

ARTIFICIAL INTELLIGENCE IN EDUCATION

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Annotation: The COVID-19 pandemic has accelerated the integration of online and hybrid teaching strategies. Educators began adopting artificial intelligence (AI) tools to support student learning outcomes. However, these technologies were unfamiliar to many, highlighting a need for teachers to acquire digital competencies that align with AI integration. This study discusses the challenges and possibilities presented by AI in education.

Key words: AI technologies, educational tools, digital competencies, opportunities, challenges.

Аннотация: Пандемия COVID-19 ускорила внедрение стратегий онлайн и гибридного обучения. Преподаватели начали применять инструменты искусственного интеллекта (ИИ) для поддержки результатов обучения студентов. Однако для многих эти технологии оказались незнакомыми, что говорит о необходимости приобретения учителями цифровых компетенций, соответствующих интеграции ИИ. В данном исследовании рассматриваются проблемы и возможности, которые открывает ИИ в образовании.

Ключевые слова: ИИ технологии, образовательные инструменты, цифровые компетенции, возможности, проблемы.

Annotatsiya: COVID-19 pandemiyasi onlayn va gibrid ta'lim strategiyalarini qabul qilishni yanada tezlashtirdi. O'qituvchilar talabalarning ta'lim natijalarini qo'llab-quvvatlash uchun sun'iy intellekt (SI) vositalaridan foydalanishni boshladilar. Biroq, ko'pchilik uchun bu texnologiyalar notanish edi. Bu esa o'z navbatida o'qituvchilarning SI integratsiyasiga mos keladigan raqamli kompetensiyalarni egallashi zarurligini ko'rsatadi. Ushbu tezis SI ta'limda taqdim etadigan qiyinchiliklar va imkoniyatlarni o'rganadi.

Kalit so'zlar: SI texnologiyalari, ta'lim vositalari, raqamli kompetensiyalar, imkoniyatlar, muammolar.

The onset of the COVID-19 pandemic triggered a rapid transition to online and blended education models, prompting educators to experiment with a range of new technologies (Ng et al., 2021; Sartika et al., 2021; Whalley et al., 2021). Among these, artificial intelligence in education (AIED) tools gained traction due to their potential to support teaching and learning. Initial discussions in the literature emphasized AI's ability to ease teacher workloads by automating non-instructional duties, providing

analytical insights, and optimizing virtual learning environments (Kexin et al., 2020). Traditionally, AIED systems, such as intelligent tutors, were used to track student learning progress and offer personalized guidance. Chaudhry & Kazim(2022) state that in recent years AI technologies have evolved to assist teachers directly, helping identify effective pedagogical strategies, automating grading and feedback, and generating assessments, which significantly boosts instructional efficiency.

Several studies have demonstrated that AI can facilitate tailored learning pathways, support knowledge development, and motivate students through intelligent agents (Ahmad et al., 2022). However, Markauskaite et al.,(2022) highlight that the success of AI integration is closely tied to the teacher's ability to effectively utilize such tools. Without addressing educators' evolving roles and the competencies they need in an AI-enriched environment, the full potential of these technologies may not be realized.

Teachers are central to creating impactful and engaging learning environments. Nonetheless, many educators lack the digital readiness to use AI-enhanced educational tools effectively. They may struggle with interpreting student data, automating task generation, or providing algorithm-driven feedback (Seo et al., 2021). Moreover, Akgun & Greenhow (2021)provide concerns about AI-related risks, including misinformation, limitations in AI capabilities, and ethical issues embedded in different platforms. Research supports the idea that teacher education plays a pivotal role in boosting student achievement, with wider social and economic implications. Hence, having theoretical and instructional frameworks to guide teachers in identifying necessary AI competencies is crucial (Chiu, 2021).

Although growing scholarly attention has been given to cultivating students' AI literacy, there remains a significant research gap regarding the digital competencies educators themselves must acquire. Green et al., (2020) argue that the pandemic created an unexpected yet valuable opportunity to advance digital teaching and learning through AI. It has emerged as a vital tool, especially in higher education, where it is used to process and analyze vast datasets for remote learning contexts (Aljarrah et al., 2021). To ensure effective use of these technologies, teachers must continuously update their skills and knowledge to develop engaging and suitable learning experiences for their students.

Howard et al.,(2022) point out the rapid shift to remote education, known as the Great Online Transition (GOT), and that it compelled teachers worldwide to adapt their teaching approaches in response to the pandemic. Among the various technologies employed, AIED tools stood out as a key solution for addressing urgent teaching issues like student disengagement, social isolation, and increased administrative workload

(Zhu et al., 2020). During this time, both school administrators and instructors sought innovative strategies to enhance teaching effectiveness, improve student interaction, and streamline administrative tasks (Kexin et al., 2020). AI technologies such as intelligent tutoring systems offer adaptive suggestions and learning tasks based on students' profiles. These platforms collect detailed records of student behaviors and interactions, enabling educators to track learning progress and deliver personalized learning content (Whalley et al., 2021). Such advancements help address the diverse challenges of online teaching, including varied learning needs, reduced motivation, and limited social engagement.

T.K.Chiu (2021) proposes that AI technologies further support learning by enabling real-time, tailored feedback and facilitating inclusive, adaptive instruction. These systems can address the specific learning requirements of individual students, help learners overcome challenges, and adjust to different learning styles. According to Liang et al., (2021) the pandemic has accelerated the integration of AI into education systems, influencing how educators deliver content and how students acquire knowledge. From language learning to medical training, AIED tools have played a significant role in improving learning outcomes, student engagement, and achievement in online learning environments.

However, for many teachers, the use of AIED tools was a first-time experience, often accompanied by difficulties in managing technical tasks or maintaining communication and collaboration. Teachers with stronger digital capabilities and AI fluency were generally more effective in adapting to the digital transformation and managing both instructional and administrative tasks more efficiently (Huang, 2021).

To support this transformation, it is essential to understand the challenges educators face with AIED tools and provide them with the necessary digital competencies. This includes the ability to choose appropriate AI applications that align with their content areas and teaching goals. For example, voice-based AI assistants like Siri can help teach language and conversational skills, while online proctoring tools with facial recognition can reduce academic dishonesty during virtual exams (Pandey et al., 2020). Although promising, many of these technologies are unfamiliar to educators and require targeted training and upskilling. Zhang & Aslan (2021) warned that the expanding role of AI in education emphasizes the need for continuous development of teachers' digital competencies.

To fully leverage the benefits of AI for teaching and learning, educators must stay updated with technological advancements and learn to integrate these tools meaningfully into their pedagogical practice.

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