Teaching Innovations, Volume 38, Issue 1, pp. 46–58
DOI: 10.5937/inovacije2501046P

Jelena V. Pokimica[1]
Lara A. Sinkovich
Boise State University,
Boise, Idaho, USA

Systematic review

Paper received: Jan 28 2025
Paper accepted: Mar 5 2025
Article Published: Apr 15 2025

A Scoping Review of Recent Developments Linking Artificial Intelligence and Lifelong Learning

Extended summary

The purpose of our paper is to gain an understanding of the nature of Generative AI (GAI) effects on lifelong learning (LLL) in terms of its advantages and shortcomings since the proliferation of AI technologies over the last half a decade. Our aim is to also highlight major concepts and characteristics in the realm of AI/GAI and LLL, as well as bring to light conceptual/theoretical tensions or debates in the context of these rapidly emerging technologies, whose pace often exceeds our understanding of its effects or functioning. The significance of this paper is that it draws attention to what the extent of GAI use means for learner knowledge, skill, and psychological regulation development amidst AI automation and augmentation. The paper also acts as a precursor to future more focused studies that could probe more deeply into the results of this review and incorporate socially-, developmentally-, and technically-oriented theoretical frameworks when investigating (G)AI and LLL. We use a scoping review method (Arskey & O'Malley, 2005; Munn et al., 2018; Tricco et al., 2016) for searching relevant databases, such as Academic Search Premier, ProQuest Central, Eric (EBSCO), Emerald Insight, and keywords of the type of "lifelong learning," "artificial intelligence," "generative AI," "ChatGPT," and other crucial ones from the guiding questions. We centered on more recent publications, over the last decade, and especially its latter part, anchored in higher education and organizations. We were also interested more broadly in the kinds of GAI and LLL linkages and concepts covered in the selected studies rather than engaging strictly critically. We employed thematic analysis (Merriam, 2009) across emerging GAI-LLL patterns from our review. Our findings are organized by three themes: 1) digitalization and technologication of lifelong learn-

1 jelenapokimica@boisestate.edu
http://orcid.org/ 0009-0009-8597-3672

ing; 2) self-directed learning, GAI and ChatGPT, and global contexts; and 3) human development and capability approach to lifelong learning. We found that balancing overreliance on AI/GAI and critical thinking and deeper learning was important. The review signaled (dis)continuity of the learning process from simpler to complex tasks that may often occur with automation and particularly take away from valuable informal learning opportunities among entry- and higher-level learners. Altogether, the role of LLL has been heightened by the emphasis on AI integration at work and in education, which will especially require self-regulation and self-efficacy of learners. Still, there are lingering questions in the AI debate realm. Besides the question of whether AI/GAI is revolutionary or like any other technology with a novelty effect, there is a question of digital gaps across the world, accounting for social and educational conditions in which people live. Therefore, thinking of educational (and organizational) interventions beyond technostructural will be essential. We uniquely add to discussions of global perspectives in the realm of AI and lifelong learning and instigate probing into deeper human ontological processes behind learning. Integrating indigenous perspectives and human development approaches would be an important area for extended theoretical and conceptual directions and refinements. For example, the capability approach (CA) supported by Poquet and de Laat (2021) and the AI capability, context of use (automation, augmentation), human workforce, and organization framework by Chowdhury et al. (2023, Fig. 2) seem like good candidates. Probing into short- and long-term learning gains (e.g., learner confidence and learning transfer) using AI-augmentation (e.g., from classroom to applied contexts, or from organizational interventions) would be additionally beneficial, while still balancing principles of teaching and learning and ethical responsibilities in AI use.

Keywords: lifelong learning, generative AI, ChatGPT, andragogy, artificial intelligence

References

- Ardichvilli, A. (2022). The impact of artificial intelligence on expertise development: Implications for HRD. *Advances in Developing Human Resources*, *24*(2), 78–98. https://doi.org/10.1177/15234223221077304
- Arksey, H., & O'Malley L. (2005). Scoping studies: towards a methodological framework. *International Jornal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616
- Asad, M. M., & Ajaz, A. (2024). Impact of ChatGPT and generative AI on lifelong learning and upskilling learners in higher education: Unveiling the challenges and opportunities globally. *International Journal of Information & Learning Technology*, *41*(5), 507–523. https://doi.org/10.1108/IJILT-06-2024-0103
- Beane, M. (2019). Learning to work with intelligent machines. *Harvard Business Review*, 140–148.
- Bennett, E. E., & McWhorter, R. R. (2021). Digital technologies for teaching and learning. In T. S. Rocco, M. C. Smith, R. C. Mizzi, L. R. Merriweather, & J. D. Hawley (Eds.). *The handbook of adult and continuing education* (pp. 177–186). Stylus Publishing, LLC.

- Chang, L., Wang, Y., Lin, H., & Liao, L. (2024). Registered nurses' attitudes towards ChatGPT and self-directed learning: A cross-sectional study. *Journal of Advanced Nursing*. https://doi-org.libproxy.boisestate.edu/10.1111/jan.16519
- Chen, C., Hu, W., & Wei, X. (2024). From anxiety to action: Exploring the impact of artificial intelligence anxiety and artificial intelligence self-efficacy on motivated learning of undergraduate students. *Interactive Learning Environments*, 1–16. https://doi.org/10.1080/10494820.2024.2440877
- Chowdhury, S. et al. (2023). Unlocking the value of artificial intelligence in human resource management through AI capability framework. *Human Resource Management Review*, *33*(1), 1–21. https://doi.org/10.1016/j.hrmr.2022.100899
- Diller, S. J. (2024). Ethics in digital and AI coaching. *Human Resource Development International*, *27*(4), 584–596. https://doi.org/10.1080/13678868.2024.2315928
- Dreier, O. (2008). *Psychotherapy in everyday life.* Cambridge University Press.
- Ericsson, K. A. (Ed.). (2009). *Development of professional expertise: Toward measurement of expert performance and design of optimal learning environments.* Cambridge University Press. https://doi.org/10.1017/CBO9780511609817
- Eynon, R., & Young, E. (2021). Methodology, legend, and rhetoric: The constructions of ai by academia, industry, and policy groups for lifelong learning. *Science, Technology, & Human Values*, *46*(1), 166–191. https://doi.org/10.1177/0162243920906475
- Jarrahi, M. H. (2019). In the age of the smart artificial intelligence: AI's dual capacities for automating and informating work. *Business Information Review*, *36*(4), 178–187. https://doi.org/10.1177/0266382119883999
- Jarvis, P. (2007). *Globalization, lifelong learning and the learning society sociological perspectives.* Routledge.
- Lee, J., & Park, J. (2023). AI as "Another I": Journey map of working with artificial intelligence from AI-phobia to AI-preparedness. *Organizational Dynamics*, *52*(3),1–10. https://doi.org/10.1016/j.orgdyn.2023.100994
- Lin, X. (2024). Exploring the role of ChatGPT as a facilitator for motivating self-directed learning among adult learners. *Adult Learning*, *35*(3), 156–166. https://doi-org.libproxy.boisestate.edu/10.1177/10451595231184928
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation.* Jossey-Bass.
- Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, *18(*143), 1–7. https://doi.org/10.1186/s12874-018-0611-x
- Ortner, S. B. (2006). *Anthropology and social theory: Culture, power, and the acting subject.* Duke University Press.
- Ovesni, K., Matović, N., & Janković, S. (2019). The work-related usage of informational communication technology and the learning of employees. In A. Pejatović, & N. Koruga (Eds.). *Book of abstracts: Adult education research and practice: Between the welfare state and neoliber-*

alism (pp. 505–517). ESREA 9th Triennial European Research Conference, 19–22 September 2019. University of Belgrade, Faculty of Philosophy, Department for Pedagogy and Andragogy, Institute for Pedagogy and Andragogy, ESREA – European Society for Research on the Education of Adults.

- Palenski, T., Hills, L., Unnikrishnan, S., & Eynon, R. (2024). How AI Works: Reconfiguring Lifelong Learning. *Postdigital Science and Education*, *6,* 1216–1239. https://doi.org/10.1007/s42438-024-00496-y
- Parker, S. K., & Grote, G. (2022). Automation, algorithms, and beyond: Why work design matters more than ever in a digital world. *Applied Psychology*, *71*(4), 1171–1204. https://doi.org/10.1111/apps.12241
- Penuel, W. R., Van Horne, K., DiGiacomo, D., & Kirshner, B. (2016). A social practice theory of learning and becoming across contexts and time. *Frontline Learning Research, 4*(4), 30–38. http://dx.doi.org/10.14786/flr.v4i4.205
- Poquet, O., & De Laat, M. (2021). Developing capabilities: Lifelong learning in the age of AI. *British Journal of Educational Technology*, *52*(4), 1695–1708. https://doi.org/10.1111/bjet.13123
- Regmi, K. D. (2024). The rise of learning technology in an unequal world: Potentials and limitations in enhancing lifelong learning. *International Review of Education*, *70*, 433–452. https://doi.org/10.1007/s11159-023-10058-2
- Sen, A. (1985). Well-being, agency and freedom: The Dewey lectures 1984. *The Journal of Philosophy*, *82*(4), 169–221. https://doi.org/10.2307/2026184
- Storey, V. A., & Wagner, A. (2024a). Andragogy in the age of AI: Transformative pathways for adult education. In V. Wang (Ed.). *Integrating AI into pedagogical and andragogical education* (pp. 25–44). IGI Global.
- Storey, V., & Wagner, A. (2024b). Integrating Artificial Intelligence (AI) into adult education: Opportunities, challenges, and future directions. *International Journal of Adult Education and Technology*, *15*(1), 1–15. https://doi.org/10.4018/IJAET.345921
- Sutton, S. G., Arnold, V., & Holt, M. (2018). How much automation is too much? Keeping the human relevant in knowledge work. *Journal of emerging technologies in accounting*, *15*(2), 15–25. https://doi.org/10.2308/jeta-52311
- Tomaszewska, R. (2023). Andragogy meets ChatGPT in lifelong learning: Exploring opportunities and challenges*. 2023 IEEE International Conference on Data Mining Workshops (ICDMW)* (pp. 868–874). https://doi.org/10.1109/ICDMW60847.2023.00117
- Tricco, A. C. et al. (2016). A scoping review on the conduct and reporting of scoping reviews. *BMC Medical Research Methodology*, *16*(15), 1–10. https://doi.org/10.1186/s12874-016-0116-4
- Zhang, L., & Xu, J. (2025). The paradox of self-efficacy and technological dependence: Unraveling generative AI's impact on university students' task completion. *The Internet and Higher Education*, *65*, 100978. https://www.sciencedirect.com/science/article/abs/pii/S109675162400040X

- Zhang, S., Zhao, X., Zhou, T., & Kim, J. H. (2024). Do you have AI dependency? The roles of academic self-efficacy, academic stress, and performance expectations on problematic AI usage behavior. *International Journal of Educational Technology in Higher Education*, *21*(34), 1–14. https://doi.org/10.1186/s41239-024-00467-0