Teaching Students to Use AI Ethically & Responsibly

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Exploring AI With Intentionality, Curiosity, and Care

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CONTENTS

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INTRODUCTION

Let's go whale-watching. Pack your sunscreen, snacks, and a pair of binoculars and let's set off on an adventure. We shove off early in the morning, a boat full of strangers, each of us hoping to spot something majestic breaching the ocean surface. An hour in, we're still watching and nothing. A low fog sits on the water. The guide cheerfully narrates each far-off sea lion as if it were a spectacle. A young person a few seats over keeps insisting that something is "just over there." Then suddenly, when we've all but given up, we see the tail. An unmistakable, gleaming arc that rises up, pauses, and vanishes again with impossible grace. It's enormous. Beautiful. And gone in seconds.

That's how teaching with artificial intelligence feels to many of us. Something massive is clearly surfacing in our work. It's powerful, sleek, and unpredictable. We see it in headlines and hear it in hallway conversations. Students ask about it. Our colleagues try it. Leaders reference it in ways that make you wonder if someone, somewhere, is expecting you to do something with it, and soon. Teaching for, with, and about AI to PK–12 students can be a little bit like the experience of trying to understand and engage with a whale, an awe-inspiring, complex, and deeply interconnected being. AI is not a living creature, but the parallels haven't escaped us:

1. **AI Is Massive but Mostly Hidden.** Like a whale, AI is huge, but most of its size is beneath the surface. Students need help understanding what's visible (like ChatGPT or image generators) and what's hidden (like algorithms, data collection, and infrastructure). You're not just seeing the tail splash. You're learning about the whole ecosystem below that.
2. **AI Is a Living System You Must Approach With Respect.** Whales are intelligent and powerful, but they require careful, ethical interaction. They can also tip your boat over! Similarly, AI must be approached responsibly. Students need to learn about bias, privacy, and the consequences of misuse. You don't tame a whale; you learn how to swim alongside it with humility while keeping safety in mind.
3. **You Can Learn From AI but Not Control It Fully.** Like studying whale behavior, students can explore and come to understand patterns in AI, but the outcomes are sometimes unpredictable or opaque. This requires that students learn to ask critical questions like, *Why did the AI do that? Can I trust it? How can I refine my interaction?*

4. **AI Requires Deep, Sustained Observation.** You don't understand a whale from witnessing one splash. You learn over time through patient observation, study, questioning, and reflection. Likewise, learning AI isn't about flashy tools. Instead, it's about developing a concept and understanding over time: data, modeling, ethics, application.
5. **AI Lives in an Interconnected Ecosystem.** Whales don't exist in isolation. They are part of a larger, interdependent ecosystem. AI is the same: It intersects with society, economy, equity, education, and environment. Teaching students about AI means showing its intersections and interdependence with the world around them.
6. **AI Can Inspire Awe and Wonder.** Encountering a whale often creates a sense of awe. AI, when taught well, can also ignite curiosity and creativity. Students can imagine new futures, solve real problems, and express themselves in new ways. Artificial intelligence will have an impact on human intelligence. Students need to know how to responsibly use AI while they develop their own thinking skills.

WHAT YOU'LL FIND IN THIS BOOK

We didn't write this book for AI evangelists. It also isn't written for skeptics waiting for AI to go away. It's written for educators standing on the deck, scanning the horizon, and wondering: *Is this for me? My students? How do we make sense of it? What happens if I do nothing? And what happens if I dive in but don't fully know what's beneath the surface?* This book serves as a guide to understanding, approaching, and using AI with all the intentionality, curiosity, and care we bring to everything else that matters in our classrooms. AI is enormous. But like any ecosystem, it can be explored. It can be mapped. It can be navigated. And eventually, it can be taught.

We've organized the contents into three major sections.

1. **Teaching *About* AI** explores the systems understanding, appropriate for various grade levels, about the AI systems themselves. This includes building foundational knowledge about what AI is, how it's created, how it makes decisions, and how it can be both useful and flawed. We're reminded of a friend who told us that it was not critical to understand how a fuel injection system works to drive a car. However, there are some aspects of how a vehicle works that are required to effectively drive and problem-solve as you drive, such as the turn signal versus the windshield wiper controls. Thus, this section includes topics such as generative models, personalized mastery-based learning, collective intelligence, and adaptive learning systems. These are all aspects of AI that students (and you) need to understand to use the information they gain. By equipping students with this foundational systems knowledge, we give them the tools to question, evaluate, and participate in the AI-driven world as informed, ethical, and empowered learners.
2. **Teaching *for* AI** focuses on the skills that students need to develop to successfully navigate an AI-influenced world. Many of these skills have been repurposed and updated, such as curiosity and questioning. Curiosity must now be directed not just at the natural world or texts, but also at how machines interpret information.

Questioning becomes more than a comprehension strategy as it's essential for interacting meaningfully with AI systems. Others are newer skills or skills that are specific to AI, such as prompt engineering and verification skills. Without these competencies, students risk becoming passive users of technology rather than critical thinkers and collaborators alongside it. This section focuses on the human intelligence that must continue to be developed for students to learn with and from AI in responsible and ethical ways. Teaching for AI is ultimately about preparing students not just to use AI tools, but to question, evaluate, and shape how those tools serve learning, decision-making, and society.

3. **Teaching *With* AI** turns our attention to the purposeful integration of AI in classroom instruction. When you understand the basics about how AI works and the skills we need to develop with students, you are ready to integrate AI into your teaching and students' learning. Of course, you still have other things to teach, concepts and skills that are represented in your grade-level standards. AI can help you with lesson planning, assessment design, and a variety of other teacher tasks, which we explored in the *Artificial Intelligence Playbook* (Hargrave et al., 2025). In this book, we focus on the use of AI in students' learning through a series of quests. When the internet in the classroom was new, an inquiry process called WebQuest was created to engage students in learning (Dodge, 1995). WebQuests were innovative for their time, guiding students through inquiry-based learning using internet resources. Now with AI and chatbots, there's an opportunity to design similarly structured experiences that leverage dialogue, personalization, and problem-solving through interaction. Thus, we have developed and tested 10 quests that invite students into learning with AI.

In these three sections, we explore 31 topics. These 31 topics will help you, the educator, support students as they learn and grow. *We think of this as using artificial intelligence to foster human intelligence.* Each of the topics includes a definition, an explanation about why it's important, classroom examples, and teacher and student practices. In addition, we see the topic in action in classrooms. And, taking our advice for using AI as a co-pilot and teacher assistant, we fed the content of each topic into our AI system (ChatGPT) and with several back-and-forth interactions on each topic, generated a skill progression across the grade bands with supports necessary for students to become successful. For each progression, we built out a handful of the supports, resulting in more than 120 online resources that can be used to support the teaching of each of these skills in PK–12 classrooms. These progressions, and the accompanying online supports, are a starting point for integrating AI into your classroom. Taken together, they represent a new form of literacy, AI Literacy. Here's a working definition:

> *AI literacy represents the technical knowledge, durable skills, and future-ready attitudes required to thrive in a world influenced by AI. It enables learners to engage, create with, manage, and design AI, while critically evaluating its benefits, risks, and ethical implications.*
> (OECD, 2025)

Teaching with AI and developing AI Literacy for your students isn't about chasing trends or fearing change. It's about learning to recognize something massive, powerful, and increasingly present in our classrooms. Like spotting a whale breaching the surface, AI can feel awe-inspiring and mysterious, sometimes overwhelming. But with patience, curiosity, and guidance, we can begin to understand what's beneath the surface and help our students do the same. Whether you're just getting your feet wet or already diving deep, we invite you to continue reading.

Let's navigate this together.

Section
1

Teaching *About* AI

"Under the Hood" Concepts to Support Good, Ethical, Effective Use of AI for Learning

OVERVIEW

The introduction suggested that teaching in the age of AI is like spotting a whale just beneath the surface. Its presence is unmistakable; massive, powerful, and at times unpredictable. This is the "about" section—the part that surfaces what AI is, how it works, and why it matters. This is not a technical manual but rather we provide information about the way that these systems work such that you can begin teaching students about AI.

Our students don't just use AI. They live in a world increasingly shaped by it. From autocorrect to adaptive learning platforms, from personalized playlists to AI-generated search results, the systems students interact with are constantly learning from them. Even still, students are rarely invited to understand how these systems operate, what they do with user data, or what values and assumptions they encode. Teaching about AI means giving students that knowledge and with it, the agency to ask better questions, make informed choices, and become responsible digital participants.

This section focuses on foundational concepts every learner should understand: how generative models make predictions, why adaptive platforms respond the way they do, what it means to be the "human in the loop," and how data fuels personalization and surveillance. It challenges students to think about where they encounter AI, what AI gets right, what it misses, and who decides how it's used. These are ethical, civic, and deeply human questions.

We want students to remain curious about AI. Just as we teach them to question texts, evaluate sources, and revise their own thinking, the same now applies to AI outputs. That means positioning AI as a tool that becomes more powerful when paired with thoughtful human use . . . rather than a "magic answer machine" or a "threat to learning."

In this section, you'll find ways to help students demystify AI, critique its limitations, reflect on how they learn, and engage in human–AI collaboration. Across the ideas presented, one thread is clear: Students should not be passive recipients of AI-generated content. They should be decision-makers, collaborators, and questioners—always keeping the human voice and human judgment at the center of their learning.

Like many complex systems of today's world, AI is mostly invisible. Its workings are hidden behind clean interfaces and seamless outputs. But when we take the time to look beneath the surface—and help students do the same—we make the invisible visible. And that's the heart of this section: to help students see what's really there, and to prepare them to think critically and use AI responsibly in a world where AI is part of the current, not just the splash.

Generative Models

WHAT IS IT?

Generative models are a type of AI designed to create unique responses to human input by using patterns and massive amounts of data it has been trained on. These models don't just respond, they generate. They can write, draw, solve problems, create videos, and even suggest personalized learning tasks.

WHY IT MATTERS

Generative models open up new possibilities for students as thinkers, creators, and problem-solvers. These tools can act like a thought partner to generate ideas, suggest wording, provide feedback, or even create visuals, images, videos, and podcasts. For students who feel stuck, generative AI can offer a jumpstart. For those who already have ideas, it can provide new ways to expand or refine them. By understanding what generative models are and what they can do, students can begin to approach assignments, projects, and creative tasks both in school and out with more flexibility and confidence. Additionally, this knowledge also helps students recognize when they're interacting with content created by AI, whether online, on social media, or even at school.

HOW IT WORKS

To help highlight how generative models work, it's useful to first understand how these tools differ from a basic search engine. Although generative models may seem similar to online platforms we've used for a long time, they operate in fundamentally different ways. A search engine returns links to existing web pages, relying heavily on keyword matching. This means users often have to phrase their query just right to get relevant results. Generative AI, on the other hand, produces new content based on patterns in its training data. It uses advanced natural language processing (NLP) to interpret meaning, nuance, and even conversational tone—making it more responsive to the user's intent rather than just the exact words used (Kimes, 2024). The result is a unique, user-guided response rather than a list of sources.

When teaching students about these differences, it's helpful to model a generative AI tool alongside another online tool they use often. Show students how a search engine delivers a list of links based on keyword matching, while a generative model creates original content in direct response to a user's request. From there, invite students to explore the capabilities of each—highlighting how generative tools allow for interaction, revision, and real-time shaping of output. These experiences help students build awareness of how different technologies respond to their input and when to choose one tool over another. Understanding this distinction lays the foundation for using generative AI models effectively and becoming a more strategic, flexible, and independent learner in today's digital world.

Common Classroom Applications

Elementary Examples

- **Compare search engines and generative AI results.** Guide students to compare a search engine and a generative model by asking the same question in both. After reviewing the results, ask students to notice: What did the search engine give me? What did the AI generate? Use this as an entry point to explain how one retrieves and the other creates based on patterns.
- **Turn the class into a "generator."** No technology needed! Show students how AI generates content by assembling information from a variety of sources. Challenge the class with an initial story starter like, "Once upon a time . . . " and have one student complete the statement. Now offer a second prompt based on the student's response. "But then the dragon said . . . " and have a second student complete the sentence. Keep the story going until everyone has completed a prompt and discuss how the final story was built using all their ideas.
- **The training set game.** Explain that generative AI is trained on data, and that a dataset comprised only of cats will not recognize a dog. Use Teachable Machine by Google to show examples of how datasets influence what a model knows.

Secondary Examples

- **Build an AI vocabulary.** Teach foundational vocabulary in generative AI like *datasets*, *models*, *tokens*, and *prediction* using slides or short videos. Have students use these in writing about generative AI, creating metaphors or analogies (e.g., "Datasets are like ingredients in a chili recipe because they come from every aisle in the grocery store.").
- **Create a "From Input to Output" flowchart.** Use generative AI vocabulary to create a flowchart of the actions: training data [arrow] model [arrow] token [arrow] prediction [arrow]. Students can then create a series of comic strip panels to illustrate how the sequence works.
- **Train your own dataset.** Older students can use Teachable Machine, a free platform from Google, to build their own model using data they have generated. For instance, they can train a model using soccer kicking and passing techniques, musical sounds on a harmonica, or to make their own facial recognition tool.

Strategy in Action

Teach students how the generative AI got there in the first place through reverse-engineering. Present a range of AI-generated outputs, such as short paragraphs, images, poems, or data visualizations, without seeing the prompts that produced them. Their task is to work backward: to reverse engineer the original input or identify the likely features of the training data that could have led to the output. Students then discuss and write their hypotheses, drawing on their understanding of how generative AI uses patterns in training data to predict and generate outputs. The purpose is to demystify the "magic" behind generative AI by helping students see it as a predictive, pattern-based tool rather than an intelligent thinker.

To scaffold the activity, the teacher can begin with modeling, walking through one example with the class using a think-aloud strategy. Next, students can work in small groups with a selection of AI outputs (text or image) that vary in accuracy, style, or perspective. Each group is given a chart or slide to fill out:

1. Describe the output.
2. Infer the likely prompt or source data.
3. Explain why the AI might have made certain choices.

For higher-level analysis, students can be asked to identify whether the output might reflect bias, missing information, or a lack of context.

Teacher Moves

- Ask students, "How do you believe this author/artist/chatbot got this information?" to build the habit and disposition of considering sources.
- Add a similar reflection question to AI-approved tasks.
- Use visuals, shapes, and other non-linguistic examples of patterns, such as tessellations, to link pattern detection to the way generative AI works.

Student Moves

- Listen for students' use of language related to generative AI models and watch for its use in their writing.
- Create "unplugged" non–generative AI experiences by asking students to make predictions using their own knowledge, such as predicting the next letter in a word, the next word in a sentence, or the next section in a reading, then discuss how generative AI systems make predictions based on pattern recognition.
- Use a single topic to generate at least three different types of content. This exercise highlights the different types of formats that the generative models can produce (lists, paragraphs, poems, songs, or even a list of questions and answers).

Extension or Adaptation Idea

- **Advanced learners:** Challenge students to change the style, tone, or word choice in prompts using different generative AI platforms and compare the output results. Ask them to form explanations for why these variances occur.
- **Multilingual learners:** Ask students to explore generative AI models in other languages and draw conclusions about how linguistic and cultural elements may influence how a platform performs.
- **Emerging readers:** Use MapSkip, a free app, to generate stories using Google Maps. This allows young children to use familiar locations in their own community to develop a digital story. This introduces students to a large dataset (Google Maps) to create original stories.
- **Cross-content:** Introduce computational thinking, which is a process used in generative AI, to the classroom. Students can break a code in mathematics and draw character connections in English, then compare how these two examples of computational thinking are alike in terms of pattern detection.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Curious Creators	• Understand that AI can make pictures, poems, or stories • Notice that AI creations can be surprising or a little strange • Begin to talk about how AI "mixes ideas" to create what users want	• Selection of AI-generated and student-created stories or images • **Human made, AI made, or too tricky to tell sort activity** • Sentence stems like "This sounds made up because . . . "
3–5: Prompt and Play Explorers	• Explain the difference between generating and retrieving • Try different prompts and compare what changes and what stays the same • Begin to reflect on how the AI didn't "know" what to make, but rather that it predicted based on patterns	• Prompt remix station using variations of the same input • **Activity for matching common AI metaphors (blender, parrot, mirror) to examples of output** • Reflection frames like "I was surprised that AI . . . " or "I noticed that ___ was created because __."
6–8: Prompt-to-Product Thinkers	• Describe how AI uses training data to generate new responses • Evaluate outputs for originality, usefulness, or weirdness • Reflect on what may have shaped the AI's response	• **Chart of common add-on prompts to use after initial input** • Training data prediction chart to help students infer where AI might have learned certain ideas or phrases

Grade Band	Skills	Supports
9–12: Generation Analysts	• Analyze how generative AI recombines data to create something new and how changing just one aspect of a prompt generates entirely different content • Evaluate strengths and limits of generative models for different purposes	• Comparison task labeling AI-created vs. human-sourced elements • Case study analysis on helpful and misleading generative outputs • **Curated AI-generated samples around one topic from varying platforms to support analysis and discussion**

Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

Personalized Mastery-Based Learning

WHAT IS IT?

Personalized learning with AI refers to the use of artificial intelligence to adapt instruction based on each student's needs, pace, and understanding. AI systems analyze how a student learns and provide targeted support, such as hints, practice problems, or feedback. This helps students master concepts more effectively while giving teachers insight into progress and challenges.

WHY IT MATTERS

Personalized mastery-based learning is the foundation of a vision for the future of education, and it builds on the work of educational psychologist Benjamin Bloom (1984). Bloom introduced the concept of mastery learning, arguing that with enough time and proper instruction, nearly all students could achieve a high level of understanding. This landmark study on mastery learning further showed that one-on-one tutoring can improve student performance by two standard deviations over traditional classroom instruction. This challenged the traditional model where time is fixed and learning varies, often leaving students behind. In most classrooms today, students are expected to move through content at the same pace, even if they have not fully understood the material. This creates learning gaps that grow over time, especially in subjects like math where each concept builds on the one before it. Mastery-based learning reverses this pattern by allowing students to move forward only when they have demonstrated strong understanding.

Artificial intelligence in education can support this model by analyzing student responses and adjusting instruction to match their needs. With timely feedback, extra practice, and personalized support, students are more likely to stay in the optimal zone for learning, gaining confidence and deeper understanding as they progress at a pace that works for them.

HOW IT WORKS

Human-like Socratic learning combines the power of guided questioning with the personalized responsiveness of a skilled tutor. Rooted in the Socratic method, this approach emphasizes asking thoughtful, open-ended questions that prompt students to examine their thinking, articulate reasoning, and deepen understanding. This is especially true when tutoring involves dialogue-rich, scaffolded questioning rather than simple answer-giving. Educational research supports the effectiveness of this approach in developing metacognition, critical thinking, and durable learning. Dozens of studies have revealed that intelligent tutoring systems (ITSs) can impact educational outcomes, especially in terms of significantly improved student attitudes

toward learning and test scores (Huang et al., 2025). Importantly, they should supplement, not replace, traditional instruction. For optimal use, educators must consider the design, fit with curriculum, and student needs.

What makes AI-based Socratic tools like Khanmigo promising is their ability to replicate some of the most effective aspects of human tutoring at scale. By asking questions that guide student thinking, offering just-in-time feedback, and adapting to individual responses, these AI systems can create a more personalized and cognitively engaging learning experience, one that closely mirrors what effective human tutors do.

Common Classroom Applications

Elementary Examples

- **"My learning profile" book.** Students create a simple booklet with pages about their favorite subjects, their interests, and their goals for learning. Guide students to reflect on how they learn best and what helps them stay motivated.
- **Learning playlist.** Students build a "playlist" of learning activities they enjoy, such as videos, books, practice games, and hands-on projects. Some adaptive learning platforms have built-in tools to do so. This encourages choice and decision-making and helps them recognize the value of working at their own pace.
- **Weekly reflection note catchers.** Build metacognition and self-directed learning skills by having students write or draw what they learned, what was hard, and what helped them. This can help them see learning as a personal journey, not just a set of tasks.

Secondary Examples

- **"What works for me" infographics.** Rather than conventional all-about-me beginning of the year activities, invite students to develop an infographic of ways they learn best, distractions to avoid, and how they tackle challenges. Students can then record themselves in short introductions for placement on the class's learning management system.
- **Learner identity interviews.** Students interview, and are interviewed by, peers about their learning habits, strengths, and challenges, then summarize findings in a joint podcast. This peer-to-peer activity can promote a positive classroom climate and give students new ideas for strategies they might try themselves. These can be assigned throughout the first quarter of the school year so that the podcasts are spaced.
- **Build personalized learning plans.** At the beginning of every instructional unit, review the unit success criteria. Next, have students rank order the success criteria from easiest to hardest, then make a plan for how they will personalize their mastery learning using AI and human resources to achieve these goals (Fisher et al., 2023).

Strategy in Action

Many students are unaware of how they learn, thinking that somehow it just happens, or, when they struggle, believing that others are somehow more intelligent than they are. Their unawareness about learning can put them at a disadvantage when it comes to personalizing their learning. Cognitive strategy stations are a hands-on classroom activity designed to introduce students to research-backed learning strategies that enhance memory, understanding, and retention. This activity draws on findings from cognitive science and neuroscience to help students explore what actually supports effective learning.

The class is divided into four stations, each centered on a different evidence-based strategy: retrieval practice, spaced repetition, dual coding, and elaboration.

- At the *retrieval practice station*, students close their notes and attempt to recall information from a previous lesson, experiencing how effortful recall strengthens memory.
- At the *spaced repetition station*, they compare their recall of concepts studied yesterday versus a week ago, helping them notice the benefits of spacing learning over time.
- In the *dual coding station*, students convert text into visuals or interpret visuals into words, reinforcing how combining words and images improves comprehension.
- At the *elaboration station*, they answer *how* and *why* questions about a concept and connect it to other concepts, deepening their understanding through explanation while promoting transfer learning.

After rotating through each station, students reflect on which strategies felt most natural or effective and consider how they might use it to personalize their own mastery learning. It can help students begin to personalize their learning journeys using tools grounded in research, rather than on myths or misconceptions.

Teacher Moves

- Say, "You can take more time on this concept. What matters is that you understand it, not how fast you finish."
- Provide flexible pacing options and allow students to revisit assessments or tasks after additional practice.
- Use formative checks to guide feedback and conference with students about their progress and next steps and ask how AI can play a role in their goals.

Student Moves

- Ask for feedback. Promote routines that require students to make requests for feedback on a specific part of their work rather than asking, "Is this right?"
- Track their own progress. Provide tools for students to track their own progress toward mastery using charts, logs, or digital dashboards.
- Select different paths for support from choices you provide, including videos, small group reteaching, and AI prompts they can use, based on their needs.

Extension or Adaptation Idea

- **Advanced learners:** Invite students to use AI tools to generate their own learning pathway for a unit, including self-selected resources, pacing guides, and checkpoints for mastery. Have them develop prompts to teach AI about how they best learn and share their results with others.
- **Multilingual learners:** Encourage students to track their learning progress by using AI to produce visual tools like color-coded charts or illustrated journals, with support for both academic language and content mastery.
- **Emerging readers:** Use AI-powered text-to-speech and image generation tools to help emergent readers access complex content in age-appropriate, engaging formats. Let students give voice prompts to the chatbot to ask questions about a topic and receive simplified, illustrated responses they can explain or retell in their own words to show understanding.
- **Cross-content:** Design cross-disciplinary projects where students use AI to guide their own learning paths based on mastery goals across subjects. For example, a student studying ecosystems in science could use AI to build a customized research plan, receive feedback on a draft of a persuasive essay in ELA, and track math-related data trends from weather reports.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Becoming a Self-Aware Learner	• Recognize when they need help • Follow simple routines for learning • Express learning preferences • Reflect with prompts ("I learned . . . ")	• Visual schedules and cues • Lesson plans for teacher modeling and think-alouds • **Choice boards for AI support** • Structured peer sharing
3–5: Managing My Learning	• Set short-term learning goals • Track progress with guidance • Use feedback to revise work • Choose from a menu of learning tasks	• **Graphic organizers for goal setting** • Feedback rubrics with student-friendly language • Weekly check-ins • Access to AI tutors or intelligent planning tools
6–8: Owning My Learning Path	• Plan and monitor learning steps • Advocate for resources or support • Use multiple strategies to meet goals • Reflect independently	• Digital learning logs or portfolios • Lessons on using learning strategies • Personalized goal conferences • **Guided reflection template for AI tool explorations**
9–12: Directing My Mastery Journey	• Set long-term and unit-level goals • Evaluate learning products against standards • Adjust pace and path with learning intentions and goals in mind	• **Interactive mastery trackers for AI skill development** • Self-assessment rubrics aligned to standards • Models of plans for student-established deadlines

online resources Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

Human-in-the-Loop Experiences

WHAT IS IT?

"Human in the loop" refers to the essential role humans play when working with AI by guiding the process, making decisions, and applying personal judgment from the initial prompt to the final output. As we teach students about AI, it's critical to help them become active users who stay in control of their tasks. AI makes suggestions; humans make decisions.

WHY IT MATTERS

A widely used analogy compares AI to riding an electric bike: Just because the bike adds power doesn't mean the rider forgets how to balance, brake, or steer. Those foundational skills still matter. Another helpful analogy is using GPS while driving. It's useful, even essential at times, but not foolproof. Drivers still need to pay attention, make decisions, and know when to trust their own judgment. AI works the same way: It can guide the process, but students must stay in the driver's seat. Similarly, AI should serve as a boost, but not a replacement for critical thinking. Students need to see AI as an augmentation tool and recognize that the real power lies not in humans or AI alone, but in humans and AI working together (Drake, 2023).

HOW IT WORKS

AI is powerful and persuasive and is designed to respond to almost any request; it can often appear superhuman. But without guidance, students may treat AI as the expert and give it the final say. That's why teaching students to "stay in the loop" by questioning, editing, and refining AI output is essential. Highlighting and teaching this idea protects original thinking, deepens understanding, and reinforces human insight. As Holmes and colleagues (2019) note, students need to learn how to work *with* AI through reflection and critique, not rely on it passively. Ding and colleagues (2023) reported that anthropomorphism, which is the belief that an object or an animal possesses human characteristics, can lead students to believe that the chatbot is a person. In particular, they noted that students in their study subscribed warmth and competence in their belief that AI could solve any problem they posed.

When teaching about AI, lead by emphasizing that the human, not the technology, is in charge. Teaching students to be mindful of the H-T-H (Human–Technology–Human) formula helps them understand that technology, including generative AI, is not an end in itself but rather is a tool that connects human input to human needs. AI has the potential to revolutionize how learning can occur in the classroom, especially in its potential to personalize learning, serve as a "super-tutor," and work as a teaching assistant (Khan, 2024). This mindset encourages students to think critically about

how they design prompts (the human director), how AI systems process and generate responses (the technology), and how they or others interpret and act on those responses (the human analyzer). By emphasizing this cycle, students learn to see themselves as active participants in the process, responsible for both the quality of the input and the ethical evaluation of the output. It fosters agency, accountability, and thoughtful use of AI in learning and everyday life.

Common Classroom Applications

Elementary Examples

- **Create "I Decide What I Learn Next" checkpoints.** After using an AI tool to suggest next steps in their learning path (e.g., which skill to practice), students pause and evaluate: Do I agree? What do I know about myself that the AI might not? This reinforces principles of metacognition and self-direction within AI-supported environments.
- **Use tutoring transparency logs.** Students keep a simple log when working with AI tutors: what they asked, what they received, what they accepted, and what they changed or ignored. The goal is to promote mindful use and help students track when and why human judgment overrules AI.
- **Role-play "When to Ask a Human" situations.** Build the disposition that humans stay essential in complex moments. Students role-play scenarios where an AI tutor gives incomplete, confusing, or overly generic feedback. They must decide: Is this the moment to bring in a teacher, peer, or expert?

Secondary Examples

- **Design your ideal learning coach.** Learning works best when both human and AI strengths are balanced. Have students design their ideal learning coach using a blend of AI and human features. What should the chatbot do, such as tracking progress and providing hints, and what humans should do to encourage, listen, and adapt.
- **Provide decision logs for AI-enhanced learning.** These are ideal to embed in AI-supported tutoring sessions and adaptive learning platforms, as well as content review study sessions. Ask students to document decisions made, especially what they accepted, modified, or rejected from the chatbot's suggestions.
- **Design a human-AI partnership plan.** Encourage digital ethics and critical thinking by having students work in groups to design an ideal system for their class, where AI helps personalize learning, but human support is still central. They must assign roles to AI and humans and explain their choices.

Strategy in Action

Help students see that using AI doesn't mean turning off their brains; it requires that they turn them on. Show students how to stay "in the loop" by reviewing and revising AI-generated content with a critical eye. For example, in a lesson on opinion writing, challenge students to consider whether people have the right to be forgotten online. After brainstorming and drafting independently, students enter their own claim and reasons into an AI platform and ask for additional suggestions, such as additional reasons, supporting details, or possible counterarguments. Provide some guiding questions to foster verification and analysis:

- What parts of this match what I was trying to say?
- What ideas might distract from my point?
- Does anything here contradict or weaken my claim?
- How would I rewrite this in my own words?
- Can I revise my response using any of this content?

While the teacher demonstrates this digitally, students can practice the same process on printed copies by marking up the AI output and making revisions based on their goals. Although this may not reflect how students will use AI in the long term, the printed version made the human-in-the-loop process visible. It serves as both a learning tool and a formative check, reinforcing that while AI can assist, the human stays in control.

Teacher Moves

- Say, "What do you know that the AI doesn't?"
- Provide examples where human judgment improved or corrected AI outputs. "The AI gave us a starting point, but now it's our job to think critically."

Student Moves

- Pause to consider, "Is this something a teacher or classmate would say too?"
- Reflect in writing, "I accepted this part of the AI's response, but changed this part because . . . "
- Seek a second opinion from a human when the AI answer feels unclear or incomplete.
- Annotate AI output to show where human insight is needed.

Extension or Adaptation Idea

- **Advanced learners:** Challenge students to evaluate and redesign an AI learning interaction (e.g., a chatbot conversation or math problem feedback) by identifying where human input and oversight were weak or missing and propose improvements.
- **Multilingual learners:** Have students use a translation AI (like DeepL or Google Translate) to translate a text between languages, then work in pairs to revise the output based on their cultural and linguistic knowledge.
- **Emerging readers:** Students use a text-to-speech AI tool to hear a simple sentence, then decide whether the voice said the sentence with the correct emotion or meaning, and revise the sentence if needed, giving them control over how AI outputs are interpreted and adjusted for clarity and intent.
- **Cross-content:** In a science and ELA crossover, students use AI to summarize scientific data, then work in writing teams to clarify the summary and make it more understandable for a younger audience. Emphasize that AI can handle patterns and structure, but humans refine language, purpose, and audience awareness.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Foundations of Feedback and Storytelling	• Recognize that AI gives answers, but people ask questions • Notice when something sounds "off" or confusing and talk about it • Explain how a person helped them think, not just the computer	• Role-play scenarios: "Who said it—me or the machine?" • **Task cards to sort: What people do, what AI can do, what humans and AI can do** • Sentence starters: "I think that because . . . " and "A person would know . . . "
3–5: Beginning to Revise With AI Support	• Compare how an AI response is different from a friend's or teacher's response • Reflect on what's missing when only AI is used • Begin to explain why people still matter, even when AI can help	• Sample AI vs. human responses to explore together • **Tool for deciding when to ask a person vs. AI** • Reflection starters: "AI gave me ____, but my partner helped me ____."
6–8: Purposeful Revision and Feedback Cycles	• Use AI to brainstorm or give feedback, then revise based on peer ideas • Judge when AI helps and when it doesn't • Explain how human thinking shaped their final work	• Peer review forms that include "What did AI help with?" • **Decision pathways that help students decide when to use AI, ask a peer, or rely on their own thinking** • Tools for tracking AI feedback vs. teacher or peer feedback

Grade Band	Skills	Supports
9–12: Strategic Revision, Reflection, and Transfer	• Critically analyze the limits of AI and the importance of human voice • Make intentional choices about how, when, and why to use AI • Reflect on where their final thinking shows independent or collaborative insight	• **Self-assessment rubrics that include human-in-the-loop checkpoints** • Case studies that show ethical or creative missteps without human input • Protocols for tracking changes from AI prompt to final product

Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

Collective Intelligence

WHAT IS IT?

Collective intelligence is the shared intelligence of a group of people. In the context of AI, it refers to the interfacing of humans and technology to lead to a deeper range of insights and solutions.

Collective intelligence is the idea that when humans and AI work together—each bringing different strengths—they can produce better thinking, stronger work, and deeper insight than either could achieve alone. In school settings, this often looks like a student collaborating with an AI platform to brainstorm, revise, organize, or refine their thinking. Unlike using technology to do the work for you or arrive at a single answer, collective intelligence is an ongoing, interactive process, or a human-AI collaboration that unfolds through thoughtful engagement. The user doesn't just type a prompt and move on; they return to the tool, ask better questions, compare outputs, and make decisions about what to keep, change, or reject. It's an active process, not a passive one.

WHY IT MATTERS

Unlike the idea of keeping the human in the loop, which focuses on oversight and control by making sure a person supervises or approves AI use, collective intelligence shifts the focus to active participation. It's not just about watching or reviewing what AI produces. It's about working with the AI to shape, refine, and evolve the thinking. It's like a group project where both contributors, the human user and the AI platform, bring something valuable. The student brings voice, context, values, and intent. The AI brings speed, suggestions, structure, and synthesis. Both contribute to the final outcome and have a role in maintaining the quality of the work. And that is exactly the point. We want to make sure that student thinking isn't reduced to solitary interactions between a single learner and a chatbot. Students must also have lots of experiences with working alongside classmates, while leveraging AI to deepen the group's knowledge. AI is not at its most powerful when it does the work for you. It is most powerful when it helps you, and the group, to think better. That's why it is important for students to learn how to move between their own ideas and what the AI provides. They need to understand that the process is ongoing and collaborative, not one-step or one-sided.

HOW IT WORKS

When student teams work with AI as a thought partner, they engage in a dynamic form of collective intelligence that enhances learning through collaboration, critical thinking, and metacognition. AI tools like ChatGPT or Khanmigo offer real-time feedback, idea generation, and content clarification, but their real value emerges when students interact with these tools together by critiquing responses, refining prompts, and building on AI-generated ideas. This mirrors dialogic learning, where knowledge is co-constructed through conversation and reasoning (Mercer & Howe, 2012). AI becomes an additional "voice" in the group, one that invites students to question, verify, and synthesize, promoting higher-order thinking.

Research on collaborative learning and knowledge-building communities supports the idea that when students learn from each other, especially in response to complex tasks, they develop deeper understanding (Bereiter & Scardamalia, 2014). Adding AI expands the group's capacity to explore diverse perspectives and simulate expert input, helping learners at all levels contribute meaningfully. As students evaluate AI suggestions and integrate them with their own ideas, they practice epistemic agency, which is the ability to take responsibility for what and how they learn (Damşa et al., 2010). Real collaboration between humans and AI depends on more than generating good content. It also depends on how users manage memory, attention, and reasoning across both contributions (Gupta et al., 2025). Students need to keep track of where ideas came from, make sure they are working toward a shared goal, and revise until everything fits together as a seamless whole. Teaching this level of awareness helps students produce stronger final work and builds the thinking habits they'll need as collaboration with AI becomes a regular part of learning and life.

Common Classroom Applications

Elementary Examples

- **The "We Try First" rule.** Before accessing an AI tool, student teams must first attempt the task using their own knowledge, discussion, and resources. Only after agreeing that they've reached a limit (e.g., "We're stuck," "We can't agree," or "We need more info") may they consult the AI, then they reflect: Was the AI helpful? Did it change our thinking?
- **"Think First" station rotations.** Students rotate through task stations (e.g., writing a paragraph, solving a word problem, brainstorming ideas), but before using an AI assistant, they must work as a team to try solving the task together. Only after attempting and discussing it can they visit the "AI Helper Station" to compare answers or seek support.
- **Use partner power checks.** During inquiry or project time, students have laminated charts labeled "Check with a teammate," "Check with AI," or "Check with both." As they work, they slide a clothespin to the option they chose and write or draw a reason on a sticky note. This supports early reflection on the different kinds of knowledge AI and peers provide.

Secondary Examples

- **Use an "AI-as-Advisor" protocol.** Before using AI, groups first brainstorm multiple solutions or perspectives on a challenge (e.g., solving a historical dilemma or writing a persuasive article). Then, they ask AI the same question to compare with their human-generated ideas. They vote as a group: Which ideas feel stronger or more thoughtful and why? This emphasizes critical comparison and the human ability to judge nuance, ethics, and creativity.

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- **Set up strategy consultations during project work.** When students tackle a complex task, such as planning a school improvement proposal, it is important for them to cultivate awareness of AI's strengths (information recall) versus the team's strengths (emotional insight, local knowledge). Ask teams to document when they choose to rely on team discussion versus when to query the AI. After major decisions, they note how they leveraged human, collective, and AI intelligence.
- **Assign roles in team projects.** Teams assign formal roles to one another to ensure the project is completed in a timely way. Develop team roles that include AI. For example,
  - Task Manager: keeps the group focused on the goal.
  - Strategy Suggester: proposes how to divide labor among AI, peers, or both.
  - AI Operator: assumes primary responsibility for inputting prompts and sharing the chatbot's responses with the group.
  - Reflector/Recorder: tracks decisions on the strategy consultations and writes justifications.

Strategy in Action

In the Brain + Bot Challenge, students work in teams to solve creative tasks by combining their own thinking with support from an AI assistant. Each group begins by tackling a challenge, such as writing a riddle, inventing a creature, or planning a healthy school lunch, using only their shared ideas. They record their brainstorming under the heading *Our Brainstorm*, focusing on what they know and how they can build on each other's thinking. Once they've made a strong attempt, teams prepare a clear, focused question to ask an AI tool. The AI response is recorded under *What the Bot Said*, and students then compare, critique, and combine ideas from both sources. Together, they create a final product labeled *Made by Brain + Bot*, choosing what to keep from each contributor. Finally, students reflect on what they did best as a team and when AI was helpful.

Teacher Moves

- Ask teams, "What does your group already know that might help solve this?"
- When facilitating a group that is stuck, ask, "How could combining your ideas make the answer stronger?"
- Facilitate whole-class share-outs that highlight how teams learned from each other.

Student Moves

- Provide accountable talk sentence stems (Michaels et al., 2008) that facilitate group consensus and decision-making:
  - "Do we all agree on what we're doing?"
  - "I like what you said, and I think we can add . . . "
  - "Here's my idea. Tell me if it makes sense."
- Have "share the air" pauses to ensure that quieter voices, as well as AI, are invited into the conversation, e.g., "We haven't heard from you, yet. What are you thinking about right now?"
- Provide prompt frames that teams can use to improve their queries.

Extension or Adaptation Idea

- **Advanced learners:** Teams explore a complex, open-ended issue (e.g., reducing screen time) by dividing into subgroups with differing perspectives. After each side presents, the group consults an AI tool to generate a neutral synthesis of both perspectives. Students then evaluate the AI's synthesis, challenge or revise it using their own insights, and produce a final team-authored version.
- **Multilingual learners:** Students work in multilingual teams to co-construct solutions or ideas using scaffolds as needed (e.g., bilingual glossaries, sentence frames, translated prompts). One student contributes in their home language or preferred mode, and teammates paraphrase or build on it.
- **Emerging readers:** Students use an AI captioning tool of visuals (with guidance). Then, in small groups, they discuss what the AI got right in the image and what needs adjustment, using oral language and peer input. The team revises their idea or drawing and captions it themselves, making AI a visual thought partner rather than a source of finished work.
- **Cross-content:** In an interdisciplinary project, such as designing a playground, each group member contributes from a subject lens: math for measurements, science for materials, art for layout, and ELA for explanation. At key checkpoints, students ask AI for suggestions or feedback (e.g., "What are eco-friendly building materials?"), but they must vote on whether to use, modify, or reject the chatbot's suggestions.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Learning to Think Together	• Take turns speaking and listening • Share ideas and respond to others • Recognize when to ask for help • Begin using group tools (charts, visuals)	• Visual turn-taking cues • **Sentence stems for sharing and building ideas with others** • Group roles with visuals
3–5: Building Ideas as a Team	• Add on to others' ideas • Ask clarifying questions • Use shared tools like charts or organizers • Begin making group decisions (e.g., who asks AI?)	• Group thinking routines (e.g., Think-Pair-Square) • "Try It and Tweak It" activity focused on making changes to AI content • **Graphic organizer for building a better idea with AI support** • Reflection sheets for group choices
6–8: Collaborating Strategically	• Assign roles and manage group tasks • Decide when to use AI vs. peer thinking • Synthesize multiple perspectives • Reflect on team strengths and decisions	• Protocols for using AI in group work • **Role cards for group use of AI (AI Manager, Synthesizer, Clarifier, Checker, Note Catcher, and Connector)** • Group decision logs or digital collaboration boards • Teacher check-ins to mediate and coach
9–12: Leading Collective Intelligence	• Facilitate group discussions and debates • Critique and refine peer and AI-generated ideas • Distribute tasks strategically across humans and tools • Evaluate group process and adapt strategies	• AI ethics and critique frameworks • Collaborative project planning tools (e.g., Trello, Google Workspace, NotebookLM) • **Prompt maps with revision notes** • Self-check tool: "Is this still my thinking?" with indicators for voice, clarity, and intent

online resources Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

Adaptive Platforms

WHAT IS IT?

Adaptive platforms are AI-powered tools that personalize learning by adjusting content, pace of learning, or supports based on a student's performance or behavior. These tools are designed to meet learners where they are and provide a path that matches their need.

WHY IT MATTERS

Chances are very good that your students are already using AI, whether you (and they) realize it or not. Tools like Khanmigo, iReady, DreamBox, and even Duolingo are all AI-powered adaptive platforms. They are designed to observe how students interact with content and then shape what comes next.

Since adaptive platforms shape learning paths, they influence what students learn next, the kinds of support they receive, and even how long they stay on a topic. That's why it's important for students to understand that these platforms respond to *their* behavior. If students rush through questions, click randomly, or don't engage thoughtfully, the platform may adjust in ways that don't support their growth. On the other hand, when students take their time, show what they really know, and ask for support when needed, the platform is more likely to offer the right kind of challenge or reinforcement. In this way, students aren't just using adaptive platforms. They're helping shape what the platform does next.

This kind of personalization isn't limited to education, making it all the more important to teach as we prepare students for what is to come. Platforms like TikTok, YouTube, and Spotify also track user behavior and adjust what they recommend next. Recognizing that both entertainment and education platforms use similar adaptive approaches can help students become more thoughtful and critical consumers and users of AI-generated content both in and out of the classroom. The goal isn't to reject these tools, but to use them more intentionally and with greater awareness.

HOW IT WORKS

Adaptive platforms are always collecting information. As students interact with a task, whether completing problems, reading a passage, answering questions, or clicking through lessons, the system gathers data about their responses. These data fuel what comes next. Most platforms operate using an if-then logic algorithm. *If* a student gets several questions right in a row, *then* the platform might offer something more challenging. *If* a student struggles on a particular type of problem, *then* the system might offer more practice or adjust the level of support. This kind of real-time adjustment is what makes the platform feel personalized, but it also means the experience is constantly being shaped by the student's choices. Studies on these intelligent tutoring systems (the more formal term) show that they are responsive

to students with a variety of learning profiles because of their ability to personalize learning (Chien-Chang et al., 2023). The learner profile system is especially important. These systems use student responses to learn more about the student. For example, users are asked about interests, strengths, learning goals, and other learner attributes. A systematic review of studies on these self-declared profiles found that they can impact the learning path (Mejeh & Rehm, 2024).

Common Classroom Applications

Elementary Examples

- **Make the if-then logic visible.** After students complete a set of questions in an adaptive learning platform, pause and ask, "What do you think the platform noticed?" or "Why do you think it gave you this next?" This encourages early pattern recognition and helps students reflect on how their actions affect what comes next.
- **Introduce platform reflection routines.** Use simple sentence starters like, "The platform helped me because . . . " or "Next time I want it to show me more about. . . . " Have students complete these reflections after each adaptive task to build habits of metacognition and ownership.
- **Use comparison activities.** Let students experience a fixed learning task (printed worksheet, class assessment, or shared video link) and then compare it with an adaptive one. Prompt discussion around questions like, "How did the computer know what to give me next?" or "Which one felt more helpful and why?"

Secondary Examples

- **Prompt reflection on the learning path.** After working in a skill-based reading tool, ask students to annotate their learning pathway: "Where did it shift? What did I do that caused the change? Did it help?" This builds awareness that the system is reactive to their performance.
- **Connect to everyday apps.** Invite students to compare their experience in adaptive learning tools to recommendation systems on TikTok, YouTube, or Spotify. Ask them, "How are these tools similar? What do they learn from you? How do you stay in control of what's shown next?" Use this as a bridge between in- and out-of-school AI awareness.
- **Predict the path before using the platform.** Before logging into a familiar adaptive tool, ask students to write or sketch what they think the learning path will be based on their current understanding. After using the platform, have them compare their prediction to what actually happened.

Strategy in Action

To help students understand how adaptive platforms respond to user input, create a short inquiry-based activity that invites students to reverse-engineer the learning path generated by an AI-powered tool. After completing a session on an adaptive platform that students are already familiar with, ask them to work in pairs or small groups to map what they believed the system noticed about them, what they got right or wrong, how quickly they moved, and what kinds of tasks they were shown.

Next, ask students to develop a simple if-then chart based on their experiences, for example,

If I got the fraction question wrong, then it gave me a review video.

If I finished early, then it moved me ahead.

Students share and compare their charts with peers who had taken different paths. This can start an authentic and meaningful conversation about how AI-powered platforms adjust based on performance and behavior and help students recognize that what they see is personalized, not random.

Teacher Moves

- Check alignment with existing data and consider how well this matches what you already know from classroom assessments and observations.
- Before students begin, explain that the platform adjusts to their progress and set the purpose for this adaptive time, emphasizing that their effort shapes the experience.
- Facilitate comparison conversations and guide students in how to compare how the platform adapted for each of them, not only in terms of difficulty, but in the type of support provided.
- Highlight how AI responds differently based on what each student needs in the moment.

Student Moves

- Ask students to pause before beginning to consider what skill the platform is focusing on and why it might it have chosen that.
- After the session, ask students to compare experiences with a peer.
- Ask questions when the path doesn't make sense. If they're unsure why the platform gave them a certain question, task, or level of support, have them notify you.

Extension or Adaptation Idea

- **Advanced learners:** Act like a platform designer. Pick a subject you know well and create an if-then logic path to guide another student through it. This builds understanding of how adaptive tools respond to different needs and will even help students review content learned.
- **Multilingual learners:** Use visual cards (icons for correct/incorrect, slow/fast, easy/hard) to help provide students with language that helps them reflect on adaptive experiences.
- **Emerging readers:** Work with sentence starters and teacher-created prompts to build simple cause/effect charts based on their activity: "I got it right → it gave me something harder."
- **Cross-content:** Teach about adaptive platforms in other areas, such as those used for drivers' education, aviation training, and world language learning.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Learning Tool Explorers	• Recognize that learning apps respond to their answers and clicks • Begin to notice when a game or app gets easier or harder • Talk about how their effort affects what happens next	• Whole-class model of an adaptive tool with teacher think-aloud • "What changed?" guided discussion after using a learning app • **"Learning Together With Technology" anchor chart**
3–5: Responsive Learners	• Describe how adaptive platforms adjust based on their choices and pace • Reflect on times when the tool was helpful—or not quite right • Begin to connect thoughtful engagement to better support	• Exit slips: "How did the platform respond to me today?" • **Reflection chart: "Did the lesson feel too easy, too hard, or just right?"** • Simple checklist: "Did I try my best or rush through?"
6–8: Pattern-Aware Users	• Explain how platforms use if-then logic to adapt content • Identify when their actions may have affected the tool's response • Reflect on whether the feedback or path matched their actual need	• **Organizer for students: "What I did/What the platform did next"** • Small group discussion prompts: "Did this match what I needed?" • Teacher-facilitated prompt: "What advice would you give someone using this tool well?"

Grade Band	Skills	Supports
9–12: Intentional Decision-Makers	• Analyze how adaptive platforms influence learning pace and path • Reflect on how their data shapes recommendations and supports • Make intentional choices when using adaptive tools to meet personal learning goals	• **"What I did and what the platform did next" tracking tool** • Journal prompt: "What did this tool assume about me and was it right?" • Peer discussion or portfolio check-in: "How can I take charge of what happens next?"

Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

AI, Data, and You

WHAT IS IT?

AI tools learn from your behavior. What you click, watch, and type helps personalize your experience and prioritize the AI-fueled interactions you experience. When used for learning, AI's ability to "learn about you" can make the experience feel more targeted, relevant, and helpful. However, it also means these systems are collecting data about you, which has implications for both teacher and student privacy.

WHY IT MATTERS

Today's students grow up in a world where personalization feels normal. From their perspectives, they see learning platforms adjusting lessons and learning pathways, apps recommending content, and ads that seem to "know" exactly what you want. Behind every personalized experience is a system collecting, sorting, and acting on the data users share. Understanding how this data collection and personalization process works is crucial for making informed and protective choices regarding privacy. That understanding can also lead to asking better questions and making smart choices about tool usage. Digital responsibility and added control over their learning and their online lives are essential.

HOW IT WORKS

Helping students understand AI and privacy starts with pulling back the curtain: How is data collected? Who uses it? And what does it mean when a platform "learns" from what you do online? Building agency is the goal. When students start to pause and ask, "Why am I seeing this?" or "Who benefits from knowing this about me?" they begin to think more critically about the systems around them. AI can support this by showing patterns in their own digital behavior, simulating privacy decisions, or helping break down complex tech-speak into plain language.

Research supports the effectiveness of these practices. Students learn best when privacy education is scaffolded. That means connecting their digital actions to real consequences with tools they already use (Leung et al., 2021). Reflecting on how adaptive systems respond to their data can also build self-regulation and decision-making skills that will serve them in school and their future workplaces (Anthonysamy, 2021; Livingstone et al., 2019).

Common Classroom Applications

Elementary Examples

- **Ask, "Who sees me?"** Guide students through a sort-and-discuss activity where they consider what happens when they watch a video, play a game, or log in to a class app. Have them categorize each action based on who might see the data: just them, their teacher, or the company behind the tool. Use this to prompt questions like, "Why do they want to know that?"
- **Play a "What's Private?" sorting game.** Lead lessons and conversations about the types of data that are okay to share and the types of data that should be kept private. Have students sort examples, such as favorite food, hobbies, grades, passwords, address, or middle name, into "Okay to Share" and "Keep Private" categories, and then discuss why some information is more sensitive and shouldn't be shared freely.
- **Introduce a password power challenge.** Teach the importance of strong, private passwords through a friendly classroom competition to build the strongest password using rules (e.g., no names, include numbers and symbols). Let students test weak versus strong passwords with an AI simulator or interactive quiz. Purpose: Introduces safe password creation and why passwords protect personal data.

Secondary Examples

- **Plan an "Accept or Ask" activity.** Students walk through mock pop-ups about data collection. Ask them to vote on whether they would click "accept all" or "ask app not to track," then guide a conversation about what each choice means and how it affects who sees their information.
- **Conduct a digital footprint walk.** Ask students to reflect on their own digital footprint by making a timeline of their typical online activity over a 24-hour period, such as using search engines, opening apps, or posting on social media. Then have them annotate which actions likely involved sharing data and with whom. Use this as a prompt for reflection: "Which of these moments shared the most about you and did you realize it at the time?"
- **Review school district and state guidelines on digital privacy for minors with students.** Many states and provinces have policy guidelines to protect student data use by technology providers. For instance, California has regulations that safeguard student data from misuse by educational technology companies and ensure a safe online learning environment, such as the Student Online Personal Information Protection Act (SOPIPA). Have students investigate protections in their region and compare to the guidelines in other states.

Strategy in Action

To help students build awareness of how AI tools and platforms use personal information, teach students to pause anytime they are asked to enter data, such as their name, birthday, location, or email, and think carefully about what was being requested. The goal isn't to avoid sharing altogether, but to build the habit of asking, "Why does this platform need this information? What might it do with it? Who else might see or use it?"

Students discuss how, in some cases, sharing information could improve the user experience. For example, entering your age might help an AI-powered site adjust reading level or content. But they also learn that some requests might be unnecessary. Help students understand that being a responsible user means thinking critically before clicking "accept," "allow," or "submit," and knowing that they can ask questions before handing over their information.

Teacher Moves

- Introduce key vocabulary like *personal information* and *data privacy* using authentic examples that students already encounter online and in the classroom.
- Create and reference an anchor chart or set of reflection questions like, "Do I know who's asking?" or "Is this safe to share?"
- Embed short check-ins during technology use to prompt student thinking and normalize pausing before sharing data.

Student Moves

- Practice a routine of "pause before you share" when deciding what information to enter into a website, app, or tool.
- Explain their thinking aloud or with a partner when deciding if a piece of information is safe or necessary to share.
- Refer to a classroom chart or set of guiding questions when they are asked for information online, especially names, birthdays, emails, or location.
- Recognize when something feels like too much information and know to ask a trusted adult for help before continuing.

Extension or Adaptation Idea

- **Advanced learners:** Analyze the sign-up process for different tools or platforms and compare what types of data they ask for and why. Then create a set of "green/yellow/red flag" indicators to guide peer use.

- **Multilingual learners:** Invite students to role-play common online scenarios, such as signing into a game or filling out a form, using sentence frames to explain what they would or wouldn't share and why.
- **Emerging readers:** Read picture books like *Chicken Clicking* by Jeanne Willis or *The Technology Tail* by Julia Cook and act out scenarios where characters must decide whether to share information or ask an adult.
- **Cross-content:** In a science unit on data collection, have students compare how scientists gather information, such as weather patterns or animal behavior, to how companies collect personal data online. Discuss any ethical implications that apply.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Digital Observers	• Recognize that tools remember what they click or choose • Notice when a site or app changes based on past choices • Begin asking, "Why am I seeing this?"	• **"What happens when you click . . . " chart and prompts** • Visuals: "Before I clicked/After I clicked" • Sentence stems: "It changed because I . . . "
3–5: Early Awareness Builders	• Understand that apps collect and use their data to change content • Ask how and why a platform knows what they like • Reflect on how behavior shapes recommendations or feedback	• Interactive scenario cards: "What does the app learn about you?" • T-chart: "What I do/What the platform does next" • **Anchor chart: "Smart clicks vs. risky clicks"**
6–8: Informed Digital Participants	• Explain how digital behavior creates a data trail • Reflect on who might use that data and for what purpose • Ask critical questions about consent, access, and benefit	• Case studies: "Who's tracking what—and why?" • **"Terms of Service" hunt for finding and understanding important information** • Group task: "Would you click accept? Why or why not?"
9–12: Privacy-Conscious Decision-Makers	• Evaluate trade-offs between personalization and privacy • Consider who benefits from their data—and who doesn't • Make informed decisions about what they share, click, or allow	• Reflection prompt: "What data did I give away today—and was it worth it?" • Privacy decision simulations with debriefs • **Structured debate: "Is personalization worth the data cost?"**

online resources Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

AI Limitations

WHAT IS IT?

AI limitations include not only what a system *can't* do, but also the illusions it creates that make it seem more capable than it is. They are built to deliver complete responses, although not necessarily correct ones. This is at the heart of understanding AI limitations: the boundary between what AI *can* do and what it might *appear* to do.

WHY IT MATTERS

When students don't understand these limitations, they may take AI at face value, accepting everything it produces as accurate, complete, and objective. This overreliance can lead to shallow thinking, repeated errors, or even the spread of misinformation. We should be teaching students to not just accept AI generated content but to question and analyze output. This kind of pause is central to both digital literacy and responsible AI use. It invites students to slow down and consider *why* AI responded the way it did, *how* it generated that answer, and *what* might be missing or misrepresented.

One particularly important limitation we want students to understand is this: No matter how "human-like" an AI system may appear, it is not a person. It's not a real character sharing lived experiences, not a friend checking in on your day, and not a teacher offering advice. In a 2023 study, the Nielsen Norman Group found that a large percentage of AI users assign human traits to AI platforms responding to them as if they had personalities, intentions, or emotions. While adult users may intellectually understand that these systems aren't human, younger users might not draw the same boundary. This makes it especially important to teach students that AI does not truly understand them, care about their well-being, or operate with emotional intent. It may *look* like AI is listening, empathizing, or connecting, but those are illusions created by design, not genuine relationships.

Generative AI is a tool. It can assist, enhance, and even accelerate many tasks but at the end of the day, it does not replace human intelligence. The AI systems we interact with today don't think, feel, or understand. They generate responses based on data patterns, not insight. Teaching students this distinction doesn't limit their use of AI; it strengthens it. When students know where the tool ends and where their thinking begins, they're more equipped to use AI responsibly, creatively, and critically.

HOW IT WORKS

To teach students about AI limitations, it helps to first explain a bit about how these tools are built and how they function. Generative AI systems are trained on massive amounts of data—books, articles, websites, photographs, and more—but the models

don't read, analyze, or learn from them in the way humans do. Instead, they identify patterns in the data and use statistical predictions to generate the most likely next word, sentence, or idea based on a user's input (Burtell & Toner, 2024). For example, an analysis of research citations used by freshman college students found that many did not exist, but often contained bits of real information, such as real authors, book titles, or journal names (Watson, 2024).

That's a crucial concept for students to grasp: AI doesn't truly *understand* the information it shares. It doesn't know whether something is true or false, biased or fair, complete or misleading. It can't fact-check itself or draw meaning from personal experience. And because these systems are trained on existing data, which users don't usually see or control, there are built-in risks and limitations, including outdated content, incomplete perspectives, or biased sources. For example, while AI systems like ChatGPT are initially trained on large datasets that reflect information available up to a specific point in time (e.g., at the time of publication the training data for OpenAI's current models was completed in October 2023), they can also access real-time information when connected to available tools. By teaching how generative AI works behind the scenes, educators can help students see why the technology has limits, and why those limits matter. When students understand this, they become better equipped to ask thoughtful questions, evaluate AI responses with a critical lens, and stay in charge of their own learning and thinking.

Common Classroom Applications

Elementary Examples

- **Sounds right, but is it?** Read short AI-generated responses aloud (or display them) and ask students to decide: "Is this definitely true?" "Might this be wrong?" "Should we check another source?" Emphasize that even if something sounds correct, it's important to think and verify.
- **"Fact or fiction" sort.** Share a set of mixed statements (some AI-generated, some human-written, some accurate, some clearly wrong or silly). Have students work in pairs to sort them into "likely true," "needs checking," and "not true," explaining their reasoning and what clues they used.
- **Ask the robot: Can it feel?** Pose prompts to an AI assistant like "How are you feeling today?" or "What's your favorite food?" Then guide a discussion about whether a robot can really have feelings, likes, or experiences. Help students distinguish between *sounding* human and *being* human.

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Secondary Examples

- **"Prompt and response" audit.** Have students enter a topical prompt into a chatbot, such as "explain climate change" or "summarize the previous novel we read in English" and then critically evaluate the response. What seems missing? Is the tone overly confident? Are there assumptions, gaps, or inaccuracies? Ask students to annotate or mark up the response and use it to support discussion.
- **Have a gallery walk for AI limitations.** Set up stations with AI-generated outputs that include common limitations (hallucinated facts, biased language, vague generalities, or incorrect math). At each station, students identify the limitation and write how they would revise the response or prompt to address it.
- **Debate the topic: Human or machine?** Students analyze whether a response was written by a human or AI and debate how they could tell. Use this as a springboard to discuss why AI can sound human but lacks actual understanding, emotion, or lived experience, and why that matters when using it to learn, write, or explore ideas.

Strategy in Action

To help students better understand the limitations of AI-generated responses, design a lesson around a prompt connected to students' experiences: "What's the best way to get around our city?" After generating a response using an AI platform, students analyze the output for accuracy, tone, and missing context. Many will quickly notice that the AI might provide generic suggestions that didn't reflect local realities, such as outdated transit info, oversimplified routes, or lack of accessibility considerations. Using their own knowledge and classroom tools, students can annotate the AI response and then revise it to better reflect the needs, experiences, and perspectives of people in their community. The activity helps surface key AI limitations and reinforces the value of human insight and experience in refining and evaluating digital content.

Teacher Moves

- Choose content students have personal experience with to help them more easily spot AI limitations.
- Prepare an AI-generated response that shows subtle issues like vague generalizations, outdated info, or missing perspectives.
- Model critical reading with questions like, "Is this accurate for _____? What's missing? Does this reflect your experience?"

Student Moves

- Use critical thinking to evaluate whether particular tasks will pose risks given AI limitations, ensuring using the technology is done with purpose and intention.
- Collaborate in groups to revise or expand the AI response using improved prompts, classroom research, or their own understanding.
- Develop fact-checking protocols for students to verify information.

Extension or Adaptation Idea

- **Advanced learners:** Create a public service announcement (PSA) on one limitation of AI, such as hallucinations, limited knowledge of current events, or inaccurate or incomplete information. Students should use AI tools to create their poster, video, or podcast.
- **Multilingual learners:** Engage students in a conversation about when translation tools are most helpful and when they fall short. Invite them to share personal examples of times when a translation didn't make sense or caused confusion, as well as times when it was genuinely useful. This real-life connection will help them better understand AI limitations.
- **Emerging readers:** Create a simple class-illustrated book called *Why AI Isn't a Person!* Use clear language to explain limitations (e.g., "AI doesn't get jokes," "AI doesn't have feelings"). This might include a section on various tasks (e.g., hugging a friend, writing a poem, solving a puzzle), that are sorted into three categories: Only Humans, Only AI, and Both Humans and AI.
- **Cross-content:** In geography, have students compare AI responses about local systems or landmarks to current events. Use this to show that AI can't replace firsthand knowledge and experiences.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Early Noticers	• Notice when texts include things that say something odd or feel off • Understand that technology can't think or feel • Talk about why people still need to check answers when using computers	• "Robot or Real?" games using emotional or personal questions • **"What technology can't do" anchor chart**

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Grade Band	Skills	Supports
3–5: Growing Skeptics	• Spot when AI leaves out important details • Question how the AI "knows" the content generated • Compare AI answers to what they've learned or experienced	• "Sounds smart, but . . . " activity with confident-but-wrong responses • **"Wait . . . is that right?" error hunt activity** • Anchor chart: "Things AI can't truly understand"
6–8: Developing Critical Users	• Evaluate how AI creates output without understanding • Reflect on tone, accuracy, and missing perspective • Explain how data patterns shape (and limit) responses	• **AI "Confidence vs. Competence" activity with bold but shallow responses** • Group task: Trace an AI mistake back to likely cause (missing context, bad prompt, etc.) • Comparison activity using same prompt with different outputs
9–12: Discerning Decision-Makers	• Analyze how and why AI can mislead or oversimplify • Articulate the risks of accepting AI at face value • Decide when AI output should be trusted, revised, or replaced	• **Case studies of authentic AI mishaps and their impact** • "Truth trap" reflection: What made this output believable but wrong? • Self-audit checklist: "What did I verify? What do I still control?"

Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI

AI and Society

WHAT IS IT?

AI and society is about exploring the ways this technology is shaping industries, influencing culture, raising ethical questions, and affecting everyday life. From social media feeds to facial recognition, from recommendations on streaming platforms to smart assistants like Siri or Alexa, AI plays a growing role in shaping what we see, what we hear, and even what we believe.

WHY IT MATTERS

One of our most important responsibilities as educators is to prepare students for the future, and in doing so, help them build the skills they'll need to make a positive impact, no matter the path they choose. Teaching students about AI and society is a critical part of that work. When we help students understand how AI is shaping the world around them, we give them tools to ask thoughtful questions, notice patterns, evaluate risks, and imagine better possibilities in an AI-driven world. AI is becoming an unavoidable factor in the careers students pursue, the jobs they hold, the communities they live in, and the decisions they face. That's why we want students to be more than just users of AI—we want them to be informed, responsible participants in shaping the world we all share.

HOW IT WORKS

In exploring what's most important when it comes to teaching students about AI, the Organisation for Economic Co-operation and Development takes the stance that preparing students for the future means building their capacity to navigate complexity, reflect on change, and take part in shaping ethical and inclusive societies, not just perform well on academic tasks (Schleicher, 2018). Just as we teach students to analyze sources, engage in meaningful dialogue, and apply academic skills to face-to-face situations, we must also teach them to understand, question, and engage with the technologies shaping their lives. Teaching about AI in society is not extra; it's essential.

Common Classroom Applications

Elementary Examples

- **Have students brainstorm ways AI might be used in school (autocorrect, book recommendations, daily tasks like lunch count or attendance).** From there have students sort the ideas into categories like *very helpful*, *somewhat helpful*, or *not helpful at all.* Use this to talk about the positive and negative aspects of AI in society.

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- **Explore an AI-powered tool already used in the classroom.** Guide students to investigate how it "knows" what to do next. Ask, "How does it decide what to recommend? What information does it use?" This builds awareness of how AI personalizes learning experiences.
- **Analyze AI-generated images.** Show students examples that appear real but include small clues that they were made by AI. Invite them to look closely and explain how they know and why that matters in a world where images can be manipulated.

Secondary Examples

- **Read and respond to a current article about AI integration in society.** The daily news is filled with articles about self-driving cars, facial recognition, or medical technology, to name but a few possible topics. Have students identify both benefits and concerns, then write an opinion piece or debate whether the AI use described is helpful, harmful, or a mix of both.
- **Foster AI career exploration.** Students interested in learning more about careers can investigate how AI has impacted their selected industry. Students may initially (and inaccurately) believe that AI is only impacting technology careers. The World Economic Forum *Future of Jobs Report* estimates that 86 percent of jobs will be reshaped by 2030 (WEF, 2025) and calls for a "reskilling revolution." Among the most heavily impacted? Farmworkers, construction workers, and nurses.

Strategy in Action

Incorporate a lesson on how artificial intelligence is used in civic systems, for example, in voting, law enforcement, or public service programs. While teaching about civics, address the ways this technology can affect fairness and access across a system. The class reads a variety of texts explaining how these technologies are used and may even talk with the school nurse, a voting commissioner, a parent in a technology field, or other local stakeholders who can help explain how these systems work in their own community. Students then engage in a guided discussion to analyze how AI is being used, who it helps, who might be at risk, and whether it aligns with the values and goals of that civic system. By connecting this learning to a topic already being taught, the teacher helps students explore real examples of where AI is showing up, shaping society, and raising questions about how we respond.

Teacher Moves

- Select content you are exploring with students in a unit or lesson and find a current example of AI being used in an area connected to that content. Provide specific examples of how and where AI is integrated into this part of society.

- Provide guiding questions for a structured discussion, such as, "Who is impacted by this? What values or goals does it support or challenge?"

Student Moves

- When relevant, join students in investigating how AI is impacting the topic of study, whether it is zoo management in biology, examining survey data in math, or reading a picture book with illustrations and photographs.
- Students can interview a family member or community worker about their experiences or concerns with AI.
- Have learners compare how AI is used in different countries and discuss equity or access issues.

Extension or Adaptation Idea

- **Advanced learners:** Generate a list of related topics or questions connected to the issue being studied (for example, surveillance, public trust, or bias), and choose one to investigate further through research or discussion.
- **Multilingual learners:** Ask students to label images showing AI in daily life (e.g., smart home, chatbots, GPS) and explain their function orally.
- **Emerging readers:** Use a short video about robots or AI helpers and draw what they learned, then annotate or highlight key ideas together.
- **Cross-content:** Students create visual representations of how AI might change their community in the next twenty years, combining creative expression with future-focused thinking, and explain their choices in a short artist's statement.

Skill Progression by Grade Band

Grade Band	Skills	Supports
K–2: Noticing Technology in the World	• Identify tools and machines in their everyday life (including smart tools) • Talk about how people use technology to help them • Recognize that AI is created by people	• **Picture walks or classroom hunts for "smart" tools** • Read-alouds featuring technology helpers (real or fictional) • Sorting activity: "Made by people" vs. "Used by people"

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Grade Band	Skills	Supports
3–5: Exploring the Role of AI in Daily Life	• Give examples of how AI is used in homes, schools, or communities • Ask questions about how and why AI is used • Begin to wonder who creates AI and why	• **"Where do we see AI?" chart for guided exploration** • Sentence starters for curiosity: "What if AI . . . ?" or "Who decides . . . ?" • Videos or visuals of everyday AI use (voice assistants, recommendations, etc.)
6–8: Considering Impact and Influence	• Analyze how AI affects decisions in school, home, or society • Discuss who benefits from AI and who might be left out • Identify ways AI shapes habits, choices, or opportunities	• **Short scenarios of AI in action with guided reflection and analysis** • Discussion protocols for fairness, bias, and access • Graphic organizers for tracking positives and concerns
9–12: Investigating Ethics, Equity, and Systems	• Evaluate the societal impact of AI in areas like education, health care, justice, and media • Explore issues of data use, privacy, and algorithmic bias	• **Protocol and topics for debate around AI and society** • Tools for analyzing who benefits or is harmed by AI decisions • Access to news articles, expert interviews, and data-driven reports for research

Examples of the boldface supports above can be found on the book's companion website here: https://companion.corwin.com/courses/TeachingStudentsAI