

DESIGNING A PERSONALIZED LEARNING ENVIRONMENT BASED ON ARTIFICIAL INTELLIGENCE AND STUDYING ITS PSYCHOLOGICAL-PEDAGOGICAL FOUNDATIONS

Tursunbek Sadriddinovich Jalolov

Asia international university pffd .(PhD)

Diyorbek Jo‘rabek o‘g‘li Jumayev

Bachelor Student, Bukhara International University

Abstract: *This article analyzes the theoretical, psychological, and pedagogical foundations of creating a personalized learning environment based on artificial intelligence (AI) technologies. The process of individualizing education is presented as an approach that adapts teaching strategies to each student’s abilities, learning pace, motivation, and emotional state. The study scientifically highlights the advantages of using AI systems to form personalized learning paths, analyze learning outcomes, and implement adaptive teaching mechanisms. Based on psychological and pedagogical theories, the article also examines both the positive and potential negative aspects of AI-mediated interaction between students and teachers.*

Keywords: *artificial intelligence, personalized learning, psychological and pedagogical foundations, adaptive systems, learning motivation, digital pedagogy, learner model, data analysis, teacher-robot collaboration.*

Introduction

One of the key trends in the 21st-century education system is digitalization and the broad integration of artificial intelligence technologies. The personalization of learning has become one of the most relevant directions in modern pedagogy worldwide. While traditional education offers the same content to all learners, AI-based educational systems provide the opportunity to design an individual learning trajectory for each student. In this process, AI algorithms automatically analyze students’ levels of knowledge, learning speed, attention stability, fields of interest, and psychological characteristics.

Creating a personalized learning environment must rely not only on technological solutions but also on deep psychological and pedagogical foundations. During learning, humans not only acquire information but also develop through motivation, emotions, personal goals, and social interaction. Therefore, the success of personalized education depends on the development of intelligent systems capable of accurately analyzing learners’ psychological needs and generating corresponding educational strategies.

Main Part

Designing a personalized learning environment based on artificial intelligence involves several key components: the learner model, the learning content model, the teaching strategy, and analytical mechanisms. Each of these components functions in an integrated manner.

1. **Learner model.** This is a personal profile formed by the AI system, which reflects the student’s level of knowledge, areas of interest, emotional condition, and learning activity.

Based on this information, the system individualizes the educational process by selecting appropriate tasks, tests, and materials for each learner.

2. Learning content model. This component structures the knowledge base and uses AI technologies to analyze, classify, and deliver educational resources in accordance with learners' needs. For instance, through natural language processing (NLP) algorithms, the system can recommend suitable texts, videos, and interactive lessons for each learner.

3. Adaptive teaching strategy. This mechanism allows the AI to dynamically adjust the learning process in real time. The system changes the level of difficulty depending on the student's responses, test performance, and behavioral patterns. This approach is based on the principle of "dynamic difficulty adjustment," helping learners progress without excessive cognitive load.

4. Psychological and pedagogical foundations. The success of personalized learning is directly related to self-awareness, motivation, and reflection mechanisms. The teacher acts as a mentor or coach – analyzing the student's emotional state and interpreting AI-generated data from a pedagogical perspective. This ensures harmony between human interaction and technological analysis.

5. AI psychological model. In identifying cognitive processes, AI systems employ emotion recognition, facial expression detection, and speech tone analysis. Through these technologies, the system can assess a learner's psychological state and provide appropriate support. For example, if a student experiences fatigue or stress, the system automatically offers short relaxation activities or motivational messages.

6. Research and analytical stage. AI systems analyze learners' performance using Big Data technologies. This enables the study of educational efficiency, engagement levels, and psychological stability. Analytical results are delivered to the teacher in real time, allowing immediate adjustment of teaching strategies.

Furthermore, AI-based personalized systems help develop metacognitive competence, i.e., the ability to manage one's own learning. Learners can use AI tools to review their results, identify mistakes, and improve their learning strategies. This fosters self-assessment and independent thinking skills.

From a psychological perspective, personalized learning strengthens intrinsic motivation, as students experience a sense of success by completing tasks suited to their capabilities. Moreover, AI-based learning environments cultivate digital empathy – the ability to establish a positive emotional connection with technology.

However, several psychological risks may arise: reduced human interaction between teachers and students, weakened emotional bonds, and excessive reliance on technology that could lower social skills. Therefore, pedagogical approaches must maintain a balance between technological and human factors.

Conclusion

Designing a personalized learning environment based on artificial intelligence is not merely a technical issue but also a deeply psychological and pedagogical one. Such systems enhance the efficiency of the learning process, ensure individualized approaches, and motivate students toward independent learning. At the same time, the teacher's role transforms from that of a supervisor to that of a learning guide. The future of personalized

education depends on the successful integration of human and artificial intelligence collaboration. AI systems developed on psychological and pedagogical principles can create digital environments that not only transmit knowledge but also support personal development. As a result, the educational process becomes more flexible, motivational, and human-centered.

REFERENCES:

1. Feldt, R., & Lwakatare, L. E. (2016). Personality traits in software engineering: A systematic literature review. *Information and Software Technology*, 70, 141-161.
2. Börner, K., & Ham, F. (2016). *The psychology of programming*. Springer.
3. Jalolov, T. S. (2023). PSIXOLOGIYA YO 'NALISHIDA TAHSIL OLAYOTGAN TALABALARGA SPSS YORDAMIDA MATEMATIK USULLARNI O'RGATISHNING METODIK USULLARI. *Educational Research in Universal Sciences*, 2(10), 323-326.
4. Jalolov, T. S. (2023). PYTHON INSTRUMENTLARI BILAN KATTA MA'LUMOTLARNI QAYTA ISHLASH. *Educational Research in Universal Sciences*, 2(10), 320-322.
5. Jalolov, T. S., & Usmonov, A. U. (2021). "AQLLI ISSIQXONA" BOSHQARISH TIZIMINI MODELLASHTIRISH VA TADQIQ QILISH. *Экономика и социум*, (9 (88)), 74-77.
6. Sadriddinovich, J. T. (2023). Capabilities of SPSS Software in High Volume Data Processing Testing. *American Journal of Public Diplomacy and International Studies* (2993-2157), 1(9), 82-86.
7. Sadriddinovich, J. T. (2023, November). IDENTIFYING THE POSITIVE EFFECTS OF PSYCHOLOGICAL AND SOCIAL WORK FACTORS BETWEEN INDIVIDUALS AND DEPARTMENTS THROUGH SPSS SOFTWARE. In *INTERNATIONAL SCIENTIFIC RESEARCH CONFERENCE* (Vol. 2, No. 18, pp. 150-153).