

Systematic Literature Review of AI-based Mentoring in Higher Education

Mana-Teresa Donner¹, Sandra Hummel¹

¹ScaDS.AI Dresden, TUD Dresden University of Technology, Germany

Abstract: AI-based mentoring systems provide personalized and adaptive support to learners in higher education, utilizing artificial intelligence to facilitate individualized learning pathways. These systems offer real-time feedback, promote self-regulated learning, and generate data-driven insights that enhance academic performance and learner engagement. This systematic literature review (SLR) evaluates the current state of research on the integration of AI in educational mentoring over the past decade. A comprehensive screening process was conducted across five databases, with 50 key studies selected from an initial pool of 710 publications, following predefined inclusion and exclusion criteria. The findings reveal that AI integration in mentoring predominantly falls into two categories: technology-driven and hybrid models, where human mentors collaborate with AI systems to provide holistic support. The most frequently employed tools include *Chatbots*, *Intelligent Tutoring Systems (ITS)*, and *AI-based Recommender Systems*, all of which provide personalized learning trajectories, real-time adaptive feedback, and tailored support. Although AI-based mentoring systems show considerable potential for scaling individualized educational support, significant challenges remain, particularly in relation to technological integration, the digital divide, and data privacy. Furthermore, while AI offers cognitive support, current systems lack emotional intelligence, necessitating human mentors to provide social and emotional guidance. The review suggests that future research should prioritize advancing AI systems' emotional intelligence, developing hybrid mentoring models, and establishing ethical frameworks to ensure transparent, fair, and trustworthy AI deployment in higher education.

Keywords: Mentoring, Artificial Intelligence, Personalized Learning, Higher Education, AI-based Mentoring

trajectories of learners but also their emotional and cultural contexts – elements essential for deep engagement and trust. The ethical imperatives of data privacy, algorithmic fairness, and transparency are not mere technicalities but foundational to the legitimacy and success of AI in education.

Looking ahead, the future of AI in higher education is as much about human-centered design as it is about technological innovation. We need to envision a seamless integration where educators are empowered to wield AI tools with confidence, enabling learners to benefit from mentorship that is not only scalable but also deeply personalized. This delicate balance between efficiency and empathy could redefine not only how we teach, but more importantly, how we inspire future generations to think, innovate, and thrive in an increasingly complex world.

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