Designing and Evaluating Next-Generation Learning Interfaces: Linking AI, HCI, and the Learning Sciences

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1 Type of Event

This is a full-day, in-person workshop to be held at AIED 2026.

2 Theme and Goals

Recent advances in generative AI and immersive technologies, such as augmented and virtual reality, are transforming how people learn, teach, and collaborate across classrooms, homes, and workplaces. These technologies enable on-demand tutoring, adaptive content generation, multimodal interaction, and new forms of human–AI collaboration in shared environments. At the same time, their integration into education introduces critical challenges, including balancing efficiency with learner agency, ensuring accessibility in immersive settings, and addressing concerns related to bias, privacy, and over-reliance on AI. As a result, interaction design plays a central role in determining whether these technologies effectively support learning.

Prior work in intelligent tutoring systems has demonstrated the value of theoretically grounded educational technologies, with successful applications in domains such as mathematics and computer science [2,10]. These systems integrate cognitive theory [2], evidence-based practices [5], and data-driven approaches [3,6,10] to achieve measurable learning gains. However, they are typically built on fixed interaction paradigms, limiting their ability to support the open-ended, multimodal, and collaborative learning scenarios enabled by recent advances in AI and immersive technologies.

At the same time, research across AI, HCI, and the learning sciences has made significant progress in isolation. HCI contributes human-centered design principles and novel interaction techniques for educational interfaces [11,8,12]. AI provides methods for adaptive modeling, natural language interaction, and generative content creation [7,9,4]. Learning sciences offer theoretical and pedagogical foundations that ground technology design in evidence-based practice [1]. However, these perspectives are often not well integrated in the design and evaluation of next-generation learning interfaces.

This workshop addresses this gap by bringing together researchers and practitioners from AI, HCI, and the learning sciences to explore how interactive systems can better support learning. We focus on the design and evaluation of human–AI collaborative learning interfaces that are technically robust, human-centered, and pedagogically grounded. By fostering interdisciplinary dialogue, the workshop aims to identify shared challenges, design principles, and research directions for next-generation learning technologies.

The workshop has three specific aims, each accompanied by guiding questions to scaffold discussion and collaboration:

- **Engage AI and HCI researchers in educational design challenges.** We aim to encourage the application of novel interactive technologies (e.g., intelligent interfaces, immersive environments, and generative AI systems) to real learning contexts.
- **Introduce learning science theories and methods.** We aim to surface theories and approaches (e.g., student modeling, learning analytics, educational data mining) that can inform more data-driven and theoretically grounded interface and interaction design.
- **Bridge AI, HCI, and learning sciences communities.** We seek to inspire new collaborations and cross-community research agendas that advance both the design and the impact of educational technologies.

3 Workshop Planned Activities

A tentative schedule is shown in Table 1.

Introduction (9:00 - 10:00) The workshop will begin with an introduction, followed by participants' introductions. The host will play and introduce the slide deck about the participants' information.

Keynote (10:00 - 10:45): We will invite a keynote speaker to share insights related to the workshop theme.

Table 1. Workshop Day Schedule

Session	Time	Activity / Description
Introduction	09:00–10:00	Workshop introduction and participants introduction, including their background, current work, and potential contribution (e.g., dataset, tool, design method).
Keynote	10:00–10:45	Invited keynote aligned with the workshop theme.
Spotlight Presentations I	10:45–12:00	Selected submissions (short talks): 8 min talk + 4 min feedback; quick survey after each to surface connections (methods, collaborators, evaluation ideas).
Lunch Break	12:00–14:00	Organizer-hosted group lunch near the venue.
Spotlight Presentations II	14:00–14:45	Continuation of selected submissions with the same format (about 10 total across both sessions).
Thematic Breakouts	14:45–15:45	Curated themes with facilitation and note-taking: (1) controllability of educational interfaces; (2) scalable feedback; (3) data & privacy; (4) evaluation paradigms; plenary share-out.
Speed Collaboration Rounds	16:00–16:45	Paired 10-minute exchanges across disciplines; rotate to surface concrete collaboration opportunities.
Closing Reflections	16:45–17:00	Synthesis of insights and next steps for continued collaboration.

Paper Presentation (10:45 - 12:00, 2:00 - 2:45) Following the keynote, 10 selected workshop submissions will be invited to present in a short spotlight format in two sections. Each presenter will have 8 minutes to share their work, followed by 4 minutes of feedback from the audience. A quick feedback survey will be given after each talk, encouraging attendees to identify interdisciplinary connections and complementary methods that could improve the work, such as: potential collaborators, methods for improving data quality, expanded interface affordances or stakeholder considerations, or broader evaluation strategies.

Thematic Breakout Discussions: "Where Worlds Collide" (2:45 - 3:45) In the afternoon, we will organize a breakout session where participants will form small groups to discuss challenges and opportunities at the intersection of educational technology and user interface research. Each group will focus on one of several curated themes, including: (1) Controllability in educational interfaces - How we can enable educators or students to guide or refine AI behavior; (2) Scalable feedback mechanisms - How interface design can support timely and personalized feedback in large-scale learning environments; (3) Data and privacy

- Balance the need for detailed educational data with transparency, consent, and trust; and (4) Evaluation paradigms - Understanding how HCI and EdTech communities approach evaluation differently, and what we can learn from each other. Each breakout group will be facilitated and will record key ideas to share in a whole-group reconvening session.

Speed Collaboration Rounds (4:00-4:45) To foster cross-community connections, we will host a speed collaboration activity. Participants from different disciplinary backgrounds will be paired for short, timed conversations. Each person will introduce their work and describe a specific problem they are trying to solve, followed by a short discussion of how their partner might contribute. For example, a participant working on educational data mining may offer a dataset and seek help designing an interface to visualize model output, while a HCI researcher may describe a novel interaction technique and ask for feedback on how it could be deployed in a classroom context. After each 10-minute round, the participants rotate to meet someone new.

Closing Reflections (4:45-5:00). We will conclude the workshop with a brief reflection session, where the organizers will summarize insights from the day and outline the next steps to continue the conversation beyond the workshop.

4 Prior or Related Work

This is the first edition of this workshop.

Recent years have seen increasing attention to AI-supported learning across multiple research communities. Major venues such as NeurIPS, AAAI, and KDD have hosted workshops on AI for Education[8][9][10] , while CHI has explored topics such as augmented educators and the future of work[11] . Learning sciences and learning analytics communities, including ICLS, CSCL, and LAK, have also advanced work on pedagogy and data-driven learning, with recent workshops on large language models for qualitative research and generative AI in learning analytics[12][13]. These efforts highlight growing interest in leveraging AI technologies to support learning. However, they are often fragmented across communities. AI research tends to focus on modeling and system capabilities, HCI emphasizes interaction design and user experience, and the learning sciences prioritize pedagogical theory and learning outcomes. As a result, there remains a lack of venues that explicitly integrate these perspectives to guide the design and evaluation of next-generation learning interfaces. This workshop builds on these prior efforts

[8] https://gaied.org/neurips2023/index.html
[9] https://ai4ed.cc/workshops/aaai2022
[10] https://ai-for-edu.github.io/workshop_kdd2024.html
[11] https://sites.google.com/view/augemted-educators-and-ai/home
[12] https://sites.google.com/view/lak-25-workshop-llms-for-qual/
[13] https://sites.google.com/monash.edu/genai-la-workshop-lak25/

while focusing on bridging AI, HCI, and the learning sciences. It aims to provide a dedicated space for interdisciplinary dialogue and collaboration around human–AI collaborative learning systems.

5 Program Committee

Our organizing committee brings together an interdisciplinary group of scholars spanning HCI, AI, and the learning sciences.

Meng Xia is an Assistant Professor in Computer Science and Engineering at Texas A&M University. Her research interests include Human–AI Interaction, Data Visualization, and Educational Technology, with a focus on human–AI collaboration for personalized education. She will serve as the General Chair and will coordinate all aspects of the workshop.

Yan Chen is an Assistant Professor of Computer Science at Virginia Tech. His work spans programming support tools, real-time learning analytics, and learning at scale, with a focus on interactive Human–AI systems for education. He will chair website development and technical infrastructure.

Qiao (Georgie) Jin is an Assistant Professor of Computer Science at North Carolina State University. Her research explores XR- and AI-driven mixed-reality tools to support teaching, learning, and social connection, particularly in real-world educational settings.

Yang Shi is an Assistant Professor of Computer Science at Utah State University. His research focuses on data-driven representations of program code for intelligent tutoring systems and student modeling in computing education, drawing on data mining and machine learning approaches.

Paul Denny is an ACM Distinguished Member and Professor at the University of Auckland whose work centers on collaborative learning and student-generated content in computing education. He is the creator of PeerWise, a large-scale platform used internationally, and brings extensive experience in building sustained research communities.

Tiffany Barnes is a Distinguished Professor of Computer Science at North Carolina State University. Her research focuses on computing education, educational data mining, and AI-supported learning environments. She will lead workshop outreach and community engagement, drawing on her extensive experience in inclusive computing initiatives.

Qingsong Wen is Head of AI and Chief Scientist at Squirrel Ai Learning and a PhD Supervisor at the University of Oxford. His research spans machine learning, time-series analysis, and AI for education, with extensive leadership experience across major AI conferences and professional societies.

Vincent Aleven is a Professor at Carnegie Mellon University's Human-Computer Interaction Institute and Director of the CATS Lab. His work focuses on intelligent tutoring systems, learning analytics, and authoring tools for educational technologies. He will co-lead workshop dissemination and outreach.

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