

IEEE Special Issue on *Education in the World of ChatGPT and other Generative AI*

Call for Papers

Full Manuscripts Due: 30 July 2023

Generative AI is a type of Artificial Intelligence (AI) algorithm that is capable of producing new outputs such as text, audio and video, based on the massive data they have been trained on. It is distinct from other AI systems that are designed to recognize patterns and make predictions. One example of generative AI is ChatGPT which uses a deep learning-based natural language processing model and transformer-based architecture to respond to users' prompts by generating meaningful text that is similar to human-constructed text. It can be used for summarizing documents, answering questions, re-writing text in different styles and tones, and writing stories, poems or even research proposals. Other generative AI includes algorithms that generate images based on a description in natural language, synthesize music, and create course content.

While the history of generative AI can be traced to the development of early versions of chatbots in the 1960s, the advent of the generative adversarial networks, or GANs, in 2014 facilitated a marked improvement in generative AI performance. The introduction of ChatGPT in Nov 2022 created heated discussions and reactions in the education community. Concerns were raised about the challenges to education and negative impacts, such as students' plagiarism, the validity of the information, and biases of content inherent in the training data. Consequently, numerous educational institutions announced the ban of ChatGPT.

Banning ChatGPT could be a stopgap solution but it invites other questions such as the practicality of implementation. In some discussions, the idea of reverting to pen-and-paper tests to avoid cheating in examinations was raised. Is banning the use of disruptive technology a viable solution or are there alternative solutions? Numerous scholars are exploring how generative AI can be harnessed to create a positive impact. For example, how ChatGPT can be used to assess essays, act as a personal tutor, help in learning a foreign language, facilitate the creation of teaching content and act as a teaching assistant.

Ultimately, the key question is how to design learning activities to take advantage of generative AI for learning, while dealing with ethical and governance issues such as biases, plagiarism, equity, accessibility, and intellectual property. In other words, we need smart design principles and solutions to harness the full potential of generative AI while developing and executing relevant policy and implementation guidelines to deter unethical and unproductive behaviors. At the same time, it is imperative to assess the efficacy and appropriateness of generative AI in an educational setting, as is the case with all emerging technologies. There is a need to thoroughly examine the effectiveness of this technology and its regulatory implications for appropriate and productive applications in an educational environment.

This Special Issue is an exciting opportunity to explore the potential of ChatGPT and other generative AI in the field of education. Authors are invited to submit their manuscripts on the latest reviews, theoretical frameworks, and research findings on innovative applications of generative AI in education. This special issue presents an opportunity to document, problematize, and address the key challenges and opportunities that arise from the intersection of education and generative AI. It aims to further our understanding of this important and rapidly developing area of research that has an immense impact on education.

## Suggested Topics

The successful design and application of generative AI require holistic considerations of theoretical frameworks, pedagogical approaches, facilitative ecological structure, and appropriate standards. Topics of interest for this special issue include, but are not limited to:

- Studies on the pedagogical or curricular approaches to teaching and learning with generative AI.
- Discussion on the theoretical frameworks of generative AI to provide the basis for the understanding of systems and their capabilities for teaching and learning.
- Discussion of the extent to which the design of learning environments with generative AI aligns with different theories of learning (e.g., behaviorism, cognitivism, (social) constructivism, constructionism, socio-cultural).
- Studies on the applications of generative AI for assessment *of*, assessment *for*, and assessment *as* learning.
- Development of the environmental structures that facilitate the employment of generative AI in education.
- Development or implementation of relevant standards governing the proper use of generative AI in human learning contexts.
- Exemplary use cases and practices of generative AI, ranging from platforms for design and development to application scenarios in various disciplines, such as STEM, social sciences, creative industries, and language teaching. These use cases and practices can span from K-12 to higher education, lifelong learning, as well as corporate training.
- Exemplary use cases and practices of generative AI for creating personalized and adaptive learning experiences tailored to individual learners' needs, abilities, and preferences.
- Social and cultural aspects of designing learning environments or activities with generative AI, including ways to mitigate the potential exacerbation of the digital divide arising from the use of generative AI.
- Socio-technical aspects of using generative AI, including usability and acceptance by instructors and learners.
- Examination of how generative AI can be used to create more accessible and inclusive learning environments for diverse learners, including those with disabilities or special needs.
- Ethical and security challenges, such as privacy, data ownership, and algorithmic bias associated with the use of generative AI in education and ways to mitigate these challenges.
- Pedagogical and technological challenges of designing and implementing generative AI in education and ways to overcome such challenges.
- Design-based research leading to insights into the extent to which different ideational and learning technology design paradigms lend themselves to the design of new types of learning experiences with generative AI.
- Evaluation studies that assess the effectiveness and impact of learning design with generative AI, including measures on learning outcomes, student engagement, motivation, and retention.
- Integration of generative AI to enhance non-traditional types or modalities of learning (e.g., massive open online courses, collaborative learning or problem-centered learning).
- Historical contextualization of generative AI and how it helps to deepen our technical and/or design-knowledge contributions to the development of learning technologies.
- Investigation on how educators can be trained and supported to effectively use generative AI tools in their teaching practice and curriculum design.

Note: TLT is somewhat unique among educational technology journals given our dual-discipline focus on CS (computer science) and LDTech (learning design and technology). We expect papers to make substantive technical and/or design-knowledge contributions to the development of learning technologies as well as to show how the technologies can be used to support learning. Papers that are concerned primarily with the evaluation of existing learning technologies and their applications are suitable for TLT only if the technologies themselves are novel, or if significant technical and/or design insights are offered.

### **Submission and Review Process**

Abstracts may be submitted to the guest editors via email at [tlt-ai@ieee.org](mailto:tlt-ai@ieee.org); this is not mandatory but will enable the editors to offer early feedback on the paper's suitability with respect to the aims and scope of the special issue.

Full manuscripts should be prepared in accordance with the IEEE Transactions on Learning Technologies guidelines and submitted via the journal's ScholarOne Manuscripts portal<sup>□</sup>, being sure to select the relevant special issue name during the submission process. Manuscripts must not have been published or currently be under consideration for publication elsewhere. Only full manuscripts intended for review, not abstracts, should be submitted via the ScholarOne portal, and conversely, full manuscripts cannot be accepted via email.

Each full manuscript that passes an initial pre-screening will be subjected to rigorous peer review in accordance with TLT's editorial policies and procedures. It is anticipated that 7 or 8 articles (plus a guest editorial) will ultimately be published in the special issue.

### **Important Dates**

Full manuscripts due: 30 July 2023

Completion of first review round: 30 September 2023

Revised manuscripts due: 31 November 2023

Final decision notification: 15 January 2024

Publication materials due: 15 February 2024

Publication of special issue: April 2023

### **Guest Editors**

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Please contact [sengchee.tan@nie.edu.sg](mailto:sengchee.tan@nie.edu.sg) with any questions, comments, or concerns. You may email an abstract of your paper for feedback by May 15 of 2023.