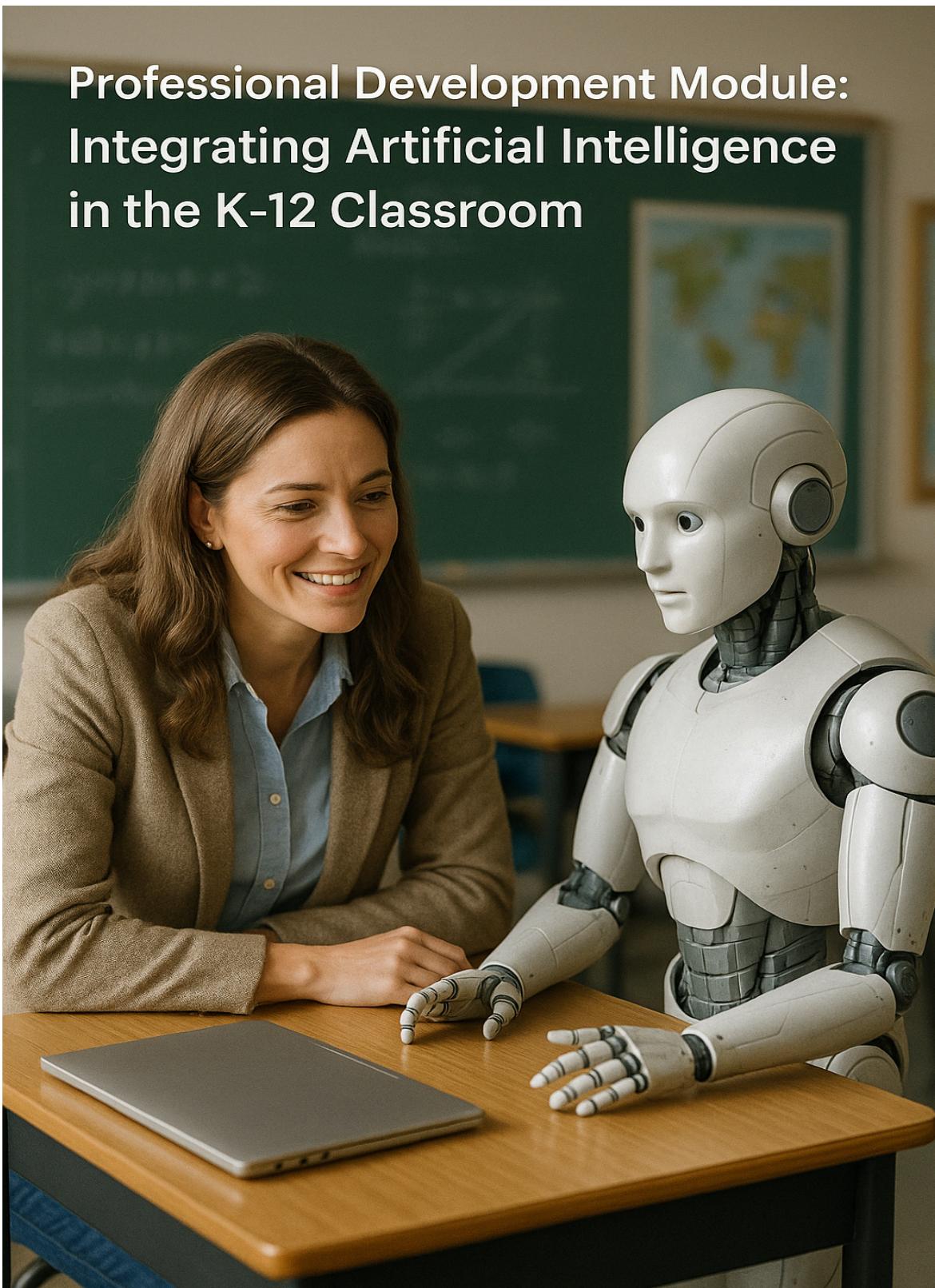


Professional Development Module: Integrating Artificial Intelligence in the K-12 Classroom



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Introduction: Your Partner in the AI-Powered Classroom

Let's explore how Artificial Intelligence can serve as your new partner in the classroom. The goal here isn't to overhaul your curriculum but to introduce small, manageable shifts that leverage AI to enhance what you already do best. Think of AI not as a replacement, but as a new kind of thought partner—a tool that, when guided by your expertise and inquiry, can help foster deeper critical thinking, boost student engagement, and cultivate the agency our students need. This module is designed to build your confidence and competence by providing practical strategies, ethical frameworks, and essential resources to help you integrate AI into your classroom responsibly and effectively. Together, we will explore how to put students and educators at the center of this digital transformation, ensuring that technology serves to enrich the learning experience while reinforcing the essential human connections at the heart of education.

1.0 Module 1: Foundational Concepts - Putting the Teacher in the Loop

Before we dive into classroom applications, it's essential to build a solid foundation. This module introduces the basic capabilities of AI and, more importantly, establishes a human-centric philosophy for its use. By understanding what AI can (and cannot) do and committing to a "teacher-in-the-loop" model, we ensure that educator judgment and student well-being remain at the core of every interaction. This approach is critical for maintaining accountability, ethical behavior, and contextual understanding in the AI-powered classroom.

1.1 What is Artificial Intelligence?

At its core, artificial intelligence (AI) is a computational science focused on developing systems that use data-driven models to perform tasks that simulate aspects of human intelligence, such as reasoning, learning, and decision-making. These systems continuously adapt to new information over time. The foundational capabilities of AI offer a wide range of possibilities for education (New Mexico Public Education Department, 2025).

Foundational Capability	Description
Understanding & Reasoning	AI organizes and stores information to make logical decisions and draw conclusions, such as in autocorrect or smart speakers.
Learning & Adapting	AI systems improve and evolve over time by analyzing data and adapting to new information, like in video streaming or online shopping recommendations.
Detecting Patterns & Personalizing Experiences	AI identifies unusual patterns and tailors interactions to individual preferences and needs, such as a chatbot or virtual assistant.
Perceiving the World	AI interprets sensory inputs like images, sounds, and videos through technologies like computer vision and speech recognition.
Understanding Language	AI processes and interacts using human languages, enabling tasks like translation, text generation, and conversational systems.

Making Decisions & Solving Problems	AI evaluates options, solves challenges, and chooses the best actions to achieve goals, such as in intelligent tutoring systems.
Planning and Optimizing	AI maps out strategies and finds the most efficient ways to accomplish tasks or use resources, like optimizing driving directions.
Acting Autonomously	AI can operate independently in real-world environments, such as self-driving cars or robotics.

1.2 The Guiding Philosophy: Human-Centric AI

A human-centric approach to AI values the person over the machine. In education, this means AI should not replace educators but rather support and enhance their capacity to build relationships, nurture student growth, and create dynamic learning experiences (New Mexico Public Education Department, 2025). This philosophy is best embodied by the "**teacher-in-the-loop**" model. While AI can process vast amounts of data, it lacks the nuance, moral considerations, and situational awareness that are hallmarks of expert teaching. By keeping **yourself** actively involved in supervising, guiding, and overriding AI outputs, we ensure that all decisions are more ethical, accurate, and contextually appropriate.

1.3 The 4-I Framework for Interaction

The 4-I framework provides a practical, human-centric cycle for engaging with AI tools. This iterative process ensures that human judgment guides the interaction from start to finish, with each step informing the next (New Mexico Public Education Department, 2025).

1. **Inquiry:** The process begins with human-driven curiosity. The user identifies a problem, question, or area of exploration that AI might assist in analyzing.
2. **Input:** The user provides specific data, context, or prompts to the AI system. The quality and clarity of this input significantly shape the relevance and usefulness of the AI's output.
3. **Interpretation:** The user analyzes and evaluates the AI-generated output. This critical stage involves assessing the information for accuracy, bias, and alignment with the original inquiry.
4. **Insight:** The user integrates the AI-assisted findings into their decision-making or creative process. This new understanding enhances human judgment and often leads back to the first step with new, more refined questions.

This cycle reinforces that AI is a tool to augment our thinking, not replace it. Now that we have established this core philosophy, let's explore some simple, effective ways to apply it in the classroom.

2.0 Module 2: Low-Lift Strategies for Immediate Classroom Use

The most effective way to build confidence with AI is to start small. This module focuses on "low-lift" strategies that can be integrated into your existing lesson plans with minimal preparation time. The following techniques are designed to be tried "tomorrow" and can make a noticeable difference in student engagement, critical thinking, and agency without requiring you to overhaul your curriculum.

2.1 Enhancing Writing and Literary Analysis

Here are three ways to use AI as a 'thought partner' to help students see their own writing and the works of others with fresh eyes:

- **Deepen Reflection on Writing:** After students complete a piece of writing or while analyzing a mentor text, use a large language model (LLM) like ChatGPT or Claude with the simple prompt: "What's beautiful about this writing?" The AI may highlight sensory language, pacing, or other craft moves the student didn't realize they had. This strategy adds another voice to the reflection process, prompting valuable conversations about what makes writing effective (Educate for Justice, 2025).
- **Conduct AI-Powered Language Dives:** Use an AI chatbot as a partner for Language Dives, an activity designed to unpack rich, complex sentences. Students can ask the AI to explain a sentence's meaning, identify figurative language, or offer a paraphrase. This is particularly effective for multilingual learners who benefit from multiple exposures to complex syntax (Educate for Justice, 2025).
- **Analyze Authorial Style:** Have students compare a famous work, like a Shakespearean sonnet, with an AI-generated version in the same style. This activity helps students better analyze the unique tone, style, and craft of the original author and see how an AI's output, by comparison, can feel bland. This sharpens their analytical skills by focusing on what makes a human writer's voice distinct (Edutopia, 2024).

2.2 Boosting Inquiry and Comprehension

- **Host Conversations with Text:** Allow students to use a chatbot to interact with a text they have just read. They can ask clarifying questions, debate points of view, or request paraphrases of difficult passages. This offers individualized support and works especially well for reluctant readers who may hesitate to ask questions in class but will eagerly test their interpretations with an AI (Educate for Justice, 2025).
- **Role-Play with Historical Figures:** In a history class, have students interact with an AI that is prompted to role-play as a historical figure like Cleopatra or Einstein. This can be an engaging way to learn about their lives and perspectives. Crucially, this activity must be paired with a fact-checking component. Students must cross-reference the AI's output with reliable historical sources to identify errors and understand the tool's tendency to "hallucinate" or fabricate information (Edutopia, 2024).

2.3 Fostering Precision and Critical Thinking

- **Push for Precise Language:** Use an AI image generator like TwinPics AI to make the abstract skill of revision more tangible. Students craft a descriptive prompt to generate an image and then iteratively revise their language to produce a more accurate result. This pushes them to be more specific, intentional, and precise with their word choices in a fun, competitive format (Educate for Justice, 2025).
- **Fact-Check the Textbook:** Empower students to build media literacy by using AI as a "neutral third party." Invite them to ask a chatbot to fact-check a textbook passage or ask what perspectives might be missing from a historical narrative. This empowers students to question their sources and engage more critically with course content without putting the teacher in a politically precarious position (Educate for Justice, 2025).

While these low-lift strategies can immediately enhance lessons, their effectiveness hinges on a crucial assumption: that students can navigate AI outputs with a critical eye. The 'Role-Play' and 'Fact-Check the Textbook' activities inherently reveal AI's flaws. The next module provides structured frameworks to move this critical awareness from an occasional discovery to a core student competency.

3.0 Module 3: Fostering Critical AI Literacy in Students

Using AI effectively is not just about getting answers; it is about teaching students to question, evaluate, and refine those answers. True AI literacy moves beyond basic operation to cultivate a healthy skepticism and a critical eye. This module provides structured, age-appropriate frameworks for building the essential skills of verification, bias detection, and intentional prompting, empowering students to navigate the digital world as informed and responsible citizens.

3.1 Skill 1: Verification and Fact-Checking

The "VERIFY" method is a critical framework for teaching students to assess the reliability of AI-generated information. It provides a memorable, age-appropriate structure for building the habits of a healthy skeptic (Miriam, 2025).

Elementary (K-5): AI Detective Training

1. **V – Voice your questions:** Teach students to pause and ask, "Does this make sense to me?"
2. **E – Explore other sources:** Introduce the "Three Source Rule"—find the fact in three different places.
3. **R – Remember what you know:** Encourage students to do a "Brain Check" to compare AI answers with their prior knowledge.

4. **I – Identify impossible things:** Play "Spot the Silly" games to find obviously wrong AI information (e.g., "dogs have six legs").
5. **F – Find a trusted grown-up:** Practice scenarios where the correct response is to ask the teacher for help.
6. **Y – Your brain is still the boss:** Remind students that AI is just a tool and their brain remains in charge.

Classroom Activity: Create an "AI Detective Kit" with notepads where students record "facts" from an AI and must find evidence in classroom books to verify them.

Middle School (6-8): The Skeptical Researcher

1. **V – Verify with primary sources:** Teach the difference between primary and secondary sources and that primary documents outrank AI outputs.
2. **E – Evaluate for bias and errors:** Look for vague language, suspicious dates, or too-perfect stories that signal fabrication.
3. **R – Research the claim independently:** Use alternative search tools or rephrase questions to compare results from different sources.
4. **I – Investigate quoted sources:** Teach students to confirm that citations provided by an AI actually exist.
5. **F – Fact-check using reliable websites:** Maintain a classroom list of grade-appropriate fact-checking sites for different subjects.
6. **Y – Your judgment matters:** Have students write reflections on why they chose to accept or reject specific AI information.

Classroom Activity: Run an "AI Fact-Check Challenge" where teams compete to identify accurate and fabricated information in an AI-generated paragraph.

High School (9-12): Advanced Critical Analysis

1. **V – Validate methodological claims:** When AI discusses research, question the methodology (e.g., sample size, date, selection).
2. **E – Examine for logical fallacies:** Teach students to recognize circular reasoning, false equivalencies, and other fallacies in AI-generated arguments.
3. **R – Recognize hallucinations:** Compare answers from different AI tools on the same topic to identify confidently stated but fabricated "facts."
4. **I – Identify expertise boundaries:** Understand which topics AI handles well (e.g., coding syntax) versus poorly (e.g., niche historical claims).
5. **F – Follow the citation trail:** Evaluate the quality of cited sources. Are they peer-reviewed, reputable, and recent?
6. **Y – Your responsibility as a scholar:** Discuss academic integrity and when and how to acknowledge AI assistance ethically.

Classroom Activity: Host an "AI Misinformation Challenge" where teams create plausible-sounding but misleading AI outputs for other teams to debunk.

3.2 Skill 2: Identifying and Confronting Bias

AI models are trained on vast datasets of human-created text, so they inevitably reflect and reproduce societal biases (Warr, 2024). Teaching students to identify these biases is a fundamental component of digital citizenship. Research has shown that LLMs can provide different scores and feedback on student writing based on perceived race or interests (e.g., "rap music" versus "classical music"). The feedback can also become more authoritative or have higher "clout" for certain student demographics, mimicking inequitable social patterns in education (Warr, 2024).

To move from awareness to action, here are two classroom-ready protocols for helping students systematically identify and challenge bias in AI outputs:

- **The 3 Cs:** This protocol from Gholiday Muhammad combines critical thinking ("deep and analytical thinking") with criticality ("power, equity, and anti-oppression") to push students toward action (McDowell, 2023).
 - **Critical:** Students analyze an AI-generated text, comparing it to class notes and other resources to determine its accuracy and asking the AI follow-up questions to probe its reasoning.
 - **Criticality:** Students work in pairs to evaluate what perspectives are missing, especially from marginalized communities, and what assumptions the AI is making.
 - **Contribution:** Students develop a list of arguments and questions to challenge the AI, asking it to rewrite statements from different perspectives to ensure a higher level of accuracy and inclusivity in the future.
- **Perspective Analysis:** Developed by Robert Marzano, this protocol uses AI to help students examine a topic from multiple viewpoints (McDowell, 2023).
 - Students first identify their own position on a controversial topic and the reasoning behind it.
 - They then ask the AI to generate arguments for both a supporting *and* an opposing position on that same topic.
 - Finally, students critically evaluate the claims, evidence, and reasoning provided by the AI for both sides, checking for accuracy and representation. This process helps them see the interrelationships within a topic and reflect on how their own thinking has evolved.

3.3 Skill 3: Prompt Engineering for Deeper Thinking

Prompt engineering is the art of crafting precise inputs to get targeted outputs from an AI. Far from being just a technical skill, it is a critical thinking process that mirrors the scientific method: hypothesis, testing, and refinement (AI Engineering Lab, 2025).

The critical thinking cycle of prompt engineering includes three key steps:

1. **Defining the Problem:** Students must first break down a complex topic into manageable parts and pinpoint exactly what information they need from the AI.
2. **Evaluating Responses:** Once the AI generates an output, students assess its accuracy, relevance, and depth, sparking discussion about the AI's limitations.

3. **Iterating Solutions:** Based on their evaluation, students revise and refine their prompts. This iterative loop builds resilience and adaptability.

Two classroom applications can help students develop these skills:

- **Prompt Critique Sessions:** After using AI for an assignment, have students work in groups to critique one another's prompts. They analyze how small changes in language can produce significantly different outcomes, deepening their understanding of how to communicate with AI effectively.
- **Role-Playing Scenarios:** Assign real-world problems, such as developing a business strategy or solving a community issue. Students design and test prompts within these hypothetical scenarios, making the learning dynamic and illustrating the practical impact of well-crafted prompts.

By building these critical AI literacy skills, we prepare students not just to use AI, but to command it thoughtfully. This naturally leads to the educator's role in setting clear expectations for how these powerful tools should be used in their own classroom.

4.0 Module 4: Designing for Academic Integrity and Ethical Use

The rise of AI has placed academic integrity and data privacy at the forefront of educators' concerns. Rather than defaulting to a reactive or punitive stance, this challenge presents an opportunity to have proactive conversations about ethical and responsible use. This module provides concrete frameworks for setting clear expectations, evaluating tools with a critical eye, and fostering a classroom culture where academic integrity is understood and upheld.

4.1 Moving Beyond "Gotcha": A Modern Approach to Academic Integrity

While AI presents new challenges to originality, it also provides a chance to engage in nuanced discussions about what it means to create authentic work.

First, it is crucial to approach AI detection tools with extreme caution. Research has shown that these tools not only have low reliability but are also frequently biased against non-native English writers (New Mexico Public Education Department, 2025; Liang et al., 2023). Instead of relying on flawed detectors, a more effective approach is to provide clear, upfront guidance to students.

The **AI Assessment Scale** is a powerful tool for establishing assignment-specific expectations (Perkins, Furze, Roe & MacVaugh, 2024). By defining the permissible level of AI use for each task, you eliminate ambiguity and empower students to make ethical choices. You can adapt this framework to create your own classroom guidelines.

Level	Description of Permissible Use
1. No AI	The assessment is completed entirely without AI assistance. Students must rely solely on their existing knowledge and skills.
2. AI Planning	AI may be used for pre-task activities such as brainstorming, outlining, and initial research. The final submission must show how the student has independently developed and refined these initial ideas.
3. AI Collaboration	AI may be used to assist with specific tasks such as drafting text or refining work. Students must critically evaluate and modify any AI-generated content to demonstrate their own understanding.
4. Full AI	AI may be used extensively to complete any elements of the task, with students directing the AI to achieve specific goals. The focus is on demonstrating critical thinking in how the AI is guided.
5. AI Exploration	AI is used creatively to generate novel insights or develop innovative solutions. Students and educators may co-design the assessment to explore unique AI applications.

For example, you might classify the '**Role-Play with Historical Figures**' activity (Module 2.2) as a Level 3: AI Collaboration, since students must critically evaluate and modify the AI's output. Conversely, the '**Deepen Reflection on Writing**' strategy (Module 2.1) could be a Level 2: AI Planning, where the AI helps generate initial insights that the student then develops independently.

4.2 A Framework for Vetting AI Tools: Navigating the M.A.Z.E.

Not all AI tools are created equal. Before adopting any new platform, educators must evaluate it to ensure it is safe, effective, and aligned with educational goals. The **M.A.Z.E.** framework, developed by the Friday Institute, provides a simple yet effective four-step guide for this vetting process (New Mexico Public Education Department, 2025).

- **Monitor Data Privacy:** How is student data collected, used, and protected? Ensure the tool complies with data protection laws and respects student privacy. The risks outlined in the

following section on student data privacy are precisely what this step of the M.A.Z.E. framework is designed to mitigate.

- **Assess for Accuracy:** Does the tool provide reliable and accurate information? Critically evaluate its outputs for correctness and validity.
- **Zero-in on Bias:** Does the tool exhibit biases? Look for potential algorithmic discrimination and ensure it is trained on diverse data. This directly connects to the skills you build with students using the '3 Cs' and 'Perspective Analysis' protocols, turning bias detection from a student activity into a professional responsibility.
- **Evaluate Value:** Does the tool offer a genuine educational benefit that enhances learning? Ensure it aligns with pedagogical goals and isn't just a novelty.

4.3 Upholding Student Data Privacy

The integration of AI tools introduces significant data privacy risks that must be managed proactively. A literature review by Ružić & Balaban (2024) identified several primary concerns for educational settings:

- **Unintentional disclosure of sensitive personal data:** Student inputs can contain identifiable information that AI models might process or reproduce inappropriately.
- **Lack of transparency:** It is often unclear how AI platforms collect, store, and utilize student data, making informed consent difficult.
- **Potential non-compliance with regulations:** Many third-party tools may not comply with student data privacy laws like FERPA (in the U.S.) or GDPR (in the E.U.).
- **Unclear accountability for data protection:** The lines of responsibility are often blurred between technology providers and schools, making it difficult to manage privacy or address breaches.

Establishing clear policies at the classroom and school level is the first step toward mitigating these risks and building a foundation for long-term professional growth in this evolving landscape.

5.0 Module 5: Your Professional Journey with AI

Integrating artificial intelligence into your practice is a continuous professional journey, not a one-time event. As the technology evolves, so will our understanding of its pedagogical potential. This final module provides mental models and frameworks to help you plan your growth, reflect on your practice, and envision a future where AI enhances your teaching in transformative ways.

5.1 Two Modes of Integration: Teaching WITH vs. ABOUT AI

As you begin to incorporate AI, it's helpful to distinguish between two primary modes of integration. Both are valuable and can be woven into your existing curriculum (New Mexico Public Education Department, 2025).

Teaching WITH AI	Teaching ABOUT AI
Focuses on using AI tools as resources to enhance traditional teaching and learning processes. This approach leverages AI to achieve existing learning objectives and can make learning more personalized and efficient.	Aims to build students' understanding of how AI works, its applications, and its societal implications. This approach incorporates the foundational principles of AI and develops critical thinking about its limitations, biases, and ethical concerns.
<i>Example: Using an AI-powered tool to provide real-time grammar feedback on a student's essay or using a simulation to conduct a virtual science experiment.</i>	<i>Example: Having students explore how recommendation algorithms function, debate the ethics of facial recognition technology, or analyze an AI tool for evidence of bias.</i>

5.2 Scaffolding Your Practice: The SAMR Model

The SAMR model is a well-established framework for reflecting on how technology is integrated into teaching and learning. It can serve as a scaffold for your own professional growth with AI, helping you move from simple substitution to transformative redefinition of tasks (New Mexico Public Education Department, 2025; Puentedura, 2014).

SAMR Level	AI's Role	Example
Substitution	AI acts as a direct substitute for a traditional tool with no functional improvement.	Using an AI chatbot to answer basic factual questions instead of a textbook glossary.
Augmentation	AI acts as a substitute but adds functional improvements that enhance the task.	Using an AI writing assistant to provide real-time feedback on grammar and syntax, improving on a basic spell checker.

Modification	AI enables a significant redesign of the learning task.	Using AI-powered simulations to allow students to conduct complex science experiments that would be impossible in a traditional lab.
Redefinition	AI enables the creation of entirely new tasks that were previously inconceivable.	Having students use AI to co-create predictive climate models or design an AI-assisted solution to a local community problem.

5.3 A Look Ahead: UNESCO AI Competencies for Teachers

As we look to the future, frameworks like the draft AI Competencies from UNESCO can guide our long-term professional development. This framework outlines a progression from basic awareness to the ability to create new pedagogical approaches with AI (UNESCO, n.d.).

Aspect	Acquisition	Deepening	Creation
Human-centred Mindset	Aware of the opportunities and risks of AI in education, based on an understanding of human rights and values.	Can integrate AI tools safely and responsibly, prioritizing the safety, privacy, and rights of all stakeholders.	Can critically evaluate, reflect upon, and contribute to the evolution of AI in education.
Ethics of AI	Understands the fundamental ethical principles related to AI and the pivotal role of humans in its development.	Can critically assess and apply AI tools based on their ethical implications, upholding values of equity, inclusion, and diversity.	Can lead by example in the critical advocacy of AI ethics and participate in communities to shape institutional and societal regulations.
AI Foundations & Applications	Recognizes fundamental AI concepts and understands how AI functions.	Can proficiently identify, evaluate, select, and apply appropriate AI	Can demonstrate proficiency in adapting or modifying AI tools to

		tools for specific educational contexts.	design solutions for unique educational contexts.
AI Pedagogy	Can identify the pedagogical benefits of specific AI systems and effective strategies for incorporating them.	Can adeptly employ human-centric pedagogical strategies in the use of AI.	Can critically evaluate AI's role in pedagogy and design AI-enhanced transformative pedagogies.
AI for Professional Development	Aware of AI's potential to support continuous professional development and is motivated to use it for lifelong learning.	Can proficiently use AI tools for collaboration and participation in professional learning communities.	Can critically adapt or modify AI tools to meet their own and their community's transformative professional development needs.

Where are you on this spectrum? Take a moment to reflect. Perhaps you are currently at the 'Acquisition' stage in AI Pedagogy but at the 'Deepening' stage in your Human-centred Mindset. Use this framework not as a judgment, but as a personalized map for your own professional growth in the coming year.

Conclusion: Start with One Small Shift

This module has covered a wide range of concepts, from foundational principles and low-lift classroom strategies to frameworks for ethical use and long-term professional growth. The goal, however, is not to do everything at once. The most powerful way to begin is to choose one strategy or framework that resonates with your teaching style and try it in your classroom next week. Perhaps it's asking an AI "what's beautiful" about a student's writing, or introducing the elementary "VERIFY" method, or clarifying your expectations for an assignment using the AI Assessment Scale. By starting with one small, intentional shift, you can begin to explore this new territory with confidence. With your critical guidance and pedagogical expertise, AI can become a powerful partner in creating more dynamic, engaging, and thoughtful learning experiences for your students.

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Appendix: Glossary of AI Terms

The following terms are helpful for navigating conversations about artificial intelligence in education (New Mexico Public Education Department, 2025).

Term	Definition
Algorithm	A set of commands or instructions that computers use to complete a task or answer a problem. In AI, algorithms are used to sift through data so a machine can make a decision.
Generative AI	An AI model that generates media (e.g., text, images, video) based on guidelines and parameters given by a user. Examples include chatbots, photo filters, and virtual assistants.
Large Language Model (LLM)	A foundational AI model trained on vast amounts of text. It uses this training to infer new content and carry out natural language processing tasks. Examples include ChatGPT, Gemini, and Claude.
Machine Learning (ML)	A type of AI that uses algorithms to extract patterns from large amounts of data. Unlike rule-based algorithms, machine learning is iterative and uses an adaptive approach to make objective predictions based on the patterns it analyzes.