’s impact on academic integrity, students’ development, and student-teacher relationships. They also worry about kids’ unequal access to AI.



### Technical limitations of AI models

Teachers identified flaws in the technology itself, such as the tendency to produce biased, inaccurate content.



### Broad philosophical and societal concerns

Teachers are concerned about AI’s role in society more broadly. Surveys don’t probe into what these concerns are, but one found this to be the main barrier to future AI use.

## Critical Questions for District Leaders:

- Which popular genAI uses will serve as the best gateway to teacher AI literacy?
- How will we help teachers adjust their lessons and instruction to account for AI?
- To what extent has teacher feedback and input informed our AI training, guidance, and support for teachers?

# How Students Are Thinking about & Using AI



**AI use is rising among (teen) students, but not often for cheating. A continued lack of guidance and access for students could widen the digital divide and lead to more unethical uses by students.**

## Student AI use is growing, but most students are not using the tech to cheat.

As with teachers, estimates of student AI use rates vary (e.g., Pew estimates that just 1 in 5 of the 68% of students who've heard of ChatGPT have used it for schoolwork<sup>53</sup>), but research indicates student AI use is increasing.

**↑ 27%**

Increase in percentage of 12–17-year-olds who've used ChatGPT for school, Feb to Jun 2023<sup>54</sup>

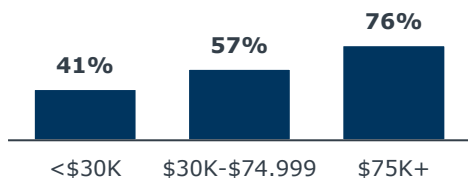


Stanford research found the **proportion of students who reported cheating in Fall 2023 was the same as in Fall 2022**, despite students having new access to genAI tools like ChatGPT.<sup>55</sup>

## Early research points to a widening digital divide, although it's unclear if due to access or motivation.

Two research studies, one by Pew and the other by ACT, offer contrasting narratives on AI access and usage. Pew's research reveals that students' awareness and usage of ChatGPT increase with their household income. Conversely, ACT's study indicates that students' ACT composite score is a statistically significant predictor of AI tool usage, while household income is not.

*Pew Research Center survey, percentage of teens who've heard of ChatGPT, by household income, Oct 2023<sup>56</sup>*



*Percent of high schoolers who've used AI tools, by ACT Composite Score<sup>57</sup>*



## Beyond academics, students are already using AI in their personal lives. A recent slew of deepfake incidents illustrates the potential for abuse by students.

**61%**

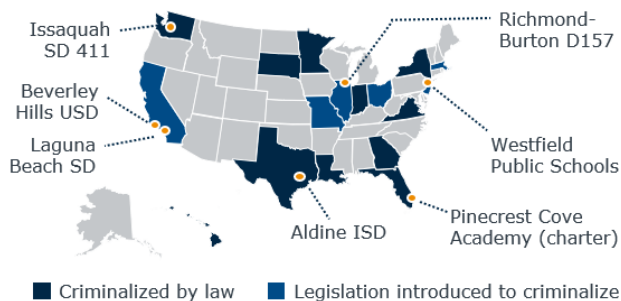


of high schoolers at one school district use Snapchat's AI features

**29%**

of 13-17-year-olds have used ChatGPT when they were bored<sup>58</sup>

*Reported Incidents of Students Creating Sexually Explicitly AI Deepfakes of Educators/Other Classmates, 2023-2024<sup>59</sup>*



## Critical Questions for District Leaders:

- How can we educate students on safe, ethical, and effective use? How does this differ by grade level?
- How will we ensure all students have equal access to genAI tools and learning experiences that account for AI?
- What harms are we allowing to accrue to students (e.g., privacy risks) by not providing AI literacy instruction?



# How Parents/Guardians Think About & Use AI



**Most parents and guardians lack experience with and information on genAI. Regardless, most want safeguards in schools to prevent misuse and express concern about AI's impact on kids' careers.**

## Most parents know little about genAI, much less how it's used in schools.

Parent/guardian experience with and knowledge of genAI, Oct 2023<sup>60</sup>

**43%**

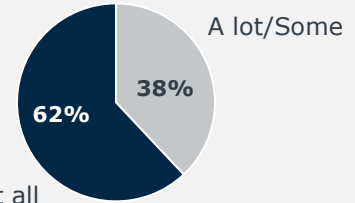
of parents have tried a genAI tool

**30%**

Have never heard of ChatGPT

How much have you heard about ways artificial intelligence tools could be used in K-12 public education?, Oct 2023<sup>61</sup>

A little/Nothing at all

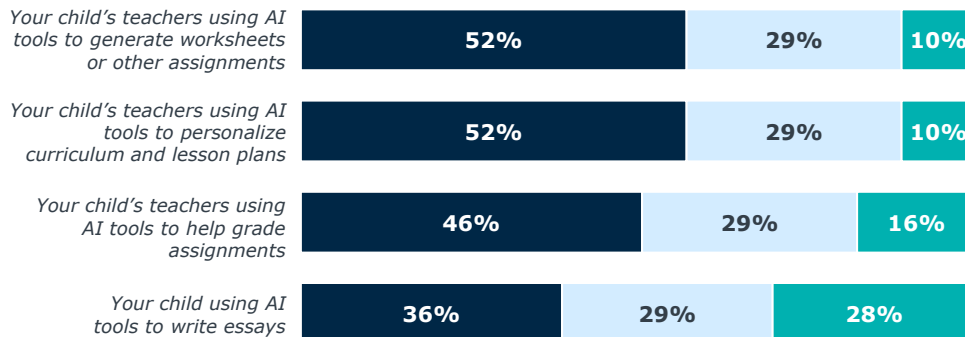


The attitudes below may stem from the lack of information pictured above. Regardless, parent concerns are real and are worth addressing in district and school communications with families.

## Amid fears about overreliance by students and teachers, parents/guardians favor guardrails and guidelines for AI in schools.

Please indicate what kind of effect you think each of the following would have on your child (Oct 2023)<sup>62</sup>

■ Somewhat/very positive    ■ Equally positive and negative    ■ Somewhat/very negative



Explicit fears create desire for guardrails<sup>63</sup>

**66%**

Express "major concern" about kids becoming too dependent on AI for school, May 2023

**51%**

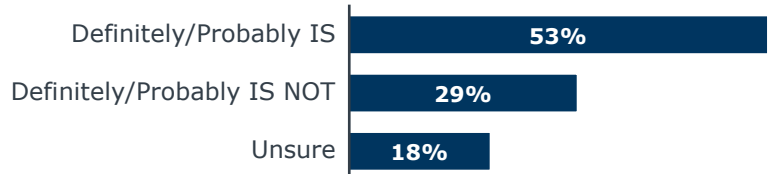
of parents think schools should limit the use of AI programs like ChatGPT until rules and safeguards can be put into place, May 2023

## Beyond immediate use in schools, parents/guardians are most concerned with AI's impact on their kids' careers.

**68%**

of parents worry about AI's impact on their child's career opportunities after high school, Oct 2023<sup>64</sup>

Do you think your child's school is preparing them to succeed in a future where AI technology could affect jobs and the global economy? (Oct 2023)<sup>65</sup>



### Critical Questions for District Leaders:

- How are we addressing parents' most salient concerns about AI, both how it's used in the classroom and how it will impact their children in the future?
- How can parents/guardians help us teach safe, ethical, and effective AI use by students?



# Glossary and Helpful Resources

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*Adopted from Center for Integrative Research in Computing and Learning Sciences' [Glossary of Artificial Intelligence Terms for Educators](#) and McKinsey & Company's [Glossary](#)*

1. **Artificial Intelligence (AI):** AI is a field of computer science where humans teach machines to do smart things like making decisions, finding patterns, and taking actions, using special rules and data.
2. **Data:** Data refers to pieces of information that AI systems use to learn and make smart decisions.
  - a. **Structured Data:** Structured data are information organized in tabular format (for example, organized in tables, databases, or spreadsheets) that can be used to train some machine learning models.
  - b. **Unstructured Data:** Unstructured data are information that lacks a consistent format or structure (for example, text, images, and audio files) and typically require more advanced techniques to extract insights.
  - c. **Training Data:** Training data is the information used to teach an AI system. It is essential to use diverse and unbiased data to avoid unfair decisions made by the AI.
3. **Algorithm:** Algorithms are sets of instructions that guide AI systems on what decisions to make. These instructions can be either created by humans or learned by the AI system itself.
  - a. Algorithmic: a series of 'if/then' rules, structured for a machine to follow.
  - b. Siri, Alexa, Google are often considered algorithmic because they are usually predictable and repetitive.
4. **Machine Learning (ML):** ML is a way for AI systems to learn from data without explicit programming. ML uses [algorithms](#) to identify patterns and build models for decision-making on their own based on historical data.
5. **Neural Networks (NN):** Neural networks are modeled on how human biological brains work. Rather than being given a set of explicit rules, these systems are 'taught' by looking at the patterns in relationships between things, processing information in layers to solve problems.
  - a. ChatGPT is a neural network as it requires large data sets and massive amounts of training on the data.
6. **Deep Learning:** Deep learning is a more advanced form of [neural networks](#), helping AI systems understand complex patterns by using multiple layers. They are widely used in image and speech recognition tasks.
7. **Transformer models:** Transformer models are a type of [neural network](#) used in language modeling. They have the capability to process sequential data. Transformers utilize a [self-attention mechanism](#), which enables them to focus on relevant parts of the input and output sequences. This attention mechanism allows the model to weigh the importance of different elements within the sequence, leading to better contextual understanding and more accurate predictions.
  - a. For example, the ChatGPT-3 model uses transformers to understand the context of a sentence.
  - b. **Self-Attention Mechanisms:** They determine the important aspects of input. The inputs are inspired by how humans can direct their attention to important features in the world, understand ambiguity, and encode information.

## Glossary and Helpful Resources (cont.)

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- 8. Foundation Models (FM):** FM are [deep learning models](#) trained on quantities of training/unstructured data that can be used for a wide range of tasks out of the box or adapted to specific tasks through fine-tuning. Examples of these models are GPT-4, PaLM, DALL·E 2, and Stable Diffusion.
  - a. Natural Language Processing (NLP):** NLP is a way for computers to understand human language, which enables them to do things like converting speech to text or correcting grammar mistakes.
  - b. Large Language Models (LLMs):** Large language models (LLMs) - a type of [foundation model](#) - can process massive amounts of unstructured text and learn the relationships between words or portions of words. LLMs can generate natural language text, performing tasks such as summarization or knowledge extraction. GPT-4 (which underlies ChatGPT) is an example of a LLM.
- 9. Generative AI (GAI):** GAI is AI that is typically built using [foundation models](#) and has capabilities that earlier AI did not have, such as the ability to generate new content in various forms of audio, code, images, text, simulations, and videos.
- 10. Chat-based generative pre-trained transformer (ChatGPT):** ChatGPT is an AI system based on a [neural network transformer model](#), designed for natural language processing tasks. It can generate responses to questions because it has been trained on lots of information from the internet to give helpful responses to questions (In other words, it is pre-trained on a large amount of web text to process sentences effectively).
- 11. Multimodal Models:** Multimodal Models generate AI content in multiple modalities (e.g., text, graphics, audio, video). These models are trained by data in various formats and learn to combine information from different sources to produce one output.
- 12. Prompt Engineering:** Prompt Engineering is an essential process that involves designing, refining, and optimizing input prompts to guide a generative AI model towards producing desired and accurate outputs.

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