

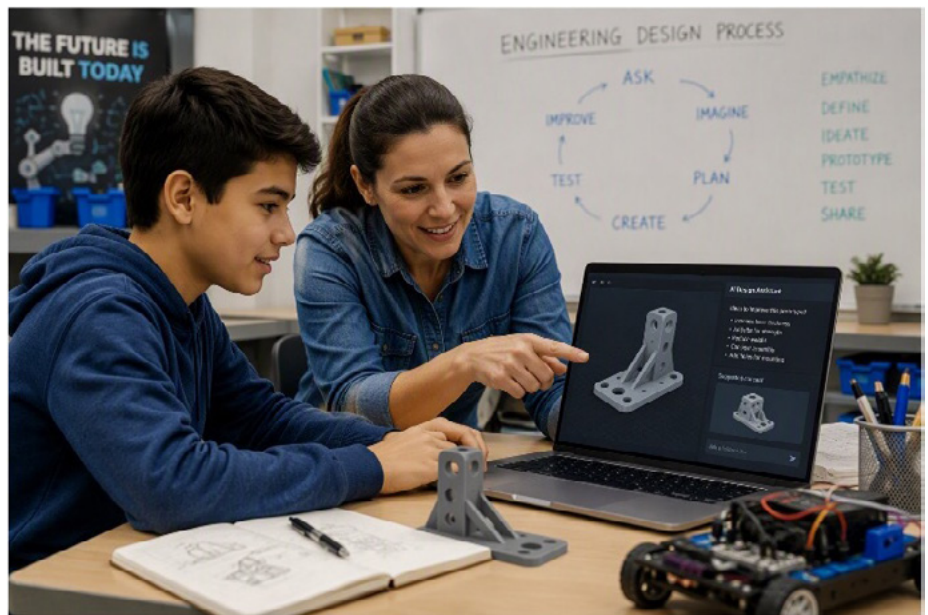
AI Leadership: An Opportunity for STEM and Technology and Engineering Teachers

BY THOMAS ROBERTS, DTE, STEFANIE D. LIVERS, AND HOLLY M. PLANK

The emergence of generative artificial intelligence (AI) is often framed as a disruption to be minimized or a tool to be managed. For technology and engineering (T&E) educators, and STEM educators more broadly, the widespread discussions around AI offer an opportunity to provide academic leadership. As T&E educators, we do not just use technology. We actively study the nature of technology, design its applications, and evaluate its impacts. It is because of this approach that we can help our schools, colleagues, and students move beyond surface-level conversations about efficiency to demonstrate how AI complements and extends the human dimensions of teaching and learning.

T&E and STEM educators have a distinct advantage in the AI era, if we choose to see it. Our instructional core is built on systems thinking, design processes, and the critical evaluation of technology. These are the same skills required to navigate a world increasingly saturated with AI-generated materials. Instead of treating AI as yet another external pressure on education, we can treat AI as another object of study.

This approach and leadership role are anchored in our professional standards. *Standards for Technological and Engineering Literacy* (STEL) provides the framework for rich inquiry into AI. STEL Standard 1, nature and characteristics of technology and engineering, and STEL Stan-



dard 2, core concepts of technology and engineering, remind us that AI is a human-designed system with specific requirements, constraints, and trade-offs (International Technology and Engineering Educators Association [ITEEA], 2020). The recently released Computer Science Teachers Association's (CSTA) *2026 PK-12 Computer Science Standards* takes a similar approach, emphasizing human-centered design, ethics and social responsibility, computational thinking, and inclusive collaboration (CSTA, 2026). When we foreground these standards, we shift the conversation from “how do I stop students from using AI?” to “how do we help students understand the logic, impacts, and limitations of the systems they are using?”

The greater potential of AI lies in extending the cognitive and creative reach of students. AI can serve as a thought partner (Yilmaz et al., 2026), not to replace thinking but to extend thinking. For example, AI can be a thought partner during ideation and prototyping phases of design, helping students test ideas earlier before materials are used. With AI, students can simulate more complex situations, generate and analyze data, and iterate at a scale that previously would not have been possible in a standard class period.

In its new standards, CSTA emphasizes the shift toward higher-level computational thinking and the societal impacts of computing. This change encourages us to move students from passive technology

consumers to critical evaluators of technology who question how computers and technology impact their world. In a STEM classroom, think of the possibilities when integrating AI into an engineering design challenge. Students can use AI to augment their reasoning by exploring “what if” scenarios to determine how to optimize designs, trade-offs with design choices, impacts of constraints, and analyzing data from tests. In these examples, AI does not limit students’ thinking; instead, it shifts students’ cognitive focus to more rigorous analysis.

Beyond the impact on instruction, we also need to consider the impact on teacher workload. AI should complement teacher expertise rather than becoming just another tool for curriculum supplementation (Schroeder et al., 2025). For example, AI can provide personalized learning and data analysis to help teachers identify common misconceptions. Teachers can use their professional knowledge to act on that information to provide intervention more quickly. The teacher’s judgment and knowledge are not replaced; instead, AI is used to give teachers actionable data in a timely manner.

This is one example of the “human-in-the-loop” philosophy. Rutgers University’s AI Ethics Lab (n.d.) defines human-in-the-loop as “a design principle to ensure that AI system outputs are informed by and aligned with human inputs, intentions, and values.” As teachers, we must model how we use AI, not defer to AI, so that students develop the critical evaluation skills needed to effectively use AI. This aligns with STEL Standard 4, which argues for evaluating ethical, social, and environmental consequences of technological systems (ITEEA, 2020). T&E educators can support school- and district-wide conversations and policies by demonstrating

how to evaluate systems for bias, hallucinations, lack of transparency, and unintended outcomes. These skills are also prioritized in the 2026 CSTA standards.

One productive way T&E educators can lead AI integration is through the AI Café model, a low-stakes, discussion-centered approach to professional learning. The AI Café model, developed by the Northwest Ohio Center for Excellence in STEM Education [NWO/COSMOS] at Bowling Green State University, invites educators into collaborative, choice-based conversations about classroom use, ethical concerns, instructional possibilities, and local constraints rather than relying only on top-down trainings focused on tool adoption. In this format, T&E educators learn with and from one another. This kind of professional learning aligns with the long-standing commitments of T&E education to design thinking, systems thinking, and reflective problem solving. It also reinforces the human-in-the-loop approach, where educators remain responsible for judgment, interpretation, and ethical decision-making rather than deferring those responsibilities to AI systems. A format like the AI Café model can be more than professional development. Instead, it is a model for how T&E educators can provide school-wide and community-wide leadership in building critical and context-responsive AI literacy.

As T&E educators lead these conversations, it is imperative to center equity. Access to technology has not typically been equitable (Vogels, 2021). That is being intensified by the “AI divide” (United Nations and International Labour Organization, 2024). AI integration in teaching and learning cannot be defined only by the most financially well-off districts. Leadership in this domain requires us to focus on AI activities that can be

adapted across resource levels. AI should be framed through the lens of design justice (Costanza-Chock, 2020). This encourages us to ask who the systems were designed for, who they benefit, who they exclude, and what harmful consequences they may create. Bringing technical proficiency to solution seeking while maintaining a commitment to social responsibility, as the STEL standards suggest, makes technology and engineering education critical to society.

We should not wait for perfect solutions to begin leveraging AI in our teaching. Troubleshooting, iterating, and evaluating impacts of technology have been part of our approach to teaching for decades. By taking the opportunity to lead conversations on AI, T&E educators, and more broadly STEM educators, will help ensure AI’s role in education is grounded in design-based and human-centered principles that have always defined our approach.

The conversation about AI in education is just beginning, and Technology and Engineering Education intends to be part of leading it. Throughout the coming year, you will see a regular series of articles under the banner of AI by Design that explore how AI is shaping technology and engineering education, from classroom strategies and research to ethics, leadership, and emerging ideas.

Please actively join the conversation by using these articles as springboards to try new approaches in your own classrooms and share what you learn along the way. If you have research, practical strategies, or thoughtful perspectives on AI and T&E education, we encourage you to consider [submitting a manuscript](#). Together, we can help ensure that AI strengthens, not replaces, the human-centered, design-focused teaching and learning that has always been the hallmark of our profession.

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Thomas Roberts, EdD, DTE is an associate professor at Bowling Green State University. He can be reached at otrober@bgsu.edu.



Stefanie D. Livers, PhD is an associate professor at Bowling Green State University. She can be reached at slivers@bgsu.edu.



Holly M. Plank, PhD is an assistant professor at Bowling Green State University. She can be reached at plankh@bgsu.edu.

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