IEEE Transactions on Learning Technologies

Special Issue: The transformative impacts of artificial intelligence on teachers' professional development: Practices, opportunities, and challenges

Generative AI (GenAI) is rapidly evolving, often outpacing public awareness and expectations. With its powerful capabilities—such as natural language processing, content generation, personalized learning support, and multi-agent simulations—GenAI is reshaping the landscape of education (e.g., Zhu et al., 2023). In particular, for teachers, including but not limited to principals, middle leaders, and in- and pre-service teachers, GenAI has a profound impact on their professional development, covering every aspect of their daily practices. It has become increasingly common for teachers to refer to GenAI as an external expert for any decision-making and content-generation tasks, and GenAI will continuously get involved in teachers' workflow in more educational scenarios in the near future. Educational organizations, sectors, and researchers are dedicated to preparing teachers with the skills, knowledge, and confidence to leverage this productive tool to empower their work to reimage a better and more intelligent education.

However, it is not easy to make this mission to come true. While the importance of GenAI in education has been increasingly emphasized, the acceptance and readiness of teachers remain underdeveloped. Besides, the successful integration of GenAI in teaching calls for pedagogical reforms, which rely on high-quality and effective teacher professional development programs at both pre- and in-service stages. Moreover, AI innovations are double-edged swords that may bring both positive and negative impacts (e.g., Chen & Lin, 2024). For example, the unethical use of GenAI and the crisis of teachers' agency and professional identity regarding adopting GenAI have been raised (e.g., Lee et al., 2025). Teachers may also face unexpected force and unprecedented anxiety to work and compete with such an intelligent creator. In this case, there is a critical need to not only showcase the successful practices that integrated GenAI to enhance teachers' behavioral, cognitive, and affective competence, but also explore on a deeper level of what GenAI really means to teachers' professional development and beyond. In this special issue, we aim to bring together high-quality papers, using various research methods (e.g., qualitative, quantitative, and mixed-method), that focus on the practices, opportunities, and challenges of GenAI on teachers' professional development.

Topics of Interest:
This special issue welcomes submissions on the following topics (including but not limited to):

- Conceptual, theoretical, and empirical papers on teachers' AI competence or literacy which may facilitate a better knowledge of how to design professional development programs.
- Innovative methods or pedagogical cases explore the integration of artificial

intelligence, as well as GenAI-based multi-agent systems into teacher professional development, with a focus on design, development, and practical implementation.
- Technical frameworks, systems, and tools for enhancing teachers' capabilities, including the development of scalable and adaptive teacher-AI collaboration solutions to support classroom instruction, personalized student learning, and the identification and addressing of students' academic and well-being issues.
- Systemic, policy-level, and leadership strategies required to support the sustainable integration of GenAI in diverse cultural and contextual settings, including the role of educational leaders in fostering innovation, equity, and ethical AI adoption.
- Research that extends particular concerns of the impact of GenAI and other related digital technologies on teachers' role, agency, identity, well-being, etc., and/ or provides possible solutions to mitigate potential negative effects and build their digital resilience.
- Future directions and emerging trends in GenAI for teacher professional development.

For our special issue, please be aware that the IEEE Transactions on Learning Technologies emphasized the intersection of technology and education. We expect evidence-based papers to make substantial contributions to the knowledge that help enrich the practices of GenAI in teachers' professional development, and reveal the opportunities and challenges for various educators (such as principals, middle leaders, and in- and pre-service teachers) with all levels of education, including preschool, K12, vocational, and higher education.

Submission and Review Process
Full manuscripts should follow the Template and writing style guidelines of IEEE Transactions on Learning Technologies, and submitted via the IEEE TLT AUTHOR PORTAL SUBMISSION SITE.

We would ask authors to kindly serve as reviewers of the submissions. Reviewers will also be recruited from the pool of TLT reviewers. Authors are strongly encouraged to recommend 3 reviewers (without any conflict of interest) at the time of submission.

The Important Dates:
Full manuscripts due: 1 August, 2025
Completion of first review round: 1 October, 2025
Revised manuscripts due: 1 December, 2025
Final decision notification: 1 January, 2026
IEEE-TLT now follows a single-volume model, in which papers will be published separately within 2-3 weeks of acceptance. IEEE publishing will compile it as an SI later on when the SI is completed.
Early access: within one week of acceptance.

Please contact jtluo@szu.edu.cn with any questions, comments, or concerns.

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