WHAT YOUR COLLEAGUES ARE SAYING . . .

"Enter the world of artificial intelligence through this playbook! We know the importance of clarity, feedback, and high-quality assessments on our students' learning, but planning for each of these can be time consuming. Use this playbook as a guide to learn practical ways AI can enhance your productivity as an educator so you can spend less time preparing and more time teaching and supporting your students."

—Alisa Barrett, Director of Instruction

"*The Artificial Intelligence Playbook* is topical, practical, and should serve as an important go-to introductory text on the subject of AI in preK–12 education."

—Carol S. Holzberg, Educational Technology Consultant and Technology Administrator

"*The Artificial Intelligence Playbook* addresses a much-needed gap in professional development. As educators become more aware of the potential impact of AI in education, there is worry that will be misused. Artificial intelligence is here to stay, and educators need to accept that and adapt. This book does an excellent job of making that transition painless—and even enjoyable. Who knew that AI could be used to take some of the burden off educators (planning, differentiating, teaching, assessing, etc.) while making learning more engaging and personalized for students?"

—Ruthanne Munger, Writing Specialist

"*The Artificial Intelligence Playbook* is a pivotal text that has come to us right during the time when it is most needed. Tackling the subject of AI in the classroom, this book gives us the solutions to what is currently affecting those of us in K–12 and higher education. A perfect guide to pedagogical and personal advancement!"

—Darius Phelps, Assistant Director of Programs

"This book will give you the confidence you need to go forth and explore AI tools to enhance the instructional practices you already find most effective with your students. It is not just a book of ideas; it provides a foundation of research and pedagogy and shows how AI tools can build on that foundation."

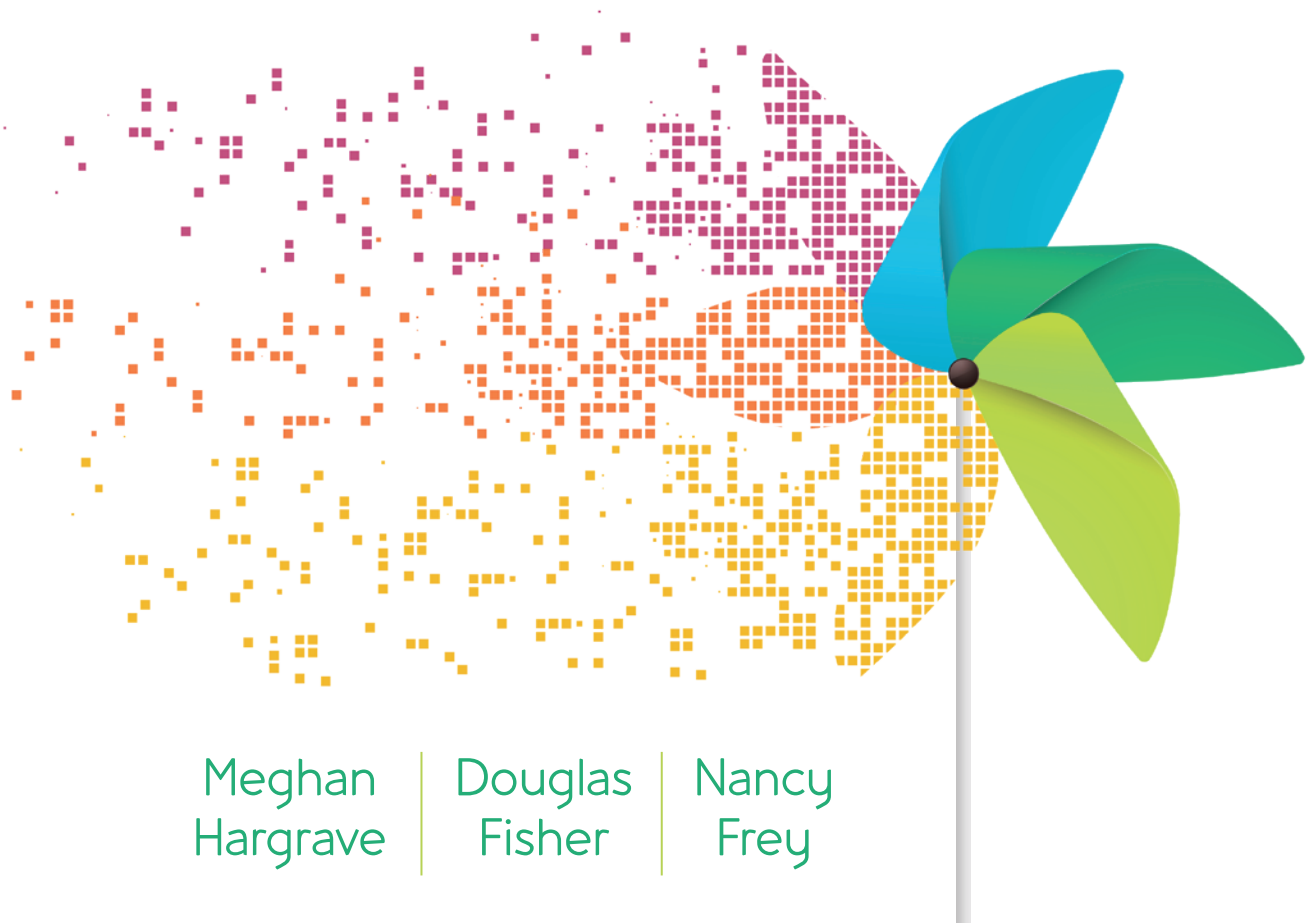**—Brett Vogelsinger**, English Teacher

the Artificial Intelligence

Intelligence

playbook second edition

second edition

Thoroughly expanded and updated for 2025!

the Artificial Intelligence playbook

Time-Saving Tools for Teachers that Make Learning More Engaging

Meghan Hargrave | Douglas Fisher | Nancy Frey

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This book is printed on acid-free paper.

CONTENTS

online resources

Visit the companion website at
https://companion.corwin.com/courses/The_AI_Playbook2e
for downloadable resources.

ACKNOWLEDGMENTS

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INTRODUCTION

The Road Ahead: Navigating AI in Education

For many educators, the new technology came as an unwelcome surprise, particularly for those teachers who were suddenly asked to use it. Many teachers complained about the added work the new technology created for them, and some students refused to comply with the new rules established for it. In fact, the new technology sparked a rebellion of sorts. Some students walked out over the policies. Some students were expelled over it. Yes, in 1830, *when chalkboards were introduced at Yale University,* it was a bumpy road to implementation (Green, 2015). A young man named Alfred Stillé, who eventually went on to become a president of the American Medical Association, was just one of the students expelled from Yale because of this rebellion, and there were certainly many others.

Similarly, when television was introduced into the classroom, educators and family members expressed concern. Some even called it the "electronic chalkboard" or "a numbing substitute for real teaching" (Blubaugh, 1999). The controversy was exacerbated with the introduction of Channel One, a news program that included advertising targeted at youth. In fact, 20 percent of the broadcasting time was spent on ads. Although Channel One was banned in many states, the reach was significant, with millions of students watching daily. Our point here is that technology that exists in society will permeate schools, and we must learn how to use the tools effectively.

A NEW EDITION ALREADY?

The publication of a second edition of this book in such a short time is a testament to the breathtaking pace at which generative artificial intelligence (AI) is evolving and reshaping education. When the first edition was released in early 2024, many educators were just beginning to explore AI's potential in their classrooms. Since then, advancements in generative AI and its applications in education have progressed faster than anyone could have anticipated, introducing new tools, updated platforms, possible uses, and ethical questions at an unprecedented rate. What once seemed futuristic now feels urgent, and the need for educators to adapt and guide their students in this rapidly shifting landscape has never been more critical.

This expanded second edition reflects the transformative changes that have emerged since the first publication, offering updated strategies, insights, and examples that account for the latest developments in AI technology. It also recognizes the growing importance of AI literacy—not just as a specialized skill but also as a core component of modern education. As the role of AI expands across industries, preparing students to engage with it thoughtfully, critically, and responsibly has become an essential function of teaching. We are reminded of the words of Andreas Schleicher (2018), director of education for the Organisation for Economic Co-operation and Development (OECD): "We must educate students for their future, not our past." In these pages, educators will find the tools they need to embrace this challenge, not only to stay current but also to lead the way in shaping how AI supports and enhances learning in their classrooms.

EDUCATION CONTINUES TO EVOLVE

It is important to note that for many teachers, the topic of AI and the pending changes can feel scary. As familiarity and comfort with classroom tools and routines decrease, anxiety increases. It is natural to mourn some of the aspects of the past that have been replaced. When we ask educators to talk about *what was* versus *what is*, they often identify some of the following changes:

What Was	What Is
Cursive skills	Print and typing skills
Long-division algorithm	Ability to explain math reasoning
Knowing to indent when paragraphing	Proficient with computer editing tools
Familiarity with Shakespeare	Understanding of author's craft and purpose (what authors seek to accomplish and techniques used)
Name and date a page	Submit assignments on a learning management system and independently navigate many digital assessment platforms

That's not to say that traditional skills like handwriting and cursive should be eliminated or that students should not know Shakespeare. It's just that given the technology that exists and the society in which we all live, some of those skills we may have enjoyed teaching in the past have evolved into other competences.

As students begin to use AI systems more and more frequently, they will still need to think about the information generated. In fact, critical-thinking skills will become increasingly valued as students receive an increasing number of synthetic texts generated by AI systems. Learning will continue to require core competencies such as analysis, inferencing, verbal reasoning, and problem-solving, but these skills might be applied in new ways and different contexts. Students who face challenges with these important critical reading skills will find themselves at an increased disadvantage as generative AI produces content that requires close reading and analysis. Writing original texts will also be highly valued. In fact, skills for writing prompts for the AI systems, which we will address in Module 2, are already being taught in schools.

✎ **Stop and Jot**

Reflecting on Transformative Technology

What other types of technology have been introduced into schools, and how have they been received?

_____

_____

_____

Each innovation in technology requires careful consideration for educators. But, like chalkboards and TV, many popular technological innovations either will be here to stay or will impact what comes down the road. For example, the iPod is no longer widely used, but modern smartphones have the same features it offered and much more. The challenges associated with advancing technologies reminds us of the technology acceptance model (Venkatesh & Davis, 1996; see Figure i.1), which suggests there are a range of external variables—including quality of content, utility, price, and design features—which then impact decisions about technology adoption and use. In education, external variables also include the need for new or better instructional strategies and student needs that are not currently being met.

Figure i.1 • Technology Acceptance Model
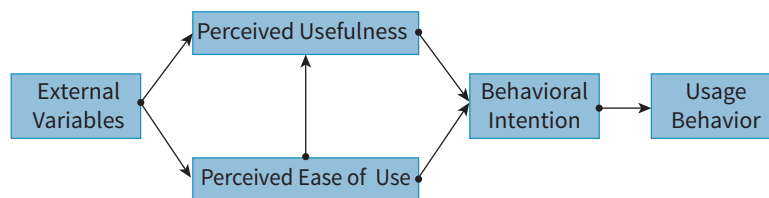
Source: Adapted from Venkatesh & Davis (1996).

The eventual adoption of the technology, whether it be chalkboards, TV, or the internet, is influenced by perceived usefulness and ease of use. In other words, users ask questions like the following:

- Does it meet a need that I currently have (usefulness)?

- Can I easily learn how to use it (ease of use)?

- Is there a reason I must use it (required use)?

These variables impact the user's intention, which means the user forms a desire to incorporate the technology because the perception is positive. Our goal in this playbook is to show you not only how to use artificial intelligence, but also how it can meet your instructional needs in positive and productive ways.

THE INTRODUCTION OF GENERATIVE AI

On November 30, 2022, ChatGPT, the most widely known and used public artificial intelligence chatbot, was launched. It wasn't meant to be made public so quickly, but social media heard about it, and the rest is history (Marr, 2023). At first, many regarded ChatGPT as a playful online tool for exploration. However, within months, the buzz about its potential to significantly impact the world became apparent. This development presented an undeniable opportunity (and need) to reshape the landscape of education.

With the overwhelming pressure for educators to manage a growing list of responsibilities—and the stress that comes from these demands—change is imperative. Whether teachers are struggling with time constraints, job requirements, lack of materials, uncertainty about what to use and when, or the impossibility of being an expert in everything, educators face common challenges—and AI is a promising solution. Its ever-growing capabilities and user-friendly interfaces are now making it even easier for teachers and students to learn and grow. AI sites have shown great potential, with impressive performance in generating coherent, systematic, and informative content for those who learn to use it effectively (Lo, 2023).

At the start of the 2023–2024 school year, after realizing what generative AI possibly had to offer, we started exploring some of the tasks this technology might be able to assist with. Together, with several groups of teachers, we quickly saw possibility. Here are some examples of tasks we used AI to assist with in those early days:

- Adjust mentor texts to topics relevant to students

- Generate lists of words and decodable sentences for foundational skills practice

- Help synthesize student responses into an exemplar essay

- Craft parent communication for conferences

- Generate some games to get eighth graders engaged in math fluency practice

Though not perfect, AI platforms quickly responded to requests (prompts) and generated content that days before would have taken hours to complete. These examples barely scratch the surface of what AI can offer. Nonetheless, the effective management and execution of these tasks left us, and continue to leave us, in awe.

Ask A Bot

Discussing the Potential of AI in Education

Generative artificial intelligence tools are designed to facilitate conversational interactions, allowing users to engage dynamically based on the human user's input. With that in mind, in this section, we encourage you to have a conversation reflecting on your thoughts thus far using the steps below.

Step 1: Visit www.chatgpt.com or another AI platform you are familiar with.

Step 2: Log in, start a chat, and share your initial thoughts or pose questions about the current role of AI in education and its future possibilities. Consider using some of the following prompts:

- How can using AI promote critical thinking?

- How does the integration of AI compare with the adoption of other technological advances?

- What implications does generative AI have for teaching and learning?

- I just read [insert text here]; can you help me understand what this means?

Step 3: Review the generated responses and reply as you would in a conversation with a colleague or another human. You might use one of the following prompts:

- What does this mean for someone who teaches [insert subject or grade]?

- I'm not sure about [insert idea], what else should I be considering about this?

- Can you provide examples of [insert topic]?

- What other considerations should we take into account?

Step 4: Reflect on the responses provided, any new insights, or the experience of engaging in this conversational style.

Of course, discerning between effective and less effective ways for teachers and students to use this technology is essential. The premise of this expanded second edition is to support educators in the adoption and use of AI by offering practical and impactful strategies for making it a valuable tool in the classroom. Our goal is simple: By engaging in the various modules and interactive components, you will explore the possibilities of AI and get practical ideas on how to use it immediately in your classroom and the classrooms you support.

McKinsey & Company (2020) surveyed more than two thousand teachers in four countries to find out how educators spend their time. As is evidenced in Figure i.2, teachers spend a lot of time preparing for lessons, engaging in evaluation and feedback, performing assessments, and completing professional development. On average, according to this data, more than half of the time, teachers are not directly interacting with students. We used this data to help decide what teaching functions to focus on in the modules that follow. Exploring how AI can assist with these time consuming tasks is the goal.

Figure i.2 • 50 Average Hours of Working Time per Week for a Teacher

Only 49% of time is in direct interaction with students.
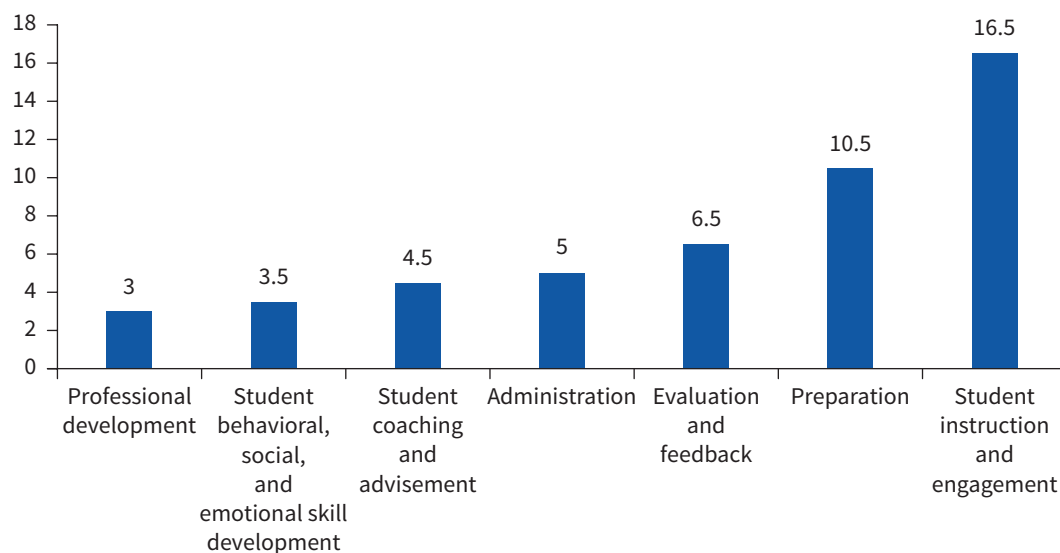
Source: Adapted from Bryant et al. (2020).

ORGANIZATION OF THE EXPANDED SECOND EDITION

This playbook is designed for educators, with the specific intention of lightening the load. In this spirit, we invite you to consider AI as a virtual teaching assistant that can provide helpful support. We hope that the tools in this playbook provide teachers with more opportunities to directly interact with learners, which not only is the reward of teaching but also is irreplaceable by a computer.

To accomplish our goal of increasing the amount of time you can spend with your students by using AI to accomplish other time-consuming tasks, we have organized this playbook into specific modules that align with the major functions that teachers must accomplish each day like those in Figure i.2.

- Module 1 provides an overview of AI in K–12 education, including updated research studies on its usage, the many types of AI platforms and their uses, and a deep dive into the important terms to know.

- Module 2, which is new to this edition, focuses on the skill of prompt writing. This section is fully dedicated to helping readers learn what to include in prompts, how to engage in follow-up prompting, and important ways to analyze output and prompt accordingly.

- Module 3 focuses on the responsible use of generative artificial intelligence. This section will help build an understanding of when to trust AI, highlight considerations for its use, and address ethical challenges such as plagiarism and citation that confront educators and policymakers.

- Module 4 shifts the focus from the logistics of AI to exploring specific teaching functions this technology can assist with. This section is dedicated to looking closely at how AI can help manage content, whether it's unit planning, unpacking standards, or sorting student data.

- Module 5 addresses another important function of a K–12 teacher's day: engaging all learners. This section offers tools for increasing relevance and motivation, and ideas for using AI to create and modify learning experiences.

- Module 6 explores how teachers can use AI to meet the instructional needs of students. It focuses on differentiating experiences without lowering expectations, designing inclusive lessons, and introducing specific AI tools to support diverse learning needs.

- Module 7 is dedicated to developing and providing useful and effective feedback for all learners using AI and gives responsible and practical ways the technology can assist with this time consuming, but important, teaching function.

- Module 8 is fully dedicated to assessment—whether it's creating assessments, adjusting them to be AI resistant, or exploring new ways to assess learning. This section dives into how AI can assist in this area.

- Module 9 is a completely new section for this edition. It explores the critical task of preparing students for an AI-powered future, offering practical ways to engage students in experiences that prepare them for effective and responsible AI use, both now and in the future.

- Module 10 addresses the final teaching function: lifelong learning. This section is dedicated to ways AI can provide teacher feedback, help build content knowledge for new topics, and offer insights into using this technology as a thought partner for one's own learning.

Like other Fisher and Frey playbooks, *The Artificial Intelligence Playbook, Second Edition*, is designed to guide readers through an interactive experience by putting ideas into practice while reading. With that goal in mind, we have crafted a series of features, mostly repeated in each part of the playbook, that deepen engagement and understanding. The following chart provides more information on each feature.

Feature	Purpose
Ask a Bot	The Ask a Bot sections provide questions and prompts that guide users through a chatbot conversation related to the content. These sections also allow users to experience the power of using AI as a productive thought partner.
Stop and Jot	The Stop and Jot sections ask readers to think and reflect on a guiding question or prompt. Use these reflective opportunities to pause and process while learning about the many ways AI can assist teaching and learning.
Task Takeover	The Task Takeover is a way for educators to consider how AI can work for them and imagine ways the technology can take over tasks specifically related to the content of the module.
Try It Out	In the Try It Out portions of the playbook, we provide users with step-by-step directions to walk through a focused learning experience. These sections are an opportunity to put learning into practice.
Self-Assessment	Each module offers a Self-Assessment specific to one aspect of the content presented. It is an opportunity for readers to quantify where they are and where they are going through a self-assessment scale.
Classroom Connection	The Classroom Connection section is dedicated to helping teachers think through AI usage with students. These sections will offer a glimpse into a topic that is further developed in Module 9.
Check Your Understanding	Each module ends with a Check Your Understanding review. This feature is not only a way to look back on the big ideas of the section, but also a model for a type of AI-generated assessment (all created with the assistance of various AI tools).

We generated these modules, and the interactive features, from the questions we have been asked by thousands of educators about the potential of AI for teaching and learning. Importantly, while AI has the potential to reduce the workload, it is not replacing teachers, which is why throughout the book we stress responsible use, give strategies for effective output analysis, and continuously stress keeping the human in the loop. The growth-producing and caring dynamic between teachers and students remains central to the work we do. It's our *why*. But as you will see in the pages that follow, AI can help with the *how*.

Module
1

Getting to Know Generative Artificial Intelligence

Learning any new technology often comes with some initial challenges, and getting started with artificial intelligence is no different. While the learning curve may appear steep, and the tools may seem intimidating at first, we have found that exploring these platforms with educators has brought a sense of excitement and newfound energy to those who jump in and try it out. The technology is ever-changing, and its capabilities seem limitless—which means that no manual or set of directions will beat exploring and discovering on your own. Whether you have already explored and used various AI platforms or you are in the early stages, this section is intended to get you thinking about where you are at and where you might be going.

✎ Stop and Jot

Reflecting on Your AI Experience

Where are you in the AI journey?

_____

_____

_____

(Continued)

9

(Continued)

How new is AI to you?

①······**②**······**③**······**④**······**⑤**······**⑥**······**⑦**······**⑧**······**⑨**······**⑩**

1 (completely new)   10 (not new at all)

What aspects of AI's potential for assisting educators intrigues you the most?

_____

_____

_____

What concerns or reservations do you have regarding the use of AI in supporting educators?

_____

_____

_____

BOOMERS AND DOOMERS

Since the introduction of generative artificial intelligence to the public in late 2022, there have been—and will continue to be—mixed feelings among educators, school leaders, caregivers, students, and the public. One article in *The Economist* (2023) discussed this divide as a two-sided debate between the AI "doomers" and "boomers." The doomers focus primarily on the risks associated with this technology, while the boomers represent a more progressive camp who are ready to "turbocharge progress." Despite their opposing views, these groups share notable similarities.

Both boomers and doomers are deeply invested in AI, perceiving it as a pivotal force shaping the future. Their intense focus on AI's trajectory leads to internal debates within each camp. However, from an external perspective, they can appear as two branches of the same community: individuals convinced that AI is the most critical issue of our time (Metz, 2024). This shared conviction underscores a commonality:

Both groups attribute significant importance to AI's development and its implications for humanity. Their passionate engagement, whether optimistic or pessimistic, highlights a mutual recognition of AI's transformative potential.

Similarly, we've noticed that the attitudes of educators toward this technology are not one way or the other, and they vary depending on its intended user and purpose. For example, some educators respond differently to student versus teacher use of AI, and they evolve when introduced to new capabilities and tools. One helpful stance, and one we've embraced, are the principles proposed by Wharton professor Ethan Mollick (2024), whose commonsense approach to AI is practical, hopeful, and judicious:

> Principle 1: *Always invite AI to the table.* No one says it has to stay. You can send it away when it doesn't work for you but might be surprised by what it has to offer.

> Principle 2: *Be the human in the loop.* Accuracy, ethical use, and bias are always the responsibility of the user. Be a good human.

> Principle 3: *Treat AI like a person (but tell it what kind of person it is).* Be specific about the stance you want the chatbot to assume so that you can improve the likelihood you'll get what you want.

> Principle 4: *Assume this is the worst AI you will ever use.* The promulgation and evolution of AI is taking place at breathtaking speed. Today's flaws are likely to lead to improvements in the future.

As you move through this playbook, regardless of where you currently stand in implementation, we encourage you to embrace a think-outside-the-box mentality. Acknowledge any self-imposed roadblocks, and do not let them get in the way of growth and learning.

AI IN EDUCATION

The U.S. Department of Education's Office of Educational Technology notes that educators at every level need to be involved in the evolution of AI in schools. Their suggested goal is to "create a vision of a desirable and achievable educational system that leverages automation while protecting and centering human agency" (U.S. Department of Education, 2023). Without question, as they note, there is an ongoing need for "necessary guidelines and guardrails" to bring this vision to a reality. These guardrails and guidelines are represented pictorially in Figure 1.1. As you remain open to continued learning, you can leverage this technology for positive change and stay at the forefront of innovation.

Figure 1.1 • Recommendation for Desired Qualities of AI Tools and Systems in Education
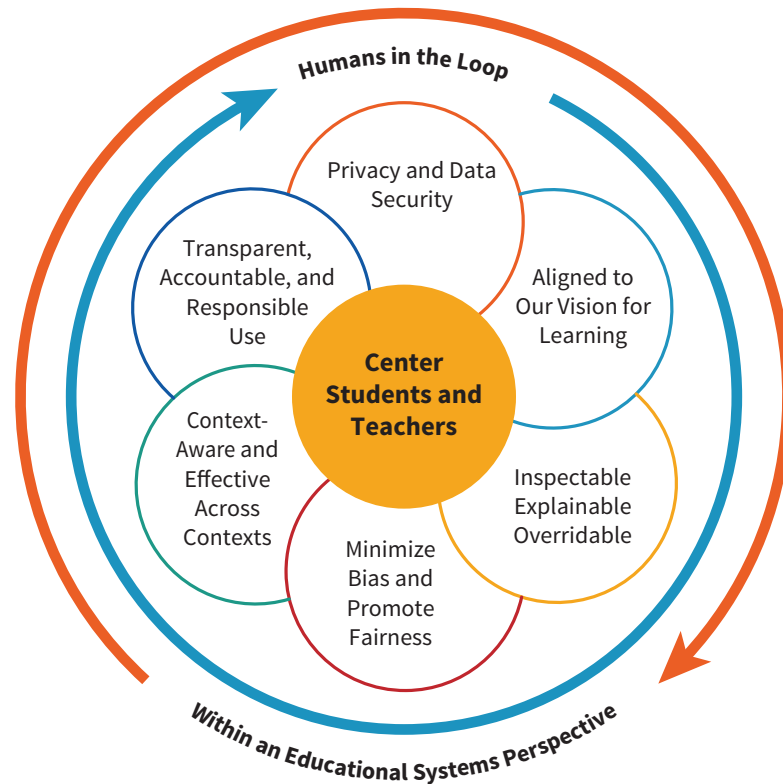
Source: U.S. Department of Education, Office of Educational Technology (2023).

Task Takeover

Exploring Possibilities

Start to imagine some of the ways AI can work for you. First, take a few moments to think of some of the tasks that are a regular part of your teaching day—anything from taking attendance to grading work and all that falls between. After landing on one task, use the following steps to explore the possibilities by engaging in a conversation with a chatbot about how AI can assist with that task in productive and innovative ways.

Step 1: Decide on a task that you currently do without AI assistance.

Step 2: Sign into www.chatgpt.com or another familiar AI platform.

Step 3: Enter a prompt, a user request, similar to this:

> I am a [position] who works with [describe students' age, subject area, etc.]. One of the tasks that is part of my regular job is [name the task], and I am wondering how generative AI can assist. List some ideas for how AI can lighten the load of this task. Ask if there are any questions or if additional information would be helpful.

Note: We have found that including a sentence like the last one in the prompt can lead to helpful follow-up questions that ultimately result in a more thorough response.

Step 4: Read the generated response. Then, use prompts like the following to engage with the chatbot in a back-and-forth discussion about the suggestions.

- Say more about _____.

- I am not sure what you mean by _____. Please explain.

- The idea _____ is interesting, but I am wondering about _____.

- This is a good idea, but it won't work because _____. Is there anything similar that would assist me with this task?

- If AI can't help with the full task, could it help with a smaller portion of it?

As you read through some of the suggestions, you will probably find that only some work for your scenario. The ones that don't might not take into consideration your circumstances, and some might be ideas you've tried in the past that have or haven't worked. Even though only some of the responses might be useful, we find that the AI-assisted thinking in situations like this often leads educators to more creative solutions they can explore. If the task you decided to discuss isn't leading to desired results, try another task, and see what happens.

AI ISN'T AS NEW AS YOU MIGHT THINK

Understanding AI and its progression helps shed light on its capabilities and how it has developed over the decades. Although the conversation around artificial intelligence may seem focused on a new technology, it has actually been around for nearly seventy years. One of the first examples being in 1952 when Arthur Samuel created a self-learning checkers-playing program. Since then, there have been plenty of examples of others using technology in this way, and like many innovations, as people have created and used it, AI has evolved to the sophistication we see today (as shown in Figure 1.2).

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Figure 1.2 • AI for Education's Generative AI Explainer

Defining Generative AI

To understand generative artificial intelligence (GenAI), we first need to understand how the technology builds from each of the AI subcategories listed below.

Artificial Intelligence

The theory and methods to build machines that think and act like humans.

Expert System AI

Programmers teach AI exactly how to solve specific problems by providing precise instructions and steps.

Machine Learning

The ability for computers to learn from experience or data without human programming.

Deep Learning

Mimics the human brain using artificial neural networks such as **transformers** to allow computers to perform complex tasks.

Generative AI

Generates new text, audio, images, video, or code based on content it has been **pre-trained** on.

ChatGPT *Midjourney* *Bard*

AI for Education

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aiforeducation.io

Source: AI for Education, 2024. www.aiforeducation.io/ai-resources/generative-ai-explainer

Artificial intelligence is defined as a machine's ability to perform tasks in human-like ways, and many of us have been interacting with AI for a long time, maybe without even realizing it (McKinsey & Company, 2024). For many, their first interaction with AI started with the use of the smartphone and communication apps like Siri and Alexa. AI also powers customer service bots, the many navigation tools that get you from here to there, and the autocorrect features on a phone that streamline communication.

Machine learning, the next layer of AI sophistication, is a term used to show how these technologies evolved by being able to not only perform in human-like ways, but also accurately identify patterns to tackle more nuanced tasks. Machine learning examples include specific recommendations on streaming services based on watch patterns, or notifications that are based on user patterns like hearing from a bank when a purchase is made that doesn't follow typical patterns. *Deep learning*, the next layer, describes technology that acts in human-like ways, notices patterns, and interacts with multiple intelligences. This led to innovations such as smartphones finding pictures and making albums based on facial recognition, the start of self-driving cars, and other tools like being able to board a plane with the touch of a finger or scan of the face in place of a physical ID.

This progression has led us to where we are today, the smallest subset of artificial intelligence, *generative AI*. Though many are referring to this technology as AI, and we will do the same throughout the playbook, what they are really responding to is the introduction of generative artificial intelligence. The ability for technology to act in human-like ways, recognize and apply patterns, respond to multiple intelligences, and use all of this to generate responses based on a user's request or prompt. Users have discovered that this most sophisticated level of AI can respond to almost any request and respond with largely accurate and helpful responses. Whether it is to write a poem about a friend, draft an email to a colleague, or create a song to help teach vowels and consonants to a group of first graders, this most recent layer of sophistication has created more of a buzz than any other the previous layers shown in Figure 1.2 because of its potential. Throughout the rest of this playbook, we will explore this type of generative AI in more detail to show how educators can understand and effectively employ it in meaningful ways.

GETTING TO KNOW ARTIFICIAL INTELLIGENCE PLATFORMS

Some of the most popular generative AI platforms are not specific to education, but they can still help with teacher tasks when given the right prompts. These platforms, referred to as large language models (LLMs), have access to a deep well of data (far exceeding the internet itself) to engage in and respond to user input. Though there is almost no limit to what they can offer, they require the user to practice a certain level of thinking, creativity, and prompt generation in order for the information produced to be relevant and effective.

Other platforms are designed for a specific purpose or user. These platforms offer a variety of features, usually called *tools,* that guide users to input certain information needed for the resource the sites will create. Knowing what you want to use AI for,

what you want to generate, and who you want to generate it for can help guide the platforms you will want to use and explore.

Self-Assessment

Potential Uses of AI

Use this scaled reflection to identify some of the areas you most want to strengthen with the use of AI. You can keep this in mind when deciding what platforms will be most helpful in the sections that follow. (The self-assessment feature will always include this scaled model, red = low, yellow = medium, and green = high.)

Menu of Potential Uses of AI
What areas do you want to strengthen with the use of AI?
Writing grade-level examples
Planning lessons and units
Providing timely feedback
Translating texts and directions
Creating math word problems and rich math tasks
Adding visuals to text
Making lessons into games
Changing readability levels

The most popular generative AI platforms, such as Gemini, ChatGPT, and Claude, respond to a wide range of prompts. As we have noted, while these platforms can generate diverse content, they require users to possess a certain level of skill in crafting effective prompts. This open-ended nature, though beneficial for experienced users, can be daunting for those new to AI or those new to using AI for a particular purpose.

Then there are specialized educational AI platforms that provide a more guided and user-friendly experience. These platforms offer a variety of tools designed to assist

educators in creating various resources. By prompting users to provide specific information, these tools streamline the process and ensure that the generated content aligns with the desired outcome.

LARGE LANGUAGE MODEL (LLM) ARTIFICIAL INTELLIGENCE

When you first engage with an LLM, the process may feel like a Google search. You input a prompt or question, and the model generates a response. However, unlike a traditional search engine, LLMs don't simply provide a list of links. Instead, they offer a direct answer or suggestion, much like a human conversation.

Interestingly, the skills required to effectively use LLMs are more social than technical (Pessan, 2024). Since LLMs interact with users in a human-like manner, strong communication skills are essential. While many people associate AI with technical expertise, the reality is that these platforms are designed to be user-friendly and require little in the way of tech skills. The key to getting the most out of LLMs lies in effective communication, including clearly articulating your needs and being receptive (and critical) to the model's responses.

In his book *Co-intelligence: Living and Working with AI*, Mollick (2024) offers a helpful analogy: the LLM as an apprentice chef. The apprentice begins by studying recipes, ingredients, and techniques, aiming to understand how these elements combine to create the ideal dish. Through practice, the apprentice learns to adjust ingredients and methods to achieve the desired outcome. Similarly, LLMs learn from massive amounts of data, refining their ability to generate relevant and informative responses. Unlike a human chef, LLMs can process information and generate responses in mere seconds, making them a powerful tool for various tasks. We asked Gemini, an LLM platform, to explain the benefits of technology in education. In seconds it generated the list in Figure 1.3.

The information generated by the LLM is a direct response to the user request, eliminating the need for additional website visits. In addition to a concise answer, the output in Figure 1.3 offers a structured and easily understandable list, presented in understandable language. Like an apprentice chef utilizing their training on ingredients, recipes, and methods, the LLM draws upon its training data to provide a response to match the user's request.

With that in mind, it's important to note that an LLM's response, though often helpful and unique, comes from a massive dataset of sources that are hopefully accurate but might have inaccuracies. Depending on the user's intended use of this information, they may need to verify it with additional sources or cite the LLM as the source.

That said, as the technology continues to evolve, LLM-powered platforms are becoming increasingly capable of directing users to supporting websites. (Some currently allow users to hover over content for a related link or offer an option at the bottom that will direct users toward applicable sources.) Additionally, search engines like Google are experimenting with AI-generated responses, raising questions about the future of AI-powered search engines and the potential to bridge the gap between these two platforms.

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Figure 1.3 • Gemini Request for "Explain the Benefit of Technology in Education"

Benefits of Technology in Education

Show drafts ⌄

Technology has revolutionized the way we learn and teach, offering a multitude of benefits that enhance the educational experience. Here are some key advantages of incorporating technology in education:

Enhanced Engagement:

- **Interactive Learning:** Technology tools like simulations, games, and virtual reality create immersive learning experiences that captivate students' attention and make learning more enjoyable.

- **Personalized Learning:** Adaptive learning platforms can tailor content to individual student needs, ensuring that everyone learns at their own pace and in a way that suits their learning style.

Improved Collaboration:

- **Online Collaboration Tools:** Students can work together on projects and assignments, even from remote locations, using tools like Google Docs, Microsoft Teams, and Zoom.

- **Virtual Classrooms:** Technology enables students to connect with peers from around the world, fostering intercultural understanding and global perspectives.

Expanded Access to Information:

- **Online Resources:** The internet provides access to a vast array of educational resources, including textbooks, articles, videos, and online courses.

- **Digital Libraries:** Students can access a wealth of information from anywhere with an internet connection, breaking down traditional barriers to learning.

Source: Author created using Gemini (2024).

Try It Out

Compare Search Engines to Large Language Models (LLMs)

Step 1: Decide on a topic you want to research.

Step 2: Visit a search engine like Google and enter a request in the search field.

Step 3: Review the first few results, and consider the following questions:

- What responses does it give?

- Where is it pulling information from?

- Are there AI features available?

- Did it give you the information you needed?

- What else would you want to know?

Step 4: Visit a large language model AI site like ChatGPT (www.chatgpt.com) and enter the same request. Review the response, and consider the following questions:

- How is a chatbot response different from the search engine response?

- Does the reply match what you were looking for?

- If this reply were shared by a human, what would you say back?

Step 5: Engage in some dialogue with the LLM site. We recommend at least four or five interactions to get a sense of what it can offer. Consider the following replies:

- Explain more.

- I don't understand _____. Give me an example.

- What would this mean for _____?

- What else do I need to know about this topic?

Step 6: Compare and contrast the platforms. What do you notice about the difference in capabilities of search engines versus artificial intelligence?

As you hopefully discovered, generative AI and search engines are different in how they provide information. This does not necessarily mean that one is better than the other. In fact, there are reasons for users to go to a search engine over generative AI and vice versa. Table 1.1 lays out the differences between these technologies. Search engines remain helpful when a user wants to find a link to a source or is looking to be directed somewhere, while generative AI excels at creating custom content and explaining information. The biggest difference with generative AI, specifically LLM platforms, is the conversational back-and-forth nature of the platforms.

Table 1.1 • Comparing Search Engines and Generative AI Platforms

	Search Engines	Generative AI Chatbots
Goal	Return a list of relevant pages related to a query	Generate new content based on a specific user request
General Operation	Evaluates websites to provide links to applicable sources based on a user's search	Scans sources and data to recognize patterns and use that to generate content in response to the user request
Core Function	Indexing and ranking websites and links	Generating unique responses based on user request
Use Examples	Find information, look for a product, learn about current events, search for articles	Create content, summarize information, understand a concept, engage in "conversation"

TEACHER-FACING ARTIFICIAL INTELLIGENCE

In the spring of 2023, as teachers were introduced to AI's capabilities, specifically LLM platforms, there were some common questions and responses:

- "How do you know what to ask?"
- "When I asked _____, I did not get what I was looking for."

The open models offer many possibilities, and they require the creativity and savviness of the user to provide a prompt that is just right for the query. As we used AI more frequently ourselves, we decided to save prompts that helped us arrive at what we were looking for. By reusing or modifying these prompts, we eliminated the need to reinvent the wheel each time.

As people started to recognize the possibilities for AI in education, platforms emerged that streamline the prompt-writing process. Sites like MagicSchool, Khanmigo, and Eduaide launched throughout the 2023–2024 school year, have proven useful in helping educators imagine the possibilities of using AI—all while reducing the work that goes into open-ended prompt generation. They offer a more structured approach to prompting, giving users specific categories of information to enter, such as grade level, standard, assignment, or text. Behind the scenes, these platforms quickly generate a prompt, and they can output exactly what an educator is looking for. In other words, they simplify the process.

Because these teacher-facing sites are focused on specific educational tasks and needs, they can be a good introduction to the uses of AI for educators. These platforms also continue to evolve; just when you think they've covered everything, a new tool emerges to simplify tasks you didn't even know needed simplifying, including anything from report card comments to formative assessment generation to math spiral review creation. These companies are not only aware of generative AI's capabilities but are also able to personalize tools to meet the unique needs of teachers.

Since teacher-facing sites are powered by the same systems as ChatGPT and Gemini, any tool on a teacher-facing site can theoretically be replicated with careful prompting and application on a LLM. However, the advantage of these specialized sites lies in their pre-built prompts and teacher-centric design. These tools are created with the specific needs of educators in mind, and their developers often collaborate with teachers to refine their output. This makes them a significant timesaver for busy educators who no longer have to worry about crafting complex prompts.

Try It Out

Get to Know Teacher-Facing AI Sites

Step 1: Visit a teacher-facing site such as MagicSchool, Eduaide, or Khanmigo. For a more comprehensive list, see pages 24–25.

Step 2: Choose a tool that aligns with a specific teaching challenge or interest. For example, if you are currently lesson planning, try a lesson plan generator, or if it is conference time, explore the report card commentor.

Step 3: Provide the necessary information, such as the subject, grade level, and learning objectives. Remember, the more specific your input, the better the output.

Step 4: Review the generated content and explore any additional features or options.

Step 5: Visit another teacher-facing site and compare the tools and outputs. Consider the following:

- How do the tools differ in terms of functionality and user interface?

- What are the strengths and weaknesses of each site?

- Which site best aligns with your teaching style and needs?

Step 6: Consider how AI-powered tools can streamline your teaching workflow and the things educators should be cautious of when using these platforms.

AI IMAGE GENERATORS

We have all spent time searching the internet for an image to add to an assignment or to use on a slide deck. We search for the "just right" image and sometimes get lucky, but other times, we spend way too much time looking for the perfect image. With AI image generation, there is a more efficient solution.

Image generators powered by artificial intelligence are capable of creating images, making videos, and even adding animation to a user's sketch or drawing. Just like LLMs pull from large sets of data to create unique written output, image generators do the same for images. In addition to scanning articles and written words, they also scan images to learn and generate what a user is looking for.

There are many AI image generators. Some are embedded in other generative AI platforms, and others are designed solely for this purpose. In the list on page 25, we have included the image generators that are currently most popular with educators. Just like each LLM tool has its own style and interface, so too do these platforms. As you experiment with different sites, you will realize that each is a bit different. Some are best at generating cartoon-style drawings, while others take a more realistic approach. Some respond to basic prompting, while others require a bit more from users. Take the time to get to know multiple sites so that in the future you will know which to use based on what you are looking to generate.

We are finding that, like everything AI-related, image generators are advancing quickly. As well as being able to create a picture or video, they can now take a user's sketch and turn it into a more advanced image or even bring it to life with simple animation tools. Imagine using these tools to add illustrations to a story, to help students check the specificity of their writing, to illustrate a story problem, or to support learners who benefit from clear visual cues. This concept isn't new, but the ability to create an image that is exactly what you're looking for—without having to search for one that fits—will enhance existing resources or lessons and ultimately save time.

In Module 3, we will address output analysis and the issues that users should be mindful of when using generated content, something especially important when using AI-generated images. Many of the issues that have surfaced around AI-generated content relate to images that are inaccurate or biased. As we use the tools, we must be mindful and educated about what to watch out for.

STUDENT-FACING ARTIFICIAL INTELLIGENCE

Just as there's been a surge in AI tools designed for educators, there has also been an increase in the number of AI platforms tailored specifically for students. These sites allow teachers to create assignments and tasks to use in instructional settings and leverage AI to enhance the learning experience. Student-facing AI platforms have built-in monitoring and guardrails, ensuring a safe and controlled environment for students to interact with AI. These features are similar to the ones included in popular educational tools like Seesaw, Pear Deck, and Google Classroom. By creating accounts and sharing access through school platforms, teachers can guide students' use of AI without compromising security and data privacy.

Most of the platforms, included in the list on pages 24–25, allow teachers to observe student interactions with AI chatbots, assess their inputs and outputs, and provide guidance on effective usage. This is a more structured and responsible method than simply instructing students to use an LLM independently. By fostering a guided learning environment, we can empower students to use AI ethically and effectively.

While some AI features might be new to students, the use of AI is not. From a young age, students have interacted with AI-powered platforms like Siri and Alexa, and most are accustomed to using autocorrect and spell-check. However, the sophisticated AI tools available today require careful guidance and coaching.

Student-facing sites like Socrat, MagicStudent, SchoolAI, and Brainly offer features that are familiar to most teachers but can now be leveraged with AI. Teachers can assign students to engage in Socratic seminars with chatbots, debate assigned topics, and participate in exam review with AI-powered tutors. Educators can also use these platforms to create immersive learning experiences, such as having students talk with a chatbot acting as a historical figure or character from a book.

Importantly, while these tools offer significant potential for enhancing student learning, we must continue to approach their use judiciously. Educators must be mindful of the ethical implications of AI and ensure that students are using these tools responsibly and critically. By providing appropriate guidance and support, we can harness the power of AI to create innovative and engaging learning experiences.

Classroom Connection

Get to Know Student–Facing AI Sites

Step 1: Visit a student-facing AI platform like SchoolAI or MagicStudent.

Step 2: Decide on an available tool, and follow the prompts provided. Be as specific as possible, as the better the input, the better the output.

Step 3: Create an assignment and follow the directions to test it out as if you are the student. (Some sites have a preview option that would be perfect to use in this instance.)

Step 4: Think about your original goal and how the AI tool measured up. Reflect on these questions:

- What did you want students to do?

- What did you hope they would work on?

- Did this preview reach your desired results?

- What changes would you make?

- Is this an AI tool that you could see yourself using with students?

AI SITES WORTH EXPLORING

This section includes a list of some of the AI platforms and tools being used in education and beyond. Keep in mind that this is an ever-evolving field, and new platforms are constantly emerging. We encourage you to explore multiple sites to understand their similarities and differences. It's important to note that while this list focuses on dedicated generative AI sites, this technology is increasingly integrated into various platforms. Generative AI features are now found on social media sites like Instagram and LinkedIn, smartphones (i.e., Apple Intelligence), and even curriculum platforms like HMH's Amira and Writeable. While these dedicated AI sites are valuable resources, it's likely that their role will evolve as technology advances. Use this list as a starting point and be open to adding to it as you get to know others.

Note: The costs of AI platforms vary—many are free, others offer both paid and free options, and most include trial periods that allow users to explore before committing to a purchase. As AI tools evolve, it is expected that schools and districts will continue to assess which platforms they might invest in for teacher and student use. Additionally, while we categorize the sites by areas of use, many have multiple applications for teachers and students.

Large Language Models (LLMs)	
Auto-completers that rely on user prompts to customize content	
Llama: Meta LLM that uses open-ended prompting	
ChatGPT: OpenAI LLM that uses open-ended prompting	
Claude: Anthropic LLM that uses open-ended prompting	
Gemini: Google LLM that uses open-ended prompting	
Education-Based Platforms for Teachers	
Customized platforms to interface with LLMs	
Content Generation	*Diffit:* Content-generation tool for teachers
	Synthesia: Turns text to video; useful for online lessons
Feedback Development for Students	*Brisk Teaching:* Chrome extension that teachers can use to provide various levels and types of feedback on student work in Google Classroom
Gamification of Lessons	*Character.ai:* Unique AI-powered "characters" that allow users to engage in customized and unique interactions
	Eduaide: Tools and prompts specific for teacher function, including gamifying lessons, creating choices boards, etc.
Planning and Productivity	*Consensus:* Tool that acts as a research assistant, merging features of a basic search engine and generative AI
	Curipod: Lesson-planning tool that integrates multiple mediums
	Education Copilot: Unit and curriculum planner
	Learnt.ai: Tools and prompts specific for teacher function, largely focused on resources that support planning and productivity
	MagicSchool: Tools and prompts specific for teacher function, including report card comment generator, multiple-choice question generator, and text-dependent question generator
Presentation Generation	*Canva Magic Studio:* AI-powered tools on the popular design site, including image, video, and slide-deck creation
	Gamma: Design tool dedicated to formatting presentations and instantly creating slide decks from content provided by the user
Research Assistance and Content Consolidation	*NotebookLM:* Google extension designed to help users summarize and connect information from diverse sources to streamline the research process
Recordings and Transcripts	*AudioPen:* Tool that turns recorded audio into coherent composition
	MeetGeek: Recording tool, originally designed for professional use, that can transcribe and summarize lectures, teaching content, or student conversation
Student Discussion Assistants	*Parlay Ideas:* Tool that facilitates, tracks, and measures written and verbal discussion
	TeachFX: Coaching tool focused on student or teacher talk
	SchoolAI: Custom chatbots made by teachers for teachers that allow students to engage in guided conversations with embedded teacher monitoring
	Socrat.ai: Tool designed to foster student discussion

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Student Tutoring Assistants	*Brainly:* AI-powered tutor meant for students and caregivers
	Khanmigo: AI-powered tutor knowledgeable in a wide range of K–12 topics and courses
Student Writing Assistants	*Draftback:* Chrome extension that timelines (and plays back) the writing process of a Google Doc; can be used for students to reflect on writing process and for detection of AI-generated text copied onto an assignment
	Grammarly: Grammar and spellchecking, tone adjustment
	Packback: AI-powered writing assistant, with some features that are also useful for teachers

Image Generators

Note: *Many of the sites listed in previous sections are also able to generate images. This section lists sites known specifically for visual output.*

Adobe Firefly: uses built-in prompts to create various styles of images, add backgrounds to existing images, and produce videos

Dall-E: an OpenAI extension on ChatGPT designed for image generation

Ideogram: an easy-to-use image generator known for its ability to create images that include text

ImageFX: Google extension designed specifically for image generation, known for ease of use and realistic image output

Leonardo AI: platform specifically designed for image creation, known for its ability to generate realistic human images

Microsoft Designer: a simple-to-use tool that includes lots of user-created images as inspiration

Midjourney: the most well-known image generator due to its ability to create detailed images; it requires advanced prompting skills

Scribble Diffusion: takes a simple sketch or drawing and turns it into a matching high-resolution image

TERMS TO KNOW

All content areas have terms and phrases specific to that area of study, and the field of AI is no different. Perhaps these phrases are new to you and your students, or maybe you've already incorporated them into your vocabulary. To help support your learning and teaching, here are some simple definitions for the words and phrases associated with the integration of AI into education.

- **AI detection:** tools that attempt to detect the use of AI on a body of work

- **AI-powered search engine:** sites that mix capabilities of AI and search engines that provide an AI-generated answer and access to related links

- **algorithm:** set of rules or steps followed to get to a particular solution

- **anthropomorphizing:** attribution of human-like qualities and characteristics to AI platforms

- **applications:** programs designed to perform certain tasks

- **app-smashing:** a term used to describe the process of generating content on one AI platform and using that content to do something else with it on another site

- **artificial intelligence:** technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity, and autonomy

- **augmented learning:** integrated technology to enhance a learning experience

- **beta:** program open to use but still in test or trial mode

- **chatbot:** computer designed to simulate conversation with human users

- **coding:** human instructions written in a way that can be read by a computer

- **copilot:** in technology, a tool or system that assists the user

- **data security:** protecting student and staff information from unauthorized access and us

- **deepfake:** AI-generated content, often an image or video, that has been digitally manipulated and designed so it appears to be someone else, often used maliciously to spread false information

- **deep learning:** subset of artificial intelligence that uses multiple layers of processing to simulate complex data analysis and decision making

- **generative AI:** artificial intelligence technology that can create new content based on user input and prompting

- **guardrails:** policies or restrictions used to ensure AI handles data responsibly

- **hallucinations:** AI-generated output that is not accurate or does not make sense

- **human-in-the-loop:** the necessity of incorporating human intelligence within an automated system

- **large language models (LLMs):** systems that process and generate human-like language

- **machine learning:** subset of artificial intelligence that includes the ability for computers to act in human-like ways and learn from experiences and data without explicit commands

- **output analysis***:* looking closely and critically at AI-generated content to ensure accuracy

- **personally identifiable information (PII):** data or input that could identify a specific individual

- **platform:** combination of software and hardware that operates a certain technology

- **prompt:** human-written requests, directions, questions, or cues for AI; the skill of crafting requests

- **scraping:** process used by AI to gather data from many sources to learn and generate unique content

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- **synthetic content:** text, video, or audio generated by AI that appears similar to human-generated material

- **tools:** features available on AI platform that allow users to generate a certain type of output or content

Check Your Understanding

The teacher-facing AI sites mentioned on the previous pages have features that can assist you with creating classroom assessments, including multiple-choice questions, matching questions, true/false questions, fill-in-the blank questions, discussion prompts, and scenario-based questions. Here are five multiple-choice questions about *Module 1: Getting to Know Generative Artificial Intelligence.* You'll find the answers in the Appendix.

Question 1: What is one suggested way for teachers to start exploring AI tools?

    A. Developing custom coding scripts

    B. Engaging in conversations with a chatbot about helping with common teaching tasks

    C. Attending advanced AI programming courses

    D. Avoiding open-ended AI platforms

Question 2: What is the main challenge of using large language models for new users?

    A. Technical expertise requirements

    B. Limited customization options

    C. The need for effective communication and prompt crafting

    D. Lack of available training materials

Question 3: What key advice does the module offer about AI-generated outputs?

    A. Always trust the output as accurate and complete

    B. Avoid using AI tools for critical teaching tasks

    C. Critically analyze outputs for accuracy and relevance

    D. Only use outputs for nonacademic purposes

(Continued)

(Continued)

Question 4: What does the term *guardrails* refer to in the context of AI, as mentioned in the module?

A. Restrictions used to ensure AI handles data responsibly

B. The system that operates AI technology

C. Human intelligence incorporated with an automated system

D. Programs designed to perform certain tasks

Question 5: What makes AI image generators unique compared to traditional image searches?

A. They require no input or user interaction

B. They create customized images based on specific prompts

C. They rely solely on preexisting internet images

D. They are only available for paid users

CONCLUSION

How did you do on the Check Your Understanding questions? If you've learned about a new-to-you generative AI platform or tool, or deepened your knowledge about generative AI in education, congratulations! Consider bookmarking this module to use as a reference for sites and terms specific to AI in education. If you find yourself feeling frustrated, stick with us. Remember what futurist Isaac Asimov once said: "I do not fear computers. I fear the lack of them." The absence of these tools could mean missing out on opportunities. As you roll up your sleeves and continue to explore, we hope you will discover new and innovative ways this technology can spark creativity and build capacity among you and your colleagues.