

**DEVELOPING STUDENTS' INDEPENDENT LEARNING COMPETENCIES
THROUGH THE USE OF ARTIFICIAL INTELLIGENCE**

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Abstract

This article explores the potential of artificial intelligence (AI) technologies in developing students' independent learning competencies in higher education. The study analyzes how AI-based tools support self-directed learning, critical thinking, and personalized learning processes. Special attention is paid to adaptive learning systems, intelligent tutoring systems, and AI-driven feedback mechanisms that enhance students' motivation and responsibility for their own learning. The findings indicate that the effective integration of artificial intelligence into the educational process contributes to the development of independent learning skills and improves overall academic performance.

Keywords: *artificial intelligence, independent learning, higher education, self-directed learning, educational technologies.*

Аннотация

В статье рассматриваются возможности использования технологий искусственного интеллекта для развития компетенций самостоятельного обучения студентов в высших учебных заведениях. Анализируется влияние ИИ-инструментов на формирование навыков самообразования, критического мышления и персонализированного обучения. Особое внимание уделяется адаптивным обучающим системам, интеллектуальным обучающим средам и автоматизированной обратной связи. Результаты исследования показывают, что применение искусственного интеллекта способствует повышению учебной самостоятельности студентов и эффективности образовательного процесса.

Ключевые слова: *искусственный интеллект, самостоятельное обучение, высшее образование, самообразование, образовательные технологии.*

Annotatsiya

Mazkur maqolada oliy ta'lim jarayonida sun'iy intellekt texnologiyalaridan foydalanish orqali talabalarning mustaqil ta'lim kompetensiyalarini rivojlantirish masalalari yoritilgan. Tadqiqotda SI asosidagi vositalarning o'z-o'zini boshqarish, tanqidiy fikrlash va shaxsiylashtirilgan ta'limni rivojlantirishdagi o'rni tahlil qilinadi. Adaptiv ta'lim tizimlari, aqlli o'qituvchi dasturlar va avtomatlashtirilgan teskari aloqaning ta'lim samaradorligiga ta'siri ko'rib chiqiladi. Tadqiqot natijalari sun'iy intellekt texnologiyalari talabalarning mustaqil ta'lim olish ko'nikmalarini shakllantirishga xizmat qilishini ko'rsatadi.

Kalit so'zlar: *sun'iy intellekt, mustaqil ta'lim, oliy ta'lim, o'z-o'zini o'rganish, ta'lim texnologiyalari.*

INTRODUCTION

In modern higher education, the development of students' independent learning competencies has become one of the most important educational objectives. Rapid technological advancements, globalization, and the widespread availability of digital learning resources have significantly changed the nature of teaching and learning. As a result, students are increasingly expected to take greater responsibility for planning, managing, and evaluating their own learning processes. Independent learning competencies, including self-regulation, critical thinking, problem-solving, and reflective thinking, are therefore essential for lifelong learning, academic success, and continuous professional development.

Independent learners are capable of setting learning goals, selecting appropriate learning strategies, monitoring their progress, and evaluating learning outcomes. These skills enable students to adapt to changing educational and professional environments, where continuous knowledge updating and skill development are required. In higher education, fostering such competencies helps learners move beyond passive knowledge acquisition toward active, self-directed, and meaningful learning experiences.

Artificial intelligence (AI) technologies offer new and powerful opportunities to support the development of independent learning. AI-based educational tools facilitate personalized learning experiences by analyzing learners' behaviors, preferences, prior knowledge, and performance data. Based on this analysis, AI systems can adapt learning content, instructional methods, and assessment strategies to meet individual learners' needs. This personalized approach allows students to learn at their own pace, strengthens motivation, and enhances learner autonomy.

Moreover, AI-powered adaptive learning systems and intelligent tutoring platforms provide continuous and immediate feedback, helping students identify their strengths and areas for improvement. Through this process, students develop self-awareness and self-regulation skills, which are central to independent learning.

Main Part. Artificial intelligence (AI) plays a significant role in developing independent learning competencies by creating adaptive, flexible, and learner-centered educational environments. The integration of AI technologies transforms traditional teaching approaches into personalized learning systems that help learners manage their own learning processes effectively and with greater confidence.

AI-based learning systems analyze learners' behaviors, preferences, prior knowledge, and performance data in order to design individualized learning pathways. Through this personalization, students are able to learn at their own pace, select appropriate learning strategies, and take responsibility for their academic achievements. As a result, essential independent learning skills such as self-regulation, time management, goal setting, and metacognitive awareness are strengthened. Learners become more conscious of how they learn, which methods work best for them, and how they can improve their outcomes through deliberate practice.

One of the most effective applications of artificial intelligence in education is intelligent tutoring systems. These systems provide personalized instruction, immediate feedback, and adaptive recommendations based on individual learning needs. By identifying learners' strengths and weaknesses, intelligent tutoring systems increase students' awareness of their learning processes and encourage them to actively address gaps in knowledge. This process fosters autonomy and supports the development of self-directed learning skills. Moreover, the availability of 24/7 tutoring support allows learners to engage in independent study beyond classroom boundaries, reinforcing continuous learning habits.

AI-based learning analytics also make a significant contribution to independent learning competencies. By providing learners with visualized information about their progress, performance trends, and learning outcomes, AI tools enable students to set goals, monitor their achievements, and reflect on their learning strategies. Such reflective practices are essential for building lifelong learning competencies. Students can adjust their study plans, allocate time more efficiently, and make informed decisions about future learning directions based on data-driven insights.

Furthermore, artificial intelligence supports the development of critical thinking and problem-solving skills through interactive and experiential learning environments. AI-driven simulations, virtual laboratories, and adaptive assessments engage learners in tasks that require analysis, decision-making, creativity, and independent exploration. These learning activities encourage students to test hypotheses, learn from errors, and refine their understanding through practice. As learners interact with complex, real-world scenarios, they develop deeper conceptual knowledge and the ability to apply theory in practical contexts.

Another important dimension is the role of AI in facilitating collaborative yet independent learning. AI platforms can organize peer-learning groups, recommend discussion partners, and moderate collaborative projects while still tracking individual contributions. This balance allows learners to benefit from social learning while maintaining accountability for their personal progress. Consequently, students cultivate communication skills, digital collaboration competencies, and independent responsibility simultaneously.

From a pedagogical perspective, AI technologies assist educators in creating learning environments that emphasize learner autonomy and responsibility. By utilizing AI-generated insights, teachers can provide targeted support to students who require additional guidance while offering more advanced, independent tasks to learners with higher levels of competence. This approach allows educators to shift from a traditional teacher-centered role to that of a facilitator, supporting independent learning without eliminating instructional guidance.

In addition, AI contributes to inclusive education, which indirectly strengthens independent learning competencies. Adaptive interfaces, speech recognition, text-to-speech tools, and multilingual support systems ensure that learners with diverse needs can access educational content independently. When barriers to access are reduced, students gain confidence in managing their own learning experiences.

Ethical and responsible use of AI also becomes part of independent learning development. Learners must evaluate AI-generated information critically, verify sources, and use digital tools responsibly. This fosters digital literacy, information evaluation skills, and academic integrity — all of which are core components of independent learning in the digital age.

RECOMMENDATIONS AND PROPOSALS

Based on the findings of the study, it is strongly recommended that higher education institutions integrate artificial intelligence-based educational tools to effectively support the development of students' independent learning competencies. AI-powered adaptive learning systems and intelligent tutoring platforms can play a crucial role in personalizing learning experiences, addressing individual learning needs, and strengthening students' self-directed learning skills.

Educational institutions should place particular emphasis on developing both students' and instructors' digital and AI-related competencies to ensure the effective and responsible use of artificial intelligence technologies in teaching and learning. Professional development programs, training workshops, and continuous support mechanisms are essential to help educators integrate AI tools into

instructional design and assessment practices. Similarly, students should be equipped with the necessary digital literacy skills to engage with AI-based learning systems effectively and autonomously.

The use of AI-driven learning analytics is also highly recommended, as it enables continuous monitoring of learners' progress, engagement, and performance. By providing timely, data-driven feedback, learning analytics tools support students in reflecting on their learning processes, identifying areas for improvement, and making informed decisions about their learning strategies. This ongoing feedback loop contributes significantly to the development of self-regulation and metacognitive skills.

The effective implementation of these recommendations will not only enhance students' independent learning competencies but also contribute to improving teaching quality, learning outcomes, and the overall effectiveness of higher education in a rapidly evolving digital learning landscape.

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