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Mapping the Evolution of Lifelong Learning, Technology, and E-Learning Research: A Bibliometric Analysis

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The rapid expansion of digital technologies has transformed the way lifelong learning and e-learning are understood and practiced. This study undertakes a bibliometric analysis to trace the evolution of research on lifelong learning, technology, and e-learning from 2011 to 2024, offering a comprehensive view of the field's intellectual and developmental trajectory. A total of 624 documents indexed in the Scopus database were analyzed using VOSviewer and Biblioshiny. The analysis included annual publication trends, leading source titles, influential authors, contributing countries, thematic keywords, and conceptual structures. Temporal mapping was employed to identify the main developmental phases of the field. The analysis reveals three distinct phases of publication growth. The first phase (2011–2015) centered on digital infrastructure and the early adoption of ICT in education. The second phase (2016–2019) saw increased attention to integrating e-learning platforms and developing lifelong learning competencies. The third phase (2020–2024) experienced a sharp surge in output, largely driven by educational shifts following the COVID-19 pandemic, as well as emerging discussions about artificial intelligence, digital transformation, and adaptive learning systems. An unexpected yet striking observation was the accelerated rise of AI-related research after 2021. Throughout these periods, enduring themes such as e-learning, lifelong learning, and digital competence remained central. At the same time, the diversity of authors, journals, and contributing countries underscored the field's interdisciplinary and global character. This study highlights a structural shift from technology-centered approaches to learner-focused and adaptive pedagogies. Two major insights stand out. First, the COVID-19 pandemic catalyzed the rapid global expansion of research and investment in digital learning. Second, the growing prominence of artificial intelligence signals an emerging shift toward intelligent, personalized lifelong learning ecosystems. A notable limitation of this work is that, although the dataset extends to mid-2025, the core analysis focuses on publications from 2011 to 2024 because data for 2025 remain incomplete. The partial records from 2025 are therefore presented only as preliminary signals of developing research directions and should be interpreted with due caution.

Keywords: lifelong learning, e-learning, digital competence, artificial intelligence, bibliometric analysis.