

# Workshop on Empowering Education with LLMs - the Next-Gen Interface and Content Generation

<https://ai4ed.cc/workshops/aied2023>

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The first annual workshop on Empowering Education with LLMs - the Next-Gen Interface and Content Generation took place at the 24th International Conference on Artificial Intelligence in Education in 2023. This workshop exposed attendees to the ample opportunities of leveraging Large Language Models (LLMs) in educational contexts, including instructors, researchers, learning engineers, and many other roles. Participants from a wide range of backgrounds and prior knowledge on LLMs benefitted and contributed to this workshop, as this space draws on work from education, natural language processing, learning analytics, data mining, machine learning, and many more fields. Additionally, as the endless opportunities of LLMs for education involves many stakeholders (students, instructors, researchers, instructional designers, etc.), multiple viewpoints helped to inform what applications might be useful, new and better ways to assess the outputs of LLMs, and spark potential collaboration efforts between attendees. We ultimately demonstrated that LLMs are actively being used for many educational applications currently and how everyone can make use of them for their own purposes. Participants were able to gain hands-on experience using existing tools, creating their own LLM-enhanced applications, and taking part in discussing the next challenges and opportunities in the LLM space. Our workshop attendees were interested in scaling the generation of instructional and assessment content using LLMs, ways of assessing the outputs of LLMs, and novel use cases of applying LLMs in educational contexts.

Prior to the workshop, we encouraged potential participants to submit papers related to AI in education, LLMs, and educational content creation. Papers covered various aspects of human-AI collaborations in educational content creation. They discussed challenges that arise in effectively helping students act on revisions when both students and AI review and edit student-generated content. Many discussed the need to explore how AI can aid students in consistently producing high-quality educational contributions. Amidst the challenges of collaborative content creation between humans and AI in education, numerous opportunities exist to enhance accessibility and learning benefits for students. Several of them looked at how students can collaborate with large language models (LLMs) such as ChatGPT or GPT-4 to enhance assessment questions or explanations. These approaches facilitate content improvement and encourage critical thinking as students evaluate model suggestions, including recommended alternatives, and recognize model limitations. Finally, several papers discussed the potential pitfalls and problems with LLMs. For instance, since LLMs are trained on extensive human-generated data, they are susceptible to biases like humans. Relying solely on automatically generated content in education risks perpetuating such biases. To mitigate this, a human-in-the-loop strategy involving students and instructors is crucial. This approach moderates biases and enhances the performance of generative models for educational suitability.

The workshop focus was aimed at uniting researchers and practitioners from both academia and industry to delve into the potential of LLMs as interfaces for communication and collaboration within

human-in-the-loop systems. The workshop's objectives encompass several key areas related to AI in education. The utilization of Large Language Models (LLMs) within educational contexts. The creation and assessment of educational content facilitated by the assistance of LLMs. The collaborative generation of educational partnerships, where either humans or AI stand to gain the most. Exploration of ethical considerations linked to employing LLMs as communication interfaces within educational environments. Development of effective and standardized user interfaces tailored for LLM-based educational systems. The amalgamation of Crowdsourcing and Learnersourcing strategies in conjunction with LLMs.

We began with introductions and an overview of the LLM in education landscape, to bring all participants, regardless of background, up to speed on the concept and latest trends. Two invited speakers then gave presentations and demos to highlight real world applications of LLMs in two different educational contexts. We then had a panel of four experts answer a series of questions relating to the challenges of opportunities of LLM-based applications. Following that, we had a final invited speaker give a presentation regarding the generation of explanations using LLMs. Next we had participant presentations, where the in-person attendees of the accepted submissions presented their research for roughly fifteen minutes each. We also had multiple virtual presentations from participants that could not attend in person, the videos of these can be found here: <https://ai4ed.cc/workshops/aied2023>. Following that, we held a thirty-minute break that included coffee and light snacks. From there, we then had an hour-and-a-half mini-hackathon, where participants worked with one another to construct a prototype of an LLM-based educational application of their own. Participants then engaged in a discussion around the challenges, opportunities, and future of LLMs in education. The workshop concluded with a summary of the day's events, core challenges and opportunities we addressed in the discussions, and an emphasis on future collaborations.

Once the workshop was concluded, we began working on publishing the accepted papers as part of a workshop proceedings. Additionally, we hope the interactions during the workshop will result in the adoption of LLM-based educational applications for many of the participants, whether that be using one of the tools, the discussed datasets, or creating their own applications in their own platforms and courses. Ultimately, we want to keep the workshop participants involved and promote collaboration between attendees. We hope to repeat this workshop, as we strive to make this become part of the basis for a community of researchers who are interested in educational applications of LLMs.