Tentative title:

## Developing Generative AI-informed Pedagogies Using Lesson Study

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The rise of Industry 4.0, marked by advancements such as AI and robotics, demands innovative approaches in education (Cheng et al., 2023). Generative AI (Gen-AI) tools, like Large Language Models (LLMs) and chatbots, possess immense potential to revolutionize learning at all levels. Ethical use of Gen-AI can transform K-12 teaching and learning by providing opportunities for personalized and adaptive learning, boosting creativity and critical thinking, enhancing accessibility and inclusivity, increasing engagement and motivation, and improving teacher productivity and data-driven decision making (Farrokhnia et al., 2023; Grassini, 2023; Ipek et al., 2023; UNESCO Education 2030, 2023). However, educators must develop pedagogical understanding and skills to effectively use Gen-AI, while addressing ethical concerns and practical challenges like academic integrity, data privacy, cognitive bias, and ensuring accessibility (Halaweh, 2023; Javaid et al., 2023; UNESCO Education 2030, 2023).

Preparing students for a future of Gen-AI advancement requires teachers to adapt and nurture creativity, critical thinking, and interdisciplinary learning (Calleja & Camilleri, 2021). Towards this end, Lesson Study (LS), which supports teacher learning and pedagogical innovation, is a highly effective international initiative (Huang et al., 2023). Camilleri and Calleja (2023) further call for utilizing LS to tackle educational challenges in Industry 4.0.

Integrating Gen-AI throughout the LS cycle (study, plan, teach, reflect) could: (1) generate targeted learning materials and resources, such as customized lesson plans, activities, worksheets, and assessments; (2) facilitate collaborative lesson planning and reflections, generating creative prompts, scenarios, and problem-solving challenges, simulating different teaching approaches and classroom scenarios; (3) personalize professional development and feedback by providing personalized feedback and recommendations for individual teachers, analyzing collective lesson study data; and (4) enhance communication and collaborations, facilitating online communities and forums for teachers to share resources, generating comprehensive reports summarizing lesson study findings and recommendations. Gen-AI can also serve as a 'knowledgeable other', supporting teachers in critically analyzing research, planning tasks and lesson activities, designing observation tools, analyzing data, and even writing reports – a typically challenging and time-consuming task for many teachers.

In LS, we view Gen-AI as a tool that promotes critical thinking about when and how to use it, and how to critically analyze the knowledge it provides. Similarly, in classroom use, Gen-AI can offer students opportunities to become more critical, inquisitive, explorative, and communicative.

We believe that those engaged in LS – teachers, facilitators, and school leaders – will leverage Gen-AI in ways that create previously unimaginable learning opportunities and outcomes for themselves and their students (Lo, 2023). By prioritizing teacher autonomy, we ensure Gen-AI

remains a valuable assistant, not a replacement for professional expertise. This human-centered approach emphasizes responsibility for appropriate use and targeted outcomes – the teacher remains firmly in the lead. However, continuous evaluation is crucial. We must regularly scrutinize the impact of Gen-AI on LS practices and adapt its use based on feedback and evidence. This would ensure that Gen-AI continues to augment, not supplant, the irreplaceable role of teachers in crafting effective learning experiences.

This Special Issue explores how LS practitioners and researchers conceptualize and develop LS to improve teaching and student learning through the integration of Gen-AI while appropriately addressing relevant concerns. It serves as a forum where researchers, LS leaders, and teachers can share their thoughts, approaches, and models for developing LS practices with the use of Gen-AI-enabled applications. Hence, the Special Issue explores and shares best practices in integrating Gen-AI into teaching and learning using LS and aims to contribute to the development of guidelines for educators addressing relevant concerns.

This special issue on the use of Gen-AI in LS can encompass a range of topics, including, but not limited to:

- Case studies: Comprehensive narratives detailing the integration of Gen-AI-informed pedagogies using LS, encompassing outcomes and valuable insights gained from the experience.
- Pedagogical applications: Exploring ways in which Gen-AI can support lesson planning, observation, and reflection.
- Teacher experiences: Action research reporting teachers' perspectives on using Gen-AI, including its impact on their professional development and classroom practices.
- Researcher experiences: Perspectives from researchers on using Gen-AI, including researching LS and their own professional development.
- Ethical and practical considerations: Discussions on ethical issues related to Gen-AI in LS, along with strategies for addressing them.
- LS: Development of pedagogical models or guiding frameworks that incorporate Gen-AI tools in teaching and learning.

We invite papers addressing the above topics with empirical data and rigorous research methodology. Specifically, the research questions include, but are not limited to:

- What are educators' perceptions and beliefs towards the use of Gen-AI in LS?
- How can schools, LS leaders, and LS practitioners adopt, adapt, and implement LS incorporating Gen-AI?
- What factors, such as digitalization in schools, school principals' digital leadership, and teachers' digital competencies, affect the incorporation of Gen-AI tools for streamlining LS?
- To what extent can the design and implementation of LS benefit from Gen-AI and its applications?
- How can the use of Gen-AI applications support teachers and LS leaders in enhancing their evidence-based knowledge of student learning?

- What challenges do practitioners encounter with the implementation of Gen-AI applications in LS?
- How can LS be adapted to new modalities of assessing students given that the content can be easily generated with Gen-AI applications?

Based on an extended abstract (max 1000 words), the co-editors will identify potential contributors to submit their full papers for consideration included in the special issue (see the timeline below).

**Special Issue**: International Journal for Lesson and Learning Studies (Vol. 15 Issue 1, 2026 (1))
https://www.emerald.com/insight/publication/issn/2046-8253

**Timeline:**
 March 31, 2024, an extended abstract (Max 1000 words) identifying themes of interest sent to
    co-editors:
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May 31, 2024: Communication of the decision of acceptance of the abstract
November 30, 2024: Submission of original manuscripts
January 31, 2025:  Completion of first round of reviews
February 15, 2025:  Inform Authors
May 31, 2025:  Submission of first revision
July 31, 2025: Second of reviews (if necessary)
August 31, 2025: Submission of final manuscripts.
October 31, 2025: Notification of final acceptance.
December 31, 2025: Copy-editing/ publication

**References**

Calleja, J. & Camilleri, P. (2021). Teachers' learning in extraordinary times: Shifting to a digitally facilitated approach to lesson study. *International Journal for Lesson and Learning Studies*, *10*(2), 118-137.

Camilleri, P. & Calleja, J. (2023). Lesson study in a time of change: Working towards a new pedagogy in the digital age. In R. Huang, N. Helgevold, J. Lang & H. Jiang (Eds.), *Teacher Professional Learning through Lesson Study in Virtual and Hybrid Environments*. WALS-Routledge Lesson Study Series

Cheng, E. C. K., Wang, T., Schlippe, T., & Beligiannis, G. N. (Eds.). (2023). Artificial intelligence in education technologies: New development and innovative practices: Proceedings of 2022 3rd International Conference on Artificial Intelligence in Education Technology. Singapore: Springer.

Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, 1-15.

Grassini, S. (2023). Shaping the Future of Education: Exploring the Potential and Consequences of AI and ChatGPT in Educational Settings. *Educ.Sci.*2023,*13*,692. https://doi.org/10.3390/educsci13070692

Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology, 15*(2), ep421. https://doi.org/10.30935/cedtech/13036.

Huang, R., Helgevold, N., Lang, J., & Jiang, H. (2023). *Teacher professional learning through lesson study in virtual and hybrid environments: opportunities, challenges, and future directions*. New York, NY: Routledge.

İpek, Z.H., Gözüm, A.İ.C., Papadakis, S., & Kallogiannakis, M. (2023). Educational Applications of the ChatGPT AI System: A Systematic Review Research. *Educational Process: International Journal*, 12(3), 26-55.

Javaid M., Haleem, A., Singh, R. P., Khan, S., & Khan, I. H. (2023). Unlocking the opportunities through ChatGPT Tool towards ameliorating the education system. Bench Council Transactions on Benchmarks, *Standards and Evaluations*, 3(2), 100115–.

Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, *13*(4), 410.

UNESCO Education 2030 (2023). CHATGPT and artificial intelligence in higher education. https://www.iesalc.unesco.org/wp-content/uploads/2023/04/ChatGPT-and-Artificial-Intelligence-in-higher-education-Quick-Start-guide_EN_FINAL.pdf