

# A Study on the Micro-Mechanisms of AI-Enabling Transformation in Psychology Education Classroom Teaching Under the Guidance of Core Competencies

Zichen Gong\*

Southwest Medical University, Longmatan District, Luzhou 646000, Sichuan, China

\**Author to whom correspondence should be addressed.*

**Copyright:** © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** Artificial intelligence (AI) technology is gradually moving from the edge of educational management to the core of classroom teaching. However, current research mostly focuses on macro policy interpretation or technical system development, lacking sufficient in-depth insight into how technology truly functions in the microenvironment of the classroom, this crucial “black box” phenomenon. Based on distributed cognition theory and the teaching structure analysis framework, this study cuts into three micro dimensions: teacher-student interaction, cognitive processing, and evaluation feedback, attempting to reveal the inherent mechanism of AI-driven classroom transformation. The research finds that avoiding the superficial application of technology and the data masking effect is key to achieving deep teaching transformation. AI does not replace macro teaching methods, but rather silently promotes the reconstruction of teaching structure by reshaping classroom information flow, redistributing cognitive load, and shortening feedback cycles.

**Keywords:** Artificial intelligence; Transformation of classroom teaching; Micro-level mechanisms

**Online publication:** March 26, 2026

## 1. Background and significance

With the deepening of the “Education Informatization 2.0 Action Plan” and the national digital education strategy, smart terminals, adaptive learning systems, and generative AI assistants are rapidly entering the classrooms of primary and secondary schools, as well as universities<sup>[1]</sup>. However, in reality, technological applications often face an awkward “Steve Jobs’ question”: the blackboard has been replaced with an interactive whiteboard, chalk has become a stylus, but the basic mode of teaching and listening in the classroom has not really changed. The academic community generally attributes the phenomenon of “two skins” between technology and teaching to insufficient information literacy or technological maturity of teachers. But this view overlooks a more crucial question - at which specific moments and stages in the classroom does AI fundamentally change the behavior and cognition of teachers and students? The micro mechanism behind how technical instructions are gradually transformed into practical teaching effects is still an unopened ‘black box’<sup>[2]</sup>. This article starts from the details of classroom interaction, systematically sorts out the internal logic of AI-driven teaching reform, and provides theoretical reference for frontline teachers to understand human-computer interaction and optimize

teaching processes<sup>[3]</sup>.

## **2. The microscopic observation dimension of teaching transformation**

### **2.1. Theoretical basis**

The traditional teaching view holds that the individual brain is the only container of cognition. In contrast, the distributed cognitive theory believes that cognitive activities can be distributed within individuals, between individuals and across media tools<sup>[4]</sup>. When AI enters the classroom, the cognitive system evolves from the binary “teacher-student” coupling to the triangular cooperative structure of “teacher AI agent student”. Artificial intelligence is not only a tool, but also performs some cognitive mediation functions, which provide a theoretical perspective for observing this change<sup>[5]</sup>.

### **2.2. Three dimensions of microscopic observation**

This study identified three specific and key micro-level observation points to conduct a detailed analysis of the deep interaction and cognitive development in the teaching process: first, the interaction between teachers and students. Focus on the dynamic flow of discourse power in the classroom, the breadth of knowledge and depth of thinking covered by teachers’ and students’ questions, and the capture and interpretation of non-verbal communication signals (such as eye contact, gestures and facial expressions)<sup>[6]</sup>. Second, the cognitive process layer. This study explores the organization and presentation of teaching information, the distribution of cognitive processing load in the process of students’ understanding and internalizing new knowledge, and how teachers can effectively stimulate higher-order thinking ability through questioning and task design<sup>[7]</sup>. Third, the evaluation and feedback layer. It systematically analyzes the time granularity of classroom feedback, the accuracy of feedback content aiming at students’ performance, and how feedback actually affects and improves teachers’ subsequent teaching decisions and practice.

## **3. AI redefines the fundamental logic of the classroom**

### **3.1. Interactive mechanism**

In the traditional large class, teachers have to manage a large group of students, and they simply can’t take care of everyone. As a result, teachers often only point to those who raise their hands, sit in the front row or have good grades. Students sitting in the back or corner are easily ignored, becoming “little transparent” in the classroom, and even completely forgotten. This fixed interactive mode has always been a hard nut to crack in the traditional classroom.

Now with AI, the subtle power structure in the classroom is beginning to loosen!

First, the scope of interaction has been greatly broadened. Teachers can use intelligent response equipment or a pen and paper interactive system to enable each student in the class to submit answers in real time every time they ask questions. Even those introverted students who don’t like to raise their hands can be captured by AI and displayed in word clouds or statistical charts. This way is not to force students to speak, but to let those silent thoughts be “seen”.

Secondly, AI can now read students’ expressions! With the help of emotional computing technology, it can capture the subtle signals of frowning and hesitation that reveal confusion. When the system data shows that the “confusion index” of a certain area in the classroom increases, AI will remind the teacher. In this way, teachers no longer rely on students’ active participation to find problems. For example, the teacher originally intended to continue to talk about examples, but at the 12th minute, AI showed that nearly half of the students in the class stumbled on a basic multiple-choice question, and all chose the same wrong option because of conceptual confusion. As soon as the teacher saw this situation, he immediately suspended his lecture and focused on this confusing concept. This decision is not based on feeling, but on the specific data provided by AI!

### 3.2. Cognitive mechanism

The core goal of educational reform is to ignite the enthusiasm of children to actively carry out in-depth learning, and the key premise of realizing in-depth learning is to fully release the inherent thinking potential in the minds of young students. In the traditional classroom, many students often spend a lot of mental energy on mechanical and repetitive low-level tasks, such as copying on the blackboard, applying problem-solving steps, and memorizing formulas and theorems by rote. In the long run, when thinking for a long time stays at the level of memory and transcription, the high-level cognitive abilities required for critical analysis, system integration and creative construction will inevitably be squeezed, obscured, or even marginalized.

First of all, AI takes “reducing cognitive load” as the core principle and takes the initiative to undertake those low-level cognitive tasks. It is like a reliable “plug-in brain assistant” around young learners, helping to handle basic work in the initial stage of the cognitive process. For example, in an English writing class, students only need to say their ideas in natural spoken language, and AI can instantly translate these words into words, while completing spell check and preliminary grammar correction. In this way, the children have crossed the barrier of “unclear expression of ideas”, allowing their thinking to flow smoothly, so that they can devote themselves to the careful polishing of logical structure, value deduction and language expression.

Secondly, the system takes “ability leap” as the core goal to build a scaffold for high-level thinking. AI is particularly good at turning abstract principles into visible, touchable, and interactive multimodal cognitive tools. For example, in the course of solid geometry, with the help of AR technology, students can “Penetrate” the rotating solid graphics surface and dynamically observe its internal structural evolution and spatial topological relationship. Compared with the complex reasoning required by purely relying on the brain, AI greatly reduces the threshold of abstract thinking, allowing students to grasp the essence of spatial relations faster and achieve rational advancement in cognition.

In the College Chinese class of a university, AI is being used to assist teaching. In the past, when students were faced with such open-ended questions as “appreciating the artistic conception of the night of flowers and moonlight on the Spring River”, they often had no way to write and felt pressure. Now the method has changed: AI will first provide a relatively standard “basic draft”, and the task of students has become “fault finding”, modification and optimization. They need to find out the logical loopholes that may exist in AI text or just the places where images are piled up, and then adjust and polish the language by themselves. Therefore, the focus of learning has shifted from “writing from scratch is easy to worry” to “critical improvement on the existing basis”. It is in this subtle transformation that the interaction between human and AI has instead become a catalyst for cultivating critical thinking ability.

### 3.3. Evaluation mechanism

Traditional teaching evaluation is always slow! The homework can only be corrected the next day, and the exam results will be announced three days later. By the time the feedback finally reaches the hands of the students, their enthusiasm for learning has long cooled down, and their cognitive biases have already taken shape. Teachers often rely solely on vague experiential judgments, such as ‘I feel that students did not understand this part’, rather than relying on solid, traceable, and energetic teaching evidence. Young educators must be aware that the profound value of AI-powered educational evaluation lies in its dual breakthroughs in “real-time feedback” and “diagnostic accuracy”!

Firstly, we need to shift the feedback cycle from ‘delayed response’ to ‘immediate companionship’. Evaluation should no longer be a summary step after the teaching process ends, but should become a dynamic support throughout the entire class. Students will receive feedback immediately upon completion, analysis immediately upon submission, and reminders immediately upon incorrect answers; AI completes corrections in milliseconds and generates personalized error maps. This zero-latency feedback mechanism conforms to the principle of “timely reinforcement” in cognitive development, ensuring that errors can be corrected during the golden window period before cognitive biases solidify.

Secondly, we need to upgrade the diagnostic granularity from “general qualitative” to “precise attribution”. AI can not only judge right from wrong, but also penetrate the surface and uncover the root cause of problems. For example, in

elementary school vertical calculation, the system can intelligently analyze writing trajectories. Such delicate attribution allows teachers to shift from a “generalized unified explanation” to “targeted and precise guidance”, ensuring that educational strategies can be accurately, consistently, and effectively implemented.

In the smart classroom, the teacher’s tablet displays the distribution map of the whole class’s answers in real-time, with red, yellow, and green markings clearly visible. Teachers no longer need to ask ‘Do you all understand?’ They can grasp the level of understanding just by looking at the color distribution. For students marked in green, the system automatically pushes expanded data for them to read; Students marked in red can receive targeted tutoring. These real-time feedback data directly affect the pace of the classroom and even alter students’ seating arrangements and group divisions. This is the most direct and vivid manifestation of AI transforming teaching!

## **4. Potential risks from a microscopic perspective**

### **4.1. The risk of “De-teachingization”**

A common scenario often arises in classrooms: teachers seem to employ technology merely for its own sake. For instance, they insist that students use tablets to vote on questions that could be answered verbally, or directly employ AI to generate flashy 3D models, replacing the hands-on modeling process. In this way, the flashy features of AI end up overshadowing the true educational objectives, turning so-called “teaching transformation” into a mere formality. At its core, teaching aims to cultivate and develop students’ thinking skills. If technology is overused and robs students of the opportunities for trial and error and exploration, the development of critical thinking becomes hollow, undermining the very purpose of education.

### **4.2. The loss of educational warmth**

AI excels at collecting quantifiable and observable metrics, such as problem-solving accuracy, processing speed, and screen time duration, but struggles to capture the most critical yet immeasurable aspects of education. These include the unique emotional responses students experience when encountering literary passages, or the sudden surge of motivation sparked by a teacher’s encouraging gaze. If educators rely excessively on AI-generated reports, their instructional decisions may shift from experience-based judgment to being dictated solely by numbers. The true transformation should leverage data to enhance teachers’ expertise and wisdom, rather than allowing cold algorithms to dictate everything.

## **5. Conclusion**

AI has changed the classroom; in other words, it has completely transformed the way teaching information flows. In the past, information transmission was a seamless process where teachers spoke and students listened, with a single line leading to the end; Now it can be done in multiple directions and simultaneously. Previously, the human brain mainly processed information on its own, but now it has become a collaboration between humans and machines. Previously, feedback was slow, but now it can interact in real-time and make immediate adjustments. Young teachers must fully understand the core of this change and put it into practice with a clear understanding.

Firstly, it is necessary to clarify what each person and machine should do: repetitive tasks such as scoring, grading homework, and searching for information can be entrusted to AI for efficient completion; Teachers should focus their energy on areas that machines cannot replace, such as mobilizing students’ emotions, guiding values, and cultivating deep thinking. Secondly, teachers are always the “backbone” of the classroom. AI is like an “intelligent navigation” that helps guide the way, but it is not an “automatic steering wheel” and cannot replace a teacher in steering. At critical moments when adjusting teaching pace, when students’ thinking collides, and in subtle areas that require emotional resonance, teachers’ on-site judgment, emotional observation, and value judgment are always the most precious and irreplaceable things in education. As the big language model becomes increasingly integrated into teaching, we need to study more on

how to establish trust between humans and machines and how to fix problems. We need to use the power of technology to improve teaching effectiveness, but also rely on the sincere investment of teachers to maintain the true warmth of education.

## Disclosure statement

The author declares no conflict of interest.

## References

- [1] Liu YY, Wang YY, Li ZX, et al., 2026, Application of the “AI + Gamification” Teaching Model in High School Information Technology Curriculum Instruction: A Case Study of the “Micro-Learning Classroom” Game. *China Educational Technology Equipment*, (7): 26–29.
- [2] Yan BY, Lin F, Feng CZ, 2026, Artificial Intelligence Empowering Classroom Teaching Reform: A Case Study of the AI-Integrated Development of the National First-Class Course in Computer Networks. *Computer Education*, (4): 180–186.
- [3] Huang JL, 2026, Practical Approaches of AI Digital Humans in Enhancing Situational Teaching in Higher Education Psychological Classrooms. *Education Science Forum*, (10): 24–28.
- [4] Huang GX, 2026, Practical Approaches to the Deep Integration of AI Technology with Primary School Mathematics Classroom Teaching. *China Basic Education Resource Database (Primary School Edition)*, 1–7.
- [5] Qu BY, 2026, Research on the Impact of AI-Enhanced Flipped Classroom on Learning Behaviors of Vocational School Students. *Automotive Maintenance and Repair*, (7): 125–126.
- [6] Song XR, 2026, Research on Strategies for Enhancing Classroom Interaction in Lower Primary Mathematics Teaching with AI Empowerment. *Gansu Education Research*, (6): 52–54.
- [7] Chen WF, Cui YM, Wang JD, 2024, “Master Teacher Classroom” Promotes the Professional Development of Rural Teachers: Mechanisms, Challenges, and Solutions—A Theory-Based Analysis Using the Interactive Ritual Chain Theory. *Research on Electro-Education*, 45(10): 116–122.

### Publisher’s note

*Whoice Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.*