

## IEEE Transactions on Learning Technologies

### Special Topic: Agentic AI and Embodied Cognition—Shaping Future Education through Interactive and Immersive Learning Paradigms and Processes

Agentic AI represents a shift from passive AI tools to goal-directed agents that can perceive context, plan, and act in pursuit of learning and teaching objectives. Embodied cognition highlights how thinking and learning emerge through ongoing sensorimotor and social interaction with the environment. Together, agentic AI and embodied cognition point toward learning technologies in which AI agents, learners, teachers, and physical/virtual environments continuously co-adapt—supporting interactive and immersive learning experiences that are personalized, contextual, and responsive in real time.

This special topic invites evidence-based research and theory that advances understanding of how agentic AI and embodied cognition can be designed, studied, and evaluated in learning and teaching contexts. We welcome contributions that connect technical innovation to learning sciences, rigorous evaluation, and practical implications for educational technology.

#### **Suggested Research (include but are not limited to):**

- Design and evaluation of agentic AI systems that interpret multimodal learner data (e.g., speech, gaze, posture, gesture, physiology) to infer learning states and support adaptive instruction.
- Human–AI teaming and teacher orchestration: how educators coordinate, supervise, and intervene in agentic AI–mediated learning environments.
- Interactive and immersive learning environments (XR, simulations, serious games, digital twins, robotics) grounded in embodied cognition principles, and their impacts on learning processes and outcomes.
- Metacognitive and self-regulated learning supports enabled by immersive interaction and agentic feedback (e.g., real-time reflection prompts, strategy coaching).
- Generative and agentic AI for learning design and content creation (e.g., scenario generation, feedback generation), with empirical evidence of effectiveness and boundary conditions.
- Assessment and learning analytics in embodied/immersive settings: new metrics, validation studies, and methods for scalable, trustworthy evaluation.
- Privacy, security, and responsible data practices for multimodal sensing and agentic AI in education (e.g., privacy-preserving learning analytics, on-device processing).
- Fairness, accessibility, and inclusion in agentic and embodied learning technologies, including bias auditing and design for diverse learners.
- Trust, safety, and governance: preventing misinformation, over-reliance, and unsafe agent behaviors in educational contexts.
- Cross-disciplinary approaches combining computer science, cognitive science, psychology, and education to advance theory, design, and implementation.

IEEE Transactions on Learning Technologies emphasizes the intersection of enabling technologies with learning and teaching. We therefore encourage submissions that go beyond describing technical systems or reporting isolated trials, and instead provide clear educational motivations, rigorous methods, and evidence-based findings with implications for research and practice.

### **Submission and Review Process**

Full manuscripts should follow the IEEE Transactions on Learning Technologies author guidelines and be submitted via the journal's online submission system. Please select this special topic when submitting your manuscript (or indicate it clearly in the cover letter, depending on the submission interface).

To support a timely review process, submitting authors may be invited to serve as reviewers. Authors are also encouraged to recommend three potential reviewers at the time of submission.

### **Important Dates**

Full submission due: April 30, 2026

Final paper due: July 30, 2026

Final decision to authors: August 30, 2026

Early Access: Per IEEE policy, after acceptance

### **Advisor:**

John Mitchell, Stanford University

John Chi-Kin Lee, The Education University of Hong Kong

### **Guest Editors:**

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