

INTEGRATING ARTIFICIAL INTELLIGENCE INTO EDUCATIONAL PRACTICES: THE SHIFT FROM ADAPTIVE LEARNING TOWARD HYBRID MODELS (A SYNTHESIS OF EMPIRICAL STUDIES FROM RUSSIA, IRAN, INDONESIA, AND CHINA)

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Abstract. This paper explores the transformative impact of artificial intelligence (AI) on contemporary education. Through a critical synthesis of four empirical studies carried out in Russia, Iran, Indonesia, and China, the author examines AI's adaptive capabilities alongside the dangers of algorithmic bias and cultural insensitivity. A three-level hybrid framework for dividing responsibilities between teachers and neural networks is introduced (technical-diagnostic, interpretative-adaptive, and motivational-reflective levels). The central argument is that in the digital era, the success of an educational system depends less on the raw power of AI and more on the quality of pedagogical design and the preservation of human-centered values.

Keywords: artificial intelligence, adaptive learning, hybrid model, pedagogical design, cultural relevance, SPEAK-BOT, intelligent tutoring systems.

Introduction

The current phase of digital transformation in education is marked by the widespread adoption of AI technologies. According to Juraev (2026), AI functions not merely as a supportive tool but as an active force that reshapes teaching methods, assessment practices, and the dynamics of the "teacher – student – learning material" relationship.

However, the rapid proliferation of generative neural networks and intelligent tutoring systems (ITS) creates a fundamental tension. On one hand, empirical evidence shows considerable gains in academic achievement, motivation, and language acquisition speed when AI is used (the Chinese study cited in Sharipova & Rsaliyev, 2026). On the other hand, research from Iran and Indonesia (Rsaliyev, 2026) uncovers serious drawbacks: algorithmic bias, neglect of cultural contexts, students' passive copying of answers, and a subsequent decline in critical thinking.

The objective of this article is to offer a balanced hybrid model for distributing tasks between teachers and AI, grounded in a synthesis of empirical data from four distinct educational settings (Russia, Iran, Indonesia, and China). The paper aims to: (1) identify the positive and negative aspects of AI use in education; (2) analyze cross-cultural variations in the effectiveness of AI tools; and (3) formulate actionable recommendations for teachers, curriculum designers, and institutional decision-makers.

Research Data

A review of the literature confirms that AI technologies possess substantial didactic potential. Juraev (2026) highlights three main areas: personalized instruction, automated assessment, and administrative support. In particular, Intelligent Tutoring Systems (ITS) can map out individual

learning trajectories, detect weaknesses, and deliver targeted exercises in real time. VanLehn (2011, cited in Juraev, 2026) notes that ITS can approach the effectiveness of human tutoring.

The strongest quantitative evidence comes from the Chinese experiment described by Sharipova & Rsaliyev (2026). Sixty students with equivalent English proficiency were split into a control group (traditional instruction) and an experimental group (AI-supported learning). Over ten weeks, the experimental group showed:

- statistically significant improvement in language skills relative to the control group;
- reduced time needed for information processing and retention;
- higher levels of motivation and self-regulated learning.

These outcomes align with the observations of Kravtsova (2024, cited in Sharipova & Rsaliyev, 2026), who stresses that neural networks (e.g., Grammarly, Tweek, Gliglish) efficiently automate the evaluation of formal speech features – grammatical accuracy, syntactic complexity, and lexical variety. Tazhenova (2025) adds that platforms like Duolingo, Babbel, and Rosetta Stone, through initial placement tests, ensure precise content adaptation to each learner's level.

Nevertheless, Juraev (2026) cautions against technological determinism: "AI enhances adaptive learning and supports teachers, but ethical concerns, data privacy, and the risk of over-reliance remain unresolved." Indeed, AI's digital benefits – round-the-clock access, instantaneous feedback, and objective statistical analysis – do not automatically translate into pedagogical effectiveness without considering human and cultural dimensions.

Risks, Limitations, and Cultural Irrelevance

Whereas the Chinese study illustrates AI's potential, the investigations in Iran and Indonesia (Rsaliyev, 2026) expose systemic constraints. A key finding from the Iranian study is that teachers did not passively accept AI suggestions; instead, they actively reinterpreted them through a cultural lens. Educators revised algorithmic assessments by introducing a "cultural relevance" category, because the neural network failed to account for Persian rhetorical traditions, where direct criticism signals strong argumentation. Without such adjustment, the AI's evaluations were meaningless.

This finding echoes Juraev's (2026) warning that algorithmic bias can produce unfair outcomes for certain student groups. More broadly, as Selwyn (2019, cited in Juraev, 2026) argues, substituting human interaction with machine-based assessment risks dehumanizing education.

Even more telling is the Indonesian study using the SPEAK-BOT framework (Rsaliyev, 2026). Four student groups performed speaking tasks in which AI prompts were designed not as ready-made answers but as discussion triggers. Interaction quality was measured by four criteria: turn-taking, elaboration, responsiveness, and discussion coherence.

The results showed dramatic variation. One group achieved maximum scores on all criteria, using AI prompts as a springboard for deep dialogue. Another group produced the weakest results, passively copying AI answers without engaging in meaningful interaction. As Rsaliyev (2026) correctly observes, this contrast demonstrates that AI can either strengthen or weaken collaborative learning, depending on whether students treat AI prompts as answer sources or as catalysts for joint discussion.

Psychological risks also exist. As noted in Sharipova & Rsaliyev (2026), citing Kravtsova (2024), when knowledge is acquired too easily (e.g., via a neural network's ready answer), neural connections may not form properly, and the psychological value of that knowledge diminishes significantly. Chatbots often produce generic or incorrect responses, and students – especially in a foreign language – cannot always formulate effective prompts.

Theoretical Model: Three-Level Distribution of Functions

Drawing on empirical data from Russia, Iran, Indonesia, and China, as well as the theoretical insights of Juraev (2026) and Sharipova & Rsaliyev (2026), the following hybrid distribution of functions is proposed.

Level 1: Technical-Diagnostic (AI Dominance)

At this level, AI handles tasks that require high processing speed and little deep contextual interpretation. These include:

- automated checking of formal speech parameters (grammar, syntax, lexical diversity);
- detection of statistical error patterns that might go unnoticed during manual grading (as in the Iranian study – AI can identify systematic errors a teacher might miss for years);
- generation of varied exercises and adaptive learning materials based on the student's level and individual difficulties;
- 24/7 language practice with immediate feedback to build automaticity.

Juraev (2026) confirms that such systems (including NLP tools for evaluating written responses) reduce teachers' workload and free up time for more meaningful interaction.

Level 2: Interpretative-Adaptive (Collaboration / Co-piloting)

Here, AI supplies analytical data while the teacher provides pedagogical interpretation. This involves:

- adapting AI analytics to learners' cultural and individual characteristics (Iranian study: adding a "cultural relevance" category);
- generating AI prompts for group discussions and organizing critical evaluation of those prompts (SPEAK-BOT framework);
- co-designing assessment rubrics that combine quantitative AI data with qualitative teacher judgments.

As Rsaliyev (2026) emphasizes, this level addresses the "black box" problem: the teacher does not blindly accept AI recommendations but actively interprets them within the specific pedagogical context.

Level 3: Motivational-Reflective (Teacher Dominance)

Functions that cannot be delegated to AI without risking dehumanization remain at this level:

- strategic goal-setting and long-term learning planning (taking into account student motivation, abilities, and life goals);

- emotional support, anxiety reduction, and motivation maintenance – AI lacks empathy;
- organizing live communicative interactions (discussions, debates, role-plays) that require attention to nonverbal cues;
- fostering critical thinking by analyzing AI-generated content – teaching students to distinguish reliable from unreliable sources and identify algorithmic bias.

Juraev (2026) refers to Holmes et al. (2019), arguing that AI should complement rather than replace human educators. Turayeva (2024, cited in Sharipova & Rsaliyev, 2026) adds that teachers shape personality, attitudes toward the world, and worldviews – a fundamentally non-algorithmizable function.

Recommendations. Based on the research, some recommendations are followed:

For Teachers

The key shift is from knowledge transmitter to learning environment architect. This requires developing prompt-engineering skills – formulating queries that stimulate reflection rather than elicit ready-made answers. As the Iranian study (Rsaliyev, 2026) showed, critical reflection on AI recommendations is becoming an essential professional competency for modern educators. Teachers are advised to:

- include assignments that require students to critically evaluate AI-generated content;
- use AI analytics to uncover hidden problems in material comprehension;
- explain to students the difference between "knowledge as an answer" and "knowledge as a process."

For Curriculum Developers

The SPEAK-BOT framework shows that AI tools should be embedded in structures where prompts act as discussion catalysts, not sources of ready-made answers. Rsaliyev (2026) recommends integrating AI literacy modules into curricula, teaching students to interact critically with neural networks. This aligns with Juraev's (2026) conclusion about the need to train teachers for effective AI use.

For the Institutional Level

Ethical and methodological frameworks for AI use must be created, taking into account subject-specific and cultural contexts. The Iranian study (Rsaliyev, 2026) irrefutably demonstrates that standardized algorithmic assessments cannot be applied uniformly without considering cultural characteristics. Institutions should provide:

- technological infrastructure (access to verified AI tools, stable internet connectivity);
- student data protection policies to prevent leaks and misuse (Juraev, 2026);
- professional development programs for teachers on AI.

Discussion

A comparative analysis of the four studies reveals a key paradox. In China (Sharipova & Rsaliyev, 2026), AI had an unequivocally positive impact on performance and motivation. In Iran (Rsaliyev, 2026), the same AI without cultural correction produced invalid assessments. In Indonesia, the same SPEAK-BOT framework yielded polar opposite results depending on the group's learning strategy.

This means that AI's effectiveness is determined less by the neural network's technical characteristics and more by the pedagogical design in which it is embedded. As Juraev (2026) convincingly states: "The future of AI in education lies in its responsible and ethical integration." Responsible integration requires:

- transparency and explainability of AI systems (no "black box");
- consideration of long-term consequences (both cognitive and socio-emotional);
- cross-cultural validation of algorithms.

Thus, the proposed three-level model resolves the false dichotomy of "teacher versus neural network." Instead of replacement, a functional redefinition of roles occurs: AI takes over routine diagnostics and generation, while the teacher retains goal-setting, emotional support, and the development of critical thinking.

Conclusion

The analysis of empirical studies conducted in China, Iran, Indonesia, and Russia, together with the theoretical synthesis by Juraev (2026), Rsaliyev (2026), and Sharipova & Rsaliyev (2026), leads to the following conclusions.

1. AI possesses substantial adaptive potential: automating diagnostics, personalizing learning trajectories, and providing 24/7 feedback objectively improves formal academic performance indicators (Chinese study).
2. Without cultural and pedagogical interpretation, AI risks reinforcing inequality and algorithmic bias: the Iranian study demonstrates the need for a "cultural relevance" category, while the Indonesian study shows that effects vary dramatically depending on the learning strategy.
3. The optimal approach is a three-level hybrid model, distributing functions among AI (technical-diagnostic level), collaboration (interpretative-adaptive level), and the teacher (motivational-reflective level).
4. The key factor in effectiveness is pedagogical design, not the power of the neural network. As Sharipova & Rsaliyev (2026) rightly conclude, the ideal is a combination of traditional teaching methods and computer-based learning, where AI acts as an effective assistant that analyzes the process but does not replace the living human teacher.

Future research should focus on long-term analysis of the socio-emotional consequences of AI implementation, the development of cross-cultural standards for algorithmic fairness, and the creation of open educational resources on AI literacy for teachers and students.

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