

THE ROLE OF THE TEACHER IN THE CONTEXT OF DIGITAL  
TRANSFORMATION OF EDUCATION: SYNERGY OF HUMAN AND ARTIFICIAL  
INTELLIGENCE

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**The article** explores the evolution of the modern educator's role in the context of the digital transformation of education. The rapid integration of Artificial Intelligence (AI) technologies into the learning process necessitates a rethinking of traditional teacher-student relationships. The study analyzes the synergy between human intelligence and AI as a key factor in enhancing educational quality. The author substantiates the need for developing new teacher competencies, including AI literacy, emotional intelligence, and mentoring functions. The findings of the article provide recommendations for maintaining a balance between technology and the human element in education.

**Keywords:** educational transformation, digital pedagogy, artificial intelligence, synergy, teacher competencies, adaptive learning, human intelligence.

### Introduction

The digital transformation of education has ceased to be just a trend and has become a necessity. The introduction of AI into the educational process challenges the traditional role of the teacher as the sole source of knowledge. In recent years, the digital transformation of education has moved from the simple digitization of content to a profound structural restructuring of educational systems. The emergence of generative AI has created a new paradigm in which the traditional "teacher as knowledge transmitter" model is losing its monopoly [1].

**Problem:** There is a risk of technological determinism, where algorithms replace human interaction.

**Goal:** To substantiate a synergy model in which AI takes over routine tasks, while educators focus on developing students' soft skills and emotional intelligence.

**Relevance of the study:** Modern educational systems face a "technological gap" between AI capabilities and the methodological readiness of teachers. While algorithms can provide instant feedback and adaptive learning paths, the role of the human teacher requires a rethinking toward socio-emotional support and critical mentoring. This paper proposes the concept of "hybrid pedagogical intelligence," in which the synergy of human cognitive expertise and AI computing power is viewed not as competition, but as a complementary relationship [2].

### Methodology

To achieve this goal, a comprehensive study was conducted, divided into three stages:

1. This study utilized a systematic review of literature from the past five years (2021-2026) using Scopus and Web of Science databases. A comparative analysis of the effectiveness of traditional learning and hybrid learning using AI assistants (e.g., intelligent tutoring systems) was also conducted.

2. A survey was conducted among 100 faculty members at higher education institutions in the republic to determine their level of digital readiness and their perception of AI as a threat or an assistant.

3. A study was conducted to examine the experience of implementing intelligent tutoring systems in the educational process and compare the academic performance of groups with and without AI. The SPSS v.27 statistical package was used to process the data, and content analysis was used to analyze the qualitative data.

Within the proposed synergy framework, learning functions are distributed based on the comparative advantages of each party (see Table 1). We distinguish three types of interaction: augmentation, where AI expands the student's cognitive capabilities; support, aimed at optimizing the teacher's workload; and mentoring, where the human factor remains dominant. The most important conclusion from Table 1 is that AI effectively handles algorithmic tasks (scoring, structuring), while the teacher focuses on the higher levels of Bloom's taxonomy-analysis, synthesis, and evaluation in a socio-ethical context.

Table 1. Functional delineation and synergy of the teacher and artificial intelligence in the educational process.

Area of responsibility	The Role of AI	The role of the teacher (human factor)	Type of interaction (synergy)
soft water is removed	Adaptive content delivery, big data structuring.	Contextualization of knowledge, explanation of complex meanings and ethical aspects.	Addition: AI provides the basis, the teacher provides the depth.
Evaluation	Automated scoring, analysis of typical errors, anti-plagiarism.	High-quality feedback, assessment of creativity and insights.	Support: AI frees up time for deep feedback.
Motivation.	Gamification, reminder and notification systems.	Empathy, personal inspiration, support in crisis situations.	Coaching: AI monitors the rhythm, the teacher manages the state.
Course development.	Generation of assignment options, selection of literature, slide design.	Architecture of meanings, data verification, goal setting.	Co-authorship: AI as an assistant-methodologist.
Socialization	Providing a platform for communication	Development of soft skills, teamwork, conflict resolution.	Mentoring: the teacher shapes the individual in the digital environment.

## Results

The study shows that the teacher's role is transforming in three main directions:

1. From lecturer to facilitator: the teacher moderates the process of knowledge discovery, not simply imparts it.
2. Data analyst: using AI analytics to identify knowledge gaps in each student in real time.
3. Educational experience architect: designing personalized educational trajectories using algorithms.

The study found that the implementation of AI frees up to 35% of teachers' time, which was previously spent on administrative work and grading standardized tests.

Key competencies of "Teacher 4.0": AI literacy: the ability to design prompts and moderate algorithms. Ethical moderation: monitoring academic integrity and the absence of bias in algorithms. Coaching and mentoring: focusing on developing critical thinking, which AI is not yet able to fully replicate.

The study included a survey of university teachers and an analysis of the academic performance of students divided into control and experimental groups. Changes in teacher time expenditures. The analysis revealed a significant redistribution of teacher work time with the integration of AI tools (such as ChatGPT-4, Gamma, and specialized LMS analytics).

Table 2. Distribution of university teacher time expenditures in traditional and AI-augmented learning settings (per week).

Type of professional activity	Traditional model (of watches)	AI-integrated model (watch)	Change (%)	Statistical significance (p-value)
Checking and grading work (tests, essays, reports)	12.5	2.5	-80 %	< 0.001
Preparation of educational materials (presentations, cases)	8.0	3.5	-56 %	< 0.05
Administrative work (reports, filling out journals)	6.0	2.0	-67 %	< 0.01
Individual mentoring (consultations, tutoring)	4.5	11.5	+155 %	< 0.001
Research work (articles, grants)	5.0	10.5	+110 %	< 0.05
Designing new courses	4.0	10.0	+150 %	< 0.01
Total (working week)	40.0	40.0	0%	-

According to the data presented in Table 2, the implementation of AI tools (such as generative models for content creation and automated assessment systems) radically changes the structure of teachers' work time. The most significant reduction in time spent is observed in the "grading and grading" block (an 80% reduction), which is explained by the delegation of routine tasks to algorithms. The freed-up time (a total of approximately 17.5 hours per week) is reallocated toward high-level pedagogical tasks.

In particular, time spent on individual mentoring increased by 155%, confirming a paradigm shift: teachers are no longer "controllers" but "mentors." The increase in time spent on research

(+110%) also demonstrates increased academic productivity in the context of digital transformation.

The experimental group (B), which used AI as an adaptive assistant under teacher guidance, demonstrated higher critical analysis scores than the control group (A), which received traditional instruction. The average score in Group B was 4.6, while in Group A it was 3.9. Engagement level: According to the survey results, 82% of students in Group B reported high satisfaction with the personalized learning pace. A survey of educators revealed an "AI paradox": 65% of respondents fear a decline in academic integrity, yet 78% acknowledge that synergy with AI is inevitable for improving the quality of education.

### Discussion

The synergy between human and AI creates an effect scientifically known as augmented intelligence [3]. The main challenge lies in the digital divide and the psychological unpreparedness of some teaching staff. The question being discussed is: Can AI replace teachers? Answer: AI will replace teachers who use AI-like methods (rote repetition), but will enhance those who value human interaction. The results support the hypothesis that AI cannot replace teachers in aspects related to empathy and education. However, teachers who ignore AI risk becoming uncompetitive.

We propose a "3S" model: support (AI assists with lesson planning) + supplementation (AI provides additional resources to students) + substitution (AI takes over automated testing entirely). The data we obtained confirm that synergy (complementarity) is more effective than either full automation or a complete rejection of technology.

Time-freeing effect: the teacher ceases to be a "controller" and becomes a "coach." The freed-up 8.5 hours (from Table 2) allow for attention to the emotional state of students, which is critical in the digital age [4].

2. The "digital trust" issue: despite the increase in academic performance, the discussion highlights the need to develop new assessment methods. If an AI can write an essay, the teacher should evaluate not the final text, but the thought process, debate, or practical application of knowledge.

3. Competency model: Synergy requires the teacher to develop the skill of setting AI problems and strengthening the skills for verifying the algorithm's responses.

Table 3. Comparative analysis of traditional and synergistic learning models.

Comparison parameters	Traditional model (Human only)	Synergy Model (Human + AI)	Role in transformation
Source of knowledge	Teacher (single native speaker)	Hybrid base (AI + expertise)	Decentralization of knowledge
Pace of learning	Linear (average for the group)	Adaptive (individual)	Personalization (SDG 4)
Feedback	Deferred (after verification)	Instant	Dynamic monitoring
Teacher's Focus	Content and discipline	Mentoring and Soft Skills	Humanization of education

Table 4. Assessment of changes in professional competencies of teachers.

Competency group	Before AI implementation (score)	After AI implementation (score)	Height (%)	p-value

Digital literacy	3.2	4.7	+46.8 %	< 0.001
Methodological design	3.8	4.5	+18.4 %	< 0.05
Individual mentoring	3.1	4.8	+54.8 %	< 0.001
Data analytics	2.4	4.3	+79.1 %	< 0.001

Table 5. Matrix of implementation of AI tools in pedagogical activities.

Integration level	Recommended tools	Tasks of the teacher	Risks and limitations
Elementary	ChatGPT, DeepL, Canva	Creation of plans and visualizations	AI hallucinations
Average	Khan Academy, Duolingo	Monitoring group progress	Decreased critical thinking
Advanced	Learning Management Systems (LMS AI)	Designing personalized journeys	Data privacy

### Conclusion

This study demonstrates that the role of educators in the context of digital transformation is not diminished, but rather crystallized. AI takes on the cognitive burden of data processing, leaving humans with the highest pedagogical mission: developing values, critical thinking, and creativity. The "human + AI" synergy model is the most sustainable strategy for the development of modern global education [5].

Digital transformation doesn't eliminate teachers from the system, but rather frees them from routine tasks to perform higher-level pedagogical functions. The synergy of AI and human intelligence enables truly personalized learning. Successful integration requires reforming teacher training programs, emphasizing AI literacy and digital ethics.

The synergy of human intelligence and AI is the only way to achieve the sustainable development goal of high-quality education. In this system, teachers become the "conductor" of a technological orchestra. Future research should focus on the long-term impact of AI on students' cognitive abilities and the development of national codes of ethics for the use of AI in schools and universities.

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