

WISE AI Literacy: A Durable Framework of Human Agency for K-12 Schools

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Abstract

This article presents the WISE AI Literacy Framework—Wisdom-centered, Informed, Safe, and Ethical—as a human-centered model for AI literacy in K–12 education. Drawing on technical, tool-use, policy, ethics, and human-centered approaches, the framework addresses a central gap in current scholarship: the limited emphasis on human judgment, disciplinary knowledge, and the enduring purposes of schooling. In response, WISE positions practical wisdom and human agency as the organizing principles for AI literacy, emphasizing not only how AI works and how it may be used, but also when, why, and to what extent its use is educationally appropriate. The framework comprises five interrelated domains: understanding AI, using AI responsibly, interacting with AI productively, evaluating AI critically, and applying AI wisely. The article further considers how these domains may be operationalized across classrooms, teaching practice, and school systems. It argues that AI literacy in education should be understood not merely as technical competence, but as the cultivation of informed, ethical, and context-sensitive human judgment in an increasingly AI-mediated world.

Keywords: Artificial intelligence (AI), literacy, framework, human agency

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Introduction

Every day, teachers confront a growing reality: Students are submitting assignments that are fluent, polished, and often indistinguishable from high-quality adult work—yet it is not always clear how much reflects their own thinking and judgment.

Recent evidence highlights this tension. A December 2025 RAND survey found that AI use for homework reached 62% among middle and high school students, while 67% of students themselves expressed concern that AI may be harming their critical thinking (Schwartz & Diliberti, 2026). Educators report growing unease about academic integrity, fair assessment, and the erosion of productive struggle, even as overall cheating rates have not dramatically increased (Lee et al., 2025; Borasi, 2026).

The result is an erosion of confidence. Educators struggle to assess authentic student learning, navigate inconsistent expectations around AI use, and make ongoing judgments about when and how AI can best serve their classrooms' core purposes (U.S. Department of Education, 2025). School leaders must balance technological access with academic integrity, automation with human agency, and innovation with the development of students' thinking and judgment. Students, meanwhile, must learn to use powerful AI tools safely and effectively while exercising judgment and retaining ownership of their learning.

These challenges are often heightened by persistent misconceptions—that AI will replace teachers, inevitably undermine thinking, or require an all-or-nothing approach. In practice, generative AI offers both risks and opportunities. When used wisely, it can expand access to knowledge, support creativity, and deepen inquiry. The central question is therefore not *whether* AI belongs in schools, but *how* it can support learning and reasoning while preserving critical thinking, academic integrity, and human judgment.

In response, researchers and organizations have proposed a range of AI literacy frameworks emphasizing conceptual understanding, ethical awareness, critical evaluation, and practical engagement (Casal-Otero et al., 2023; Ng et al., 2024; Long & Magerko, 2020; Touretzky et al., 2019). These frameworks represent important progress. However, as generative AI becomes embedded in everyday classroom practice, important pedagogical questions remain unresolved: How should AI shape curriculum, instruction, and assessment? Under what conditions, and for what purposes, should it be used in teaching and learning? What forms of human knowledge are most important in guiding these decisions?

To address this need, we constructed our own WISE (Wisdom-centered, Informed, Safe, and Ethical) AI Literacy Framework. The framework emerged from communicating and collaborating with practicing educators while designing professional development and graduate courses relating to AI literacy. In this context, we repeatedly encountered a core question: What should educators know and be able to do with generative AI? While existing frameworks offered valuable insights, none fully centered on human judgment and the enduring purposes of K–12 education in a way that directly translated into daily teaching decisions. WISE combines the best elements of existing frameworks while centering human agency. Developed in collaboration with practicing educators, it is offered as a practical, beginning framework open to further research, critique, and refinement.

Existing AI Frameworks

A significant number of researchers, policymakers, and educational organizations have developed frameworks to guide AI literacy in education. These frameworks aim to help students and teachers understand AI systems, evaluate their outputs, and use emerging technologies responsibly (Casal-Otero et al., 2023; Ng et al., 2024). Table 1 compares several major orientations in the literature and highlights their distinctive contributions to AI literacy in K–12 education.

Table 1
Comparison of Major AI Literacy Framework Approaches

Framework Orientation	Representative Examples	Primary Emphasis	Key Contributions
Technical AI Literacy Frameworks	Touretzky et al. (2019); Long & Magerko (2020); CSTA & AI4K12 (2025)	Understanding how AI systems work and identifying core AI concepts for all K-12 students.	Provide foundational conceptual knowledge about algorithms, machine learning, data, and perception.
Tool-Use and Interaction Frameworks	Ng et al. (2024); Mills et al. (2024); U.S. Department of Labor (2025)	Practical interaction with AI tools, including prompting, iterative dialogue, and output interpretation.	Emphasize applied AI use in real-world contexts; articulate a progression from understanding to use, evaluation, and responsible application; highlight workforce readiness, transferability, and effective delivery principles (e.g., experiential learning, contextualization)
Policy- and Ethics-Oriented Frameworks	Holmes et al. (2022); UNESCO (2024a); UNESCO (2024b); European Commission / OECD (2025)	Ethical awareness, fairness, bias, transparency, accountability, and societal implications.	Emphasize responsible governance, ethical reflection, and preparing students to participate thoughtfully in AI-mediated societies.
Human-Centered Frameworks	Digital Education Council (2025); Vontz et al. (2026)	Human knowledge, judgment, and practical wisdom as the foundation for AI use.	Integrates technical understanding, responsible use, productive interaction, critical evaluation, and contextual judgment while keeping human agency at the center

Technical AI Literacy Frameworks. Technically oriented frameworks focus on helping learners understand how AI systems function. These models emphasize foundational concepts such as algorithms, machine learning, data representation, perception, and reasoning. One of the most widely cited examples is the AI4K12 initiative, which introduced the “Five Big Ideas in AI” to support K–12 education (Touretzky et al., 2019). Long and Magerko (2020) propose a set of AI literacy competencies to develop conceptual understanding of AI technologies and their implications, while more recent work by CSTA and AI4K12 (2025) identifies prioritized AI learning outcomes for all students. Together, these approaches provide essential foundations for understanding how intelligent systems operate.

Tool-Use and Interaction Frameworks. Tool-use and interaction frameworks emphasize practical engagement with AI systems in everyday learning. These models focus on helping students and teachers interact productively with AI through skills such as effective prompt engineering, iterative dialogue, and interpreting outputs. Prominent examples include Ng et al.

(2024), which outlines competencies for productive human-AI collaboration, and the Digital Promise AI Literacy Framework (Mills et al., 2024), which provides educators with guidance on using AI as a tool for creation, problem-solving, and personalized learning.

A complementary example is the U.S. Department of Labor's AI Literacy Framework (2025), which defines AI literacy as a set of foundational competencies for using and evaluating AI in real-world contexts. The framework outlines a progression from understanding AI principles to exploring uses, directing AI effectively, evaluating outputs, and using AI responsibly. In addition, it emphasizes delivery principles such as experiential learning, contextualized instruction, and the development of complementary human skills. Together, these approaches highlight a shift from viewing AI literacy as conceptual knowledge toward framing it as a practical, transferable capability embedded in authentic tasks and workflows.

Policy- and Ethics-Oriented Frameworks. Policy- and ethics-oriented frameworks place greater emphasis on the societal, moral, and governance dimensions of AI. These approaches address issues such as fairness, bias, transparency, accountability, privacy, and the broader impact of AI on individuals and communities. Key contributions include Holmes et al. (2022), which calls for community-wide ethical frameworks in education; UNESCO's AI competency frameworks for students and teachers (2024a; 2024b), which emphasize human rights and ethical participation; and the European Commission, and OECD (2025), which provides guidance for preparing learners to navigate AI-mediated societies. These frameworks underscore the importance of equipping students not only to use AI systems but also to understand their broader societal implications.

Human-Centered Frameworks. A fourth orientation explicitly foregrounds humans as the foundation for responsible AI use. The Digital Education Council AI Literacy Framework (Digital Education Council, 2025), for example, balances technical competencies with critical thinking, creativity, emotional intelligence, and ethical awareness. Designed primarily for higher education, however, it does not fully address the distinct pedagogical realities of K–12 schooling, including the development of disciplinary knowledge, productive struggle, and moment-to-moment classroom decision-making.

More fundamentally, frameworks such as DEC primarily organize AI literacy around effective participation in AI-enabled academic and professional environments. WISE begins from a different educational premise: The central challenge of AI in K–12 education is ensuring that AI supports the development of human judgment, disciplinary understanding, intellectual independence, and responsible agency. Accordingly, WISE organizes technical understanding, ethical use, interaction, and evaluation around practical wisdom (*phronesis*)—the human capacity to determine what is best, right, and good in specific educational contexts. In this sense, WISE is not simply a framework for AI competency, but a framework for preserving the human purposes of education in an AI-mediated world.

Toward a Human-Centered Model of K-12 AI Literacy. Together, these frameworks represent significant progress by helping learners understand AI systems, interact with them productively, and consider their ethical implications. However, a key gap remains: Most frameworks do not fully position human judgment and durable disciplinary knowledge (i.e., what schools and teachers currently teach) as the central organizing principles for AI use in K–12 education.

As AI systems grow more capable, the central educational challenge shifts from helping students understand or use these tools to ensuring humans remain responsible for directing how and why they are used. In AI-mediated classrooms, these decisions are constant. Students must decide how to use AI safely, ethically, and responsibly when brainstorming, summarizing, or solving problems. Teachers must make context-sensitive pedagogical judgments about how AI shapes inquiry, creativity, and feedback in relation to meaningful learning. At the systems level, schools must align policy, curriculum, and assessment with the enduring purposes of education.

Human agency depends on the ability to interpret information, evaluate claims, and act responsibly. The progression from data to information, knowledge, and wisdom (Whatley, 2024) clarifies why schools remain essential. Disciplinary learning builds the intellectual tools for reasoning and decision-making (Bransford et al., 2000), while inquiry, discussion, and reflection—grounded in social interaction (Bruner, 1996; Vygotsky, 1978; Dewey, 1938)—cultivate practical wisdom (Schwartz & Sharpe, 2010).

AI can support learning by providing rapid access to information and scaffolding ideas, but it can also weaken the effortful processes of understanding when it removes uncertainty, revision, and dialogue. Without strong, prior knowledge, students struggle to evaluate AI outputs or detect errors and bias (Allen & Kendeou, 2023).

Wise AI use depends on disciplinary knowledge, ethical reasoning, and context-sensitive judgment about the purposes of learning and the consequences of delegating intellectual work (Aristotle, ca. 305 B.C.E./2004; Flyvbjerg, 2001; Schwartz & Sharpe, 2010). WISE builds on existing contributions by centering human judgment and practical wisdom as the foundation for responsible decision-making in K–12 schools.

The WISE AI Literacy Framework

We began conceptualizing a human-centered framework by establishing a more educationally aware definition of AI literacy. AI literacy is the durable capacity to use AI wisely, effectively, safely, and ethically across contexts. Meaningful and responsible engagement with AI is not primarily a technical challenge but an educational one. It requires structured disciplinary understanding, the capacity for contextual judgment, and the ability to help students accurately perceive situations, carefully analyze evidence, prudently judge competing claims, and competently act in their civic, social, and personal worlds.

To explicitly address this conception of AI literacy, we built the WISE AI Literacy Framework (**W**isdom-centered, **I**nformed, **S**afe, and **E**thical), which centers human knowledge, judgment, and practical wisdom in AI literacy.

- **Wisdom-centered.** Places practical wisdom (contextual decision-making) at the heart of the framework. It is the human capacity to determine what is best (most effective), right (ethically appropriate), and good (worth pursuing for human development) in specific contexts of AI use. This includes deciding when AI should be used, when it should be limited, and how it can serve meaningful educational purposes.

- **Informed.** Grounds AI use in traditional forms of knowledge (i.e., understanding, applying, judging, and contemplating) structured by disciplines/subjects, alongside a clear understanding of how AI systems work and where their limits lie. This foundation enables students and teachers to use AI to deepen understanding.
- **Safe.** Ensures that AI use protects students and learning environments by safeguarding privacy, maintaining academic integrity, and preventing harm through clear expectations, policies, and responsible safeguards. At the school and district levels, this includes establishing consistent guidelines for appropriate AI use, protecting student data, communicating expectations to families, and providing professional learning to help teachers implement AI safely and responsibly.
- **Ethical.** Guides responsible AI use through attention to fairness, bias, transparency, and accountability, while cultivating self-governance—the capacity to regulate one’s own use of AI and make principled decisions about when and how it should be used. Ethical use requires not only following rules but exercising judgment, including questioning, challenging, and, when necessary, resisting or redirecting AI in ways that support human learning and flourishing.

WISE, then, integrates the most valuable elements of technical, tool-oriented, policy-oriented, and human-centered approaches while re-centering AI literacy on human agency. Specifically, it draws foundational conceptual understanding from technical frameworks (Domain 1), practical interaction and prompting skills from tool-use approaches (Domain 3), ethical awareness, fairness, and safety considerations from policy- and ethics-oriented frameworks (Domain 2), and critical evaluation from human-centered perspectives (Domain 4). What distinguishes WISE is that it organizes all these elements around practical wisdom and human judgment (Domain 5), making them serve the broader goals of learning, disciplinary knowledge, and human agency rather than treating them as parallel competencies.

Responsible use of AI ultimately depends on the ability of students, teachers, and schools to determine when AI assistance is appropriate, how it should be integrated into intellectual work, and why it should be directed toward meaningful human purposes. These decisions require not only technical understanding of AI systems or familiarity with specific tools but also disciplinary knowledge, ethical reasoning, and contextual judgment about the purposes of a task and the consequences of delegating intellectual work to machines (Flyvbjerg, 2001; Schwartz & Sharpe, 2010).

In practical terms, WISE shifts the focus of AI literacy to informed, safe, and ethical judgment—more like a compass than a GPS. It orients AI judgments toward what matters most: what students should do, what teachers should prioritize, and what schools should value. AI literacy is not simply about using intelligent systems effectively but about ensuring that human thinking remains central in an AI-mediated world.

Every level of the educational system can use WISE to guide decision making. For students, it means learning to use AI as a tool for thinking and learning—making informed decisions about when and how to use it, questioning its outputs, refining ideas, and taking responsibility for their work. For teachers, it means exercising professional judgment to integrate AI responsibly while ensuring it serves the human purposes of their classrooms. For schools and districts, it means

establishing shared expectations, policies, and professional learning that ensure AI aligns with the intellectual and human purposes of education.

The framework honors the enduring purposes of education and the fundamental forms of human knowledge, while recognizing the real capabilities of AI. As intelligent systems continue to evolve, the need for human interpretation, ethical judgment, and wise application remains constant.

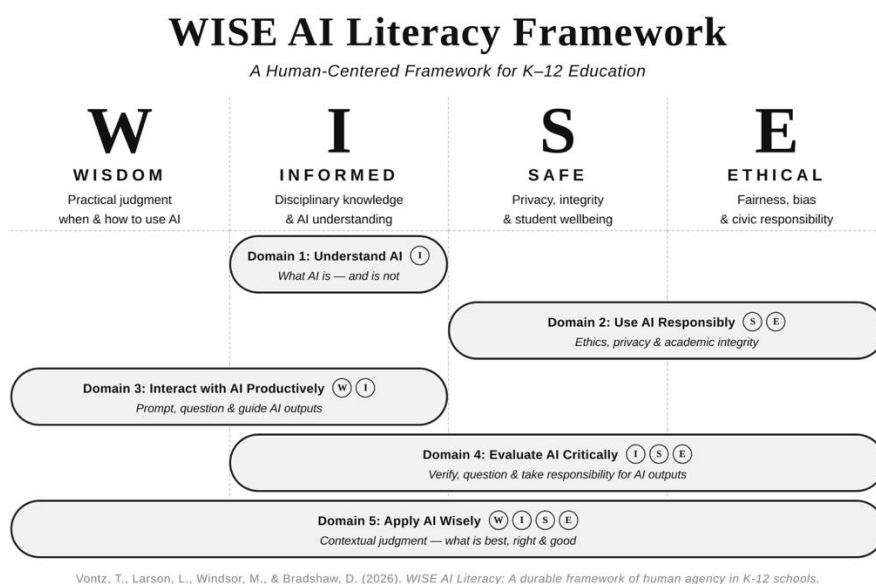
WISE is organized around five interrelated domains that support informed human engagement with AI: understanding AI, using AI responsibly, interacting productively with AI systems, evaluating AI outputs critically, and applying AI in context. Table 2 explains how each domain reflects a distinct focus and set of competencies that support informed engagement with AI in K-12 settings. Together, these domains move from foundational knowledge to action and decision-making in practice.

Table 2
WISE AI Literacy

Domain	Focus	Core Competencies	Why This Domain Matters
Domain 1 Understand AI (Informed)	Foundational understanding of how AI systems work and their limitations.	Understand how AI systems generate outputs; recognize probabilistic responses and training data influences; distinguish AI from traditional software; identify common misconceptions about AI; recognize limitations of AI output.	A clear conceptual understanding of AI helps prevent overtrust, disengagement from reasoning, and misuse of AI tools.
Domain 2 Use AI Responsibly (Safe, Ethical)	Ethical responsibilities when using AI in educational and other contexts.	Recognize ethics in AI use; protect privacy and sensitive data; identify bias and fairness concerns; understand transparency and accountability; align AI use with academic integrity and professional norms.	AI systems can introduce ethical risks that are not immediately visible; responsible use requires awareness and careful judgment.
Domain 3 Interact with AI Productively (Informed, Safe, Ethical)	Mixing human and artificial knowledge in ways that support powerful teaching, learning, and products.	Use prompts and dialogue to guide AI interactions; refine questions and requests iteratively; compare and question AI outputs using disciplinary knowledge; recognize when to redirect or disengage from AI interactions.	Human expertise and interaction shape the quality of AI outputs; productive dialogue with AI helps ensure that technology supports human thinking.
Domain 4 Evaluate AI Critically (Wisdom-Centered, Informed, Safe, Ethical)	Examining AI outputs and taking personal responsibility for their accuracy and relevance.	Verify information generated by AI; identify hallucinations and bias; evaluate reasoning and relevance within disciplinary contexts; document and explain AI use; accept accountability for AI-assisted work.	AI outputs may appear authoritative even when incorrect; human judgment remains essential for evaluating accuracy, reasoning, and outputs.
Domain 5 Apply AI Wisely (Wisdom-Centered, Informed, Safe, Ethical)	Determining what is best (most effective), right (ethically responsible), and good (serving meaningful human purposes) when using AI.	Determine when AI meaningfully improves thinking, learning, or problem-solving; decide when human reasoning should remain primary; use AI to support creativity, inquiry, and understanding; exercise contextual judgment for AI use.	AI's greatest value emerges when human knowledge and judgment amplify learning, understanding, and responsible human action.

Figure 1 visualizes the relationships among the five domains. The subsequent discussion further explains how each domain reflects a distinct focus and a set of competencies that support informed engagement with AI in educational settings.

Figure 1
WISE AI Literacy Framework



Domain 1: Understand AI (Informed). Developing a practical conceptual understanding of how generative AI works and its limitations is the necessary foundation for wise use. Students and teachers need to know that these systems rely on probabilistic pattern matching from vast training data rather than comprehension or reasoning.

At its core, this domain rests on a clear distinction between *data-driven pattern recognition and human understanding*. AI generates outputs through statistical prediction rather than meaning making; it has no internal model of truth, context, or intent. Key ideas include the probabilistic nature of responses, the influence of training data (including its gaps and biases), and the inherent limitations of current systems—hallucinations, outdated knowledge, and the absence of genuine reasoning. This conceptual clarity is what allows learners to approach AI outputs with appropriate skepticism rather than naïve trust (Bender et al., 2021; Bommasani et al., 2021; Long & Magerko, 2020; Touretzky et al., 2019).

In practice, a middle school science teacher might have students examine an AI-generated explanation of photosynthesis, then identify which parts reflect accurate scientific models versus plausible-sounding fabrications. A high school social studies class could compare AI summaries of a historical event against primary sources to reveal how training data shapes (and distorts) narratives. Without this foundational understanding, even strong prompting and evaluation skills rest on shaky ground.

Domain 2: Use AI Responsibly (Safe, Ethical). Responsible use goes beyond following rules to developing self-governance in AI-rich environments. Students must learn to protect their privacy,

respect academic integrity, recognize when AI use crosses ethical lines, and understand how algorithmic bias can reinforce stereotypes or inequities.

The central concept here is learning to treat *AI as a sociotechnical system* that is never neutral, always embedded in human values, power structures, and societal patterns. Ethical responsibility requires more than compliance; it demands the cultivation of self-regulation and moral imagination: the ability to anticipate unintended consequences, weigh competing goods, and take ownership of outcomes. This domain foregrounds transparency, accountability, fairness, and the protection of human dignity in every interaction with AI (Casal-Otero et al., 2023; Holmes et al., 2022; European Commission & OECD, 2025).

A concrete example is a teacher who requires students to include a brief “AI Contribution Statement” with major assignments, detailing what AI helped with and what remained their own work. In another classroom, students role-play scenarios involving biased AI outputs (e.g., an AI resume screener or content moderator) and discuss fair alternatives. At the school level, clear, consistently enforced policies create a culture where responsible use becomes the norm.

Domain 3: Interact with AI Productively (Informed, Safe, Ethical). Productivity with AI emerges when students and teachers treat it as a thinking partner rather than an answer generator. This involves crafting effective prompts, engaging in iterative dialogue, providing disciplinary context, and knowing when to steer or abandon a conversation with the model.

The key idea is that productive interaction is fundamentally *dialogic and reciprocal*. Human expertise provides the context, goals, and critical judgment that AI lacks; the quality of the output depends far more on the human half of the exchange than on the model's sophistication. This domain therefore emphasizes iterative refinement, strategic scaffolding, and the disciplined use of disciplinary knowledge to shape AI responses toward meaningful educational ends (Ng et al., 2024; Bommasani et al., 2021).

For instance, an English teacher might guide students through multiple rounds of prompting to co-develop a thesis statement, requiring them to explain how each revision improved (or weakened) their argument. A math teacher could have students use AI to explore different approaches to a problem, then justify which solution best demonstrates conceptual understanding. The goal is for students to leave these interactions with stronger ideas and clearer thinking, not just polished final products.

Domain 4: Evaluate AI Critically (Wisdom-Centered, Informed, Safe, Ethical). Because AI outputs often sound authoritative, critical evaluation is among the most important skills to teach in an AI-mediated classroom. Students must verify claims, detect hallucinations, assess the quality of reasoning, and judge relevance against disciplinary standards and credible sources.

At a deeper level, this domain shifts evaluation from simple fact checking to *disciplined judgment*. It requires learners to apply subject-specific criteria—accuracy, coherence, relevance, and significance—while also considering the broader purposes of the task and the potential impact of the output on their own thinking. Critical evaluation is an act of intellectual agency: reclaiming

responsibility from AI Models for what counts as knowledge in a given context (Long & Magerko, 2020; Luckin & Cukurova, 2023).

One proposed classroom routine involves “AI Critique Stations,” where students receive an AI-generated response to a complex question and work in groups to fact-check, identify logical flaws, flag potential biases, and improve upon the AI-generated response. Over time, this practice builds the habit of never accepting AI output at face value. Teachers can further strengthen this domain by modeling their own evaluation process aloud when preparing lessons or providing feedback, making invisible judgment processes visible to students (Ritchhart et al., 2011).

Domain 5: Apply AI Wisely (Wisdom-Centered, Informed, Safe, Ethical). This capstone domain integrates all others. It focuses on the contextual, values-based judgment required to decide *when, why, and to what extent* AI should be used for any given learning goal. Practical wisdom here means determining whether AI will deepen understanding, creativity, and agency or risk short-circuiting the struggle and reflection that produce genuine growth.

The core concept is *practical wisdom* (phronesis): the cultivated ability to deliberate about what is best, right, and good in specific educational situations. Unlike technical skill or simple rule-following, wise application requires integrating knowledge from all four prior domains and weighing them against the enduring purposes of education—productive struggle, disciplinary understanding, and the development of independent human judgment (Flyvbjerg, 2001; Schwartz & Sharpe, 2010).

In one classroom, students might begin a research project by wrestling with the problem independently before turning to AI for targeted support, then reflecting on how the tool influenced the depth of their final work. A teacher might redesign a unit so that AI is used for initial brainstorming and revision but deliberately withheld during the core analytical phase. At the school level, this domain informs decisions about which tools to adopt, how to redesign assessments, and what kinds of learning experiences remain fundamentally human.

Operationalizing WISE: Implications for K–12 Education

WISE becomes most meaningful when translated into educational practice. While the framework identifies the core domains of AI literacy necessary for responsible engagement with intelligent technologies, schools must ultimately determine what these domains look like in everyday classrooms, lessons, and decisions. Operationalizing the framework requires moving beyond conceptual understanding to developing practices that cultivate informed human judgment about how, when, why, and to what extent AI should be used.

This human–AI partnership has several important implications for how teaching and learning should be designed. These implications can be understood more systematically by examining how WISE develops across classroom, instruction, and policy contexts, progressing from knowledge to practice to judgment. Table 3 below illustrates how each WISE domain can be operationalized across K-12 contexts. The implications that follow build on this overview by illustrating key instructional shifts and providing concrete examples of practices that support human-centered AI use in classrooms.

Table 3*From Knowledge to Practice to Judgment: Operationalizing WISE in K-12 Schools*

Domain	Students	Teachers	Schools / Districts
Domain 1 Understand AI	Knowledge: Basic understanding of how AI systems generate responses; probabilistic outputs; limits of AI knowledge. Practice: Students explain about how AI works; annotated examples identifying errors or hallucinations in AI responses; class presentations on AI misconceptions. Judgment: Recognizing when AI responses are incomplete, misleading, or require human knowledge to interpret.	Knowledge: Deeper understanding of how generative AI systems work and their instructional implications. Practice: AI literacy lessons within specific disciplines; classroom materials explaining AI capabilities and limits; examples demonstrating AI strengths and weaknesses within subject areas. Judgment: Deciding when AI tools are appropriate for learning activities and when human reasoning should remain primary.	Knowledge: Institutional understanding of AI capabilities, risks, and educational implications. Practice: Schoolwide AI literacy resources; parent communication explaining AI in education; foundational AI training for staff. Judgment: Determining how AI should be understood within the educational community and the norms that will guide its use.
Domain 2 Use AI responsibly	Knowledge: Ethical issues surrounding AI use including bias, privacy, and academic integrity. Practice: AI use disclosures on assignments; ethical use agreements; examples of responsible AI-supported work with explanations. Judgment: Recognizing when AI use is appropriate, inappropriate, or ethically problematic.	Knowledge: Ethical, legal, and professional responsibilities when using AI tools in teaching and assessment. Practice: Classroom AI policies; assignment guidelines clarifying appropriate AI use; protocols protecting student privacy and integrity. Judgment: Balancing innovation with ethical responsibilities and student protection.	Knowledge: System-level understanding of privacy, safety, and responsible AI use. Practice: School or district AI use policies; data protection guidelines; professional learning on responsible AI integration. Judgment: Establishing clear institutional expectations for responsible AI use.
Domain 3 Interact with AI productively	Knowledge: Understanding how prompts, dialogue, and questions shape AI outputs. Practice: Structured prompts for learning tasks; AI-supported study routines; reflection journals describing AI-assisted learning. Judgment: Knowing how to guide AI interactions so that AI supports thinking rather than replacing it.	Knowledge: Strategies for integrating AI tools into instruction in ways that strengthen learning. Practice: AI-supported learning activities; AI-guided study partners or tutoring chatbots; prompt frameworks for students. Judgment: Designing learning experiences where AI extends practice, explanation, and inquiry without undermining student reasoning.	Knowledge: Awareness of AI tools that can support learning and teaching. Practice: School-approved tool lists; institutional guidance for classroom AI interaction; professional development on effective human–AI collaboration. Judgment: Selecting and supporting AI tools that enhance learning while maintaining educational integrity.

Domain	Students	Teachers	Schools / Districts
Domain 4 Evaluate AI critically	Knowledge: Strategies for verifying information and identifying hallucinations or bias. Practice: AI critique assignments; verification reports comparing AI responses with credible sources; analyses identifying reasoning flaws. Judgment: Evaluating AI responses critically rather than accepting them as authoritative.	Knowledge: Methods for teaching verification, reasoning, and disciplinary critique of AI outputs. Practice: Lessons requiring students to analyze AI responses; verification checklists; assessments focused on evaluating reasoning and evidence. Judgment: Holding students accountable for verifying AI-assisted work and explaining their reasoning.	Knowledge: Institutional understanding of academic integrity challenges associated with AI. Practice: Verification guidelines; academic integrity expectations related to AI; training on evaluating AI-generated work. Judgment: Ensuring institutional practices promote critical evaluation rather than passive acceptance of AI outputs.
Domain 5 Apply AI wisely	Knowledge: Understanding when AI meaningfully improves thinking, creativity, and problem solving. Practice: AI-supported projects solving authentic problems; documented workflows showing how AI's contributions to products; reflections on AI use. Judgment: Deciding when AI enhances learning and when human reasoning should remain primary.	Knowledge: Understanding how AI can support planning, feedback, differentiation, and student learning. Practice: AI-enhanced instructional units; redesigned assessments suited for an AI-mediated world; AI-supported teacher workflows. Judgment: Integrating AI strategically in ways that amplify learning without undermining human knowledge and reasoning.	Knowledge: Strategic understanding of how AI can support teaching, learning, and organizational improvement. Practice: School AI implementation plans; coordinated professional learning initiatives; systems using AI responsibly to support students and teachers. Judgment: Determining how AI should be adopted and governed to support meaningful educational goals.

Design Assessments That Make Thinking Visible. One of the most immediate implications of this framework is the need to rethink how student learning is assessed in an AI-mediated environment. In an AI-mediated environment, the central challenge is no longer whether students can produce answers, but whether those answers reflect their thinking. Traditional product-focused assignments are increasingly insufficient. Schools must therefore prioritize assessments that require students to explain their reasoning, justify their choices, revise their work, and apply ideas in new contexts—making thinking visible even when AI tools are available. Examples:

- A middle school history teacher asks students to use AI to generate an explanation of the causes of the American Revolution, then requires students to annotate the response, identifying inaccuracies and adding evidence from primary sources.
- A high school math teacher requires students to record a short video explaining their solution process, including why a particular method works, even if AI was used to check the answer.
- A school adopts a policy that major assignments must include a “thinking artifact” (e.g., draft progression, explanation, or oral defense) alongside any AI-assisted product.

Center Disciplinary Knowledge and Reasoning. AI is only as useful as the knowledge students bring to it. Schools must double down on subject-matter learning—disciplinary knowledge remains essential for making sense of the world—including evaluating and interacting with AI. In an AI-mediated world, knowledge is no less important; it enables the intelligent use of AI. Examples:

- In an English class, students compare an AI-generated literary analysis to their own, identifying where the AI misses tone, symbolism, or context.
- In science, students use AI to propose a hypothesis, then evaluate whether it is scientifically valid based on established principles and evidence.
- A social studies department develops common tasks where students must critique AI-generated historical claims using sourcing, contextualization, and corroboration.

Teach Students to Interact with and Evaluate AI. Using AI effectively is not a passive activity—it is a dialogic process. Students must learn how to guide AI through purposeful questioning, refine their prompts, and critically examine the responses they receive. This includes recognizing hallucinations, identifying bias, and comparing AI outputs to credible sources and disciplinary standards. The goal is not better prompts alone, but better thinkers who can use AI as a tool for inquiry that requires interpretation, extension, and critical engagement. Examples:

- Students are given two AI responses to the same question and asked to determine which is more accurate and why, citing evidence.
- A teacher models how to revise a weak AI prompt into a stronger one, then has students practice iterative questioning to improve results.
- Students complete a “misconception hunt” activity in which they must identify and correct errors in AI-generated explanations.

Establish Clear Policies and Norms for Transparency and Integrity. In the absence of clear expectations, students and teachers are left to navigate AI use inconsistently, leading to confusion and mistrust. Schools must move beyond simple prohibitions or open-ended permission and instead establish shared norms that define when AI use is appropriate, how it should be disclosed, and what constitutes acceptable support. Clear expectations protect both academic integrity and student learning. Examples:

- A school implements a simple expectation: “If AI helped, explain how.” Students include a brief AI-use statement with major assignments.
- A teacher defines clear boundaries: AI may be used for brainstorming and feedback, but not for final answers without explanation and revision.
- A district provides families with guidance explaining how AI is used in classrooms and how student thinking is still assessed.

Develop Student Self-Governance. The long-term goal of AI literacy is not compliance, but independence. Students must learn to regulate their own use of AI—to recognize how, when, and in what specific ways it supports their learning. This requires building habits of reflection, intentionality, and responsibility so that students remain in control of their learning. Examples:

- Before using AI, students reflect: “What do I already know? What am I trying to learn? How will AI help me think better?”
- After using AI, students respond: “Did this help me understand, or did it just give me an answer?”
- Students are required to justify their decision to use (or not use) AI as part of an assignment.

Sequence AI Use to Build Knowledge Before Dependence. When students rely on AI too early, they risk bypassing the very cognitive work that builds understanding. The sequence in which AI is introduced matters. Students who first develop knowledge and independent reasoning are better

able to use AI productively; those who do not may become AI-dependent. Schools should be intentional about when and how AI is introduced across grade levels and learning tasks. Examples:

- Students attempt to solve a problem independently before using AI to compare and refine their thinking.
- A teacher delays AI use in the early stages of a unit and introduces it later for critique, revision, and extension.
- A school establishes grade-level expectations for when and how AI use is introduced across subjects.

Preserve Productive Struggle and Human Development. AI can remove the friction that makes learning meaningful—the effort, uncertainty, and revision through which students develop understanding, resilience, and intellectual identity. Schools must intentionally preserve opportunities for productive struggle and human interaction. These are not inefficiencies; they are the conditions under which deep learning and character formation occur. Examples:

- Teachers design tasks that require students to wrestle with problems before turning to AI for support.
- Class discussions and peer feedback remain central, even when AI is used for initial brainstorming.
- Schools emphasize learning experiences that require original thought, sustained effort, and reflection, not just efficient output.

Support Teacher Judgment through Discipline/Subject-Specific Guidance. Teachers are the key decision-makers in how AI is used in classrooms. They need more than general guidance—they need to understand how their disciplines/subjects best interact with AI to affect learning. As AI takes on more routine tasks, the judgment, expertise, and relational work of teaching become even more important. Examples:

- A math department develops shared guidelines to distinguish when AI supports procedural fluency from when it undermines conceptual understanding.
- An English department creates expectations for AI use in drafting versus final writing, emphasizing voice and interpretation.
- Professional development is organized by subject area, where teachers analyze real classroom AI scenarios and determine appropriate responses.

These implications illustrate how WISE moves from concept to practice. Across classrooms, schools, and systems, the goal is not simply to use AI, but to use it in ways that strengthen knowledge, deepen learning, and cultivate sound judgment. Consequently, operationalizing the framework is not solely about adopting new tools, but about ensuring that human agency remains at the center of teaching and learning in an AI-mediated world

Conclusion: Human Wisdom in the Age of AI

The rapid emergence of generative AI has raised important questions about the role of human knowledge in education. If intelligent systems can produce explanations, summaries, and arguments with increasing sophistication, some have wondered whether traditional forms of learning remain necessary. We have argued that the opposite is true. In an AI-mediated world, human knowledge, judgment, and wisdom become more important, not less.

Existing AI literacy frameworks have made valuable contributions by helping learners understand how AI systems function, interact productively with emerging technologies, and consider the ethical implications of AI in society. WISE builds on these contributions by emphasizing the human capacities that ultimately guide the use of intelligent systems. Technical knowledge, tool use, and ethical awareness are all essential elements of AI literacy, but they must be integrated with disciplinary understanding, critical evaluation, and contextual judgment.

AI systems will continue to evolve, but the need for humans to interpret information, evaluate claims, and make prudent decisions will remain constant. The goal of AI literacy is not technological competence, tool proficiency, or efficient task completion. It is the development of knowledgeable, thoughtful, and responsible individuals capable of exercising sound judgment in a world increasingly shaped by intelligent machines. We set out to build a compass. WISE is a first iteration. Like any compass, its value lies not in the instrument itself but in the judgment of the person holding it.

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