

# Research on the Reform of College Teachers' Teaching Methods Driven by Large Language Models

Haikun Zhang\*, Lulu He, Jiacheng Pan, Dajun Liu

School of Mathematics-Physics and Finance, Anhui Polytechnic University, Wuhu 241000, Anhui, China

\*Corresponding author: Haikun Zhang, haikunzhang@ahpu.edu.cn

**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:** The rapid development of large language models is profoundly transforming the knowledge supply mode, classroom interaction structure, learning support mechanisms, and evaluation logic in higher education teaching. Against this backdrop, the reform of teaching methods among university faculty is no longer a mere issue of technological application, but a systematic transformation involving teaching objectives, teaching organization, classroom relationships, evaluation systems, and teachers' professional development. Based on the teaching practice of higher education, this paper synthesizes the policy orientation of educational digitalization, research on the educational application of generative artificial intelligence, and the reality of classroom reform in universities. It analyzes the historical background, value logic, and practical dilemmas of the reform of university teachers' teaching methods in the era of large language models, pointing out that the current reform mainly faces challenges such as the risk of tool dependence, insufficient teachers' digital intelligence literacy, lagging classroom evaluation, growing data ethics risks, and inadequate institutional supply. On this basis, it proposes that the reform should be systematically promoted from the dimensions of reconstructing teaching objectives, reshaping teaching processes, rebuilding evaluation systems, repositioning teachers' roles, and improving institutional guarantees. The study holds that large language models will not replace teachers, but will reshape the boundaries of teachers' teaching functions and their professional competence structures. Only by transforming from knowledge imparters to learning designers, thinking guides, process diagnosticians, and value gatekeepers can university faculty achieve a deep transformation of teaching methods and a substantial improvement in educational quality in the era of large language models.

**Keywords:** Large language models; Generative artificial intelligence; Teaching method reform; Digitalization of higher education

**Online publication:** June 30, 2026

## 1. Problem statement

In recent years, generative artificial intelligence, particularly large language models, has advanced rapidly, driving AI from a hidden back-end computing tool to a front-end cognitive tool directly integrated into

classrooms, involved in learning activities, and influencing instructional decision-making<sup>[1]</sup>. Research by the OECD indicates that generative AI is reshaping teaching practices while posing novel challenges to assignment assessment, academic integrity, privacy protection, and other areas<sup>[2]</sup>. Large language models have fundamentally transformed students' knowledge acquisition patterns: knowledge transmission has shifted from one-way input to multi-directional interaction, and learning support has evolved from uniform provision to personalized adaptation, forcing profound reforms in university teaching models.

However, large language models are not inherently equivalent to high-quality teaching. They can easily induce cognitive inertia and over-reliance on pre-generated answers among students. If university faculty continue to adhere to traditional knowledge-imparting and outcome-based assessment models, this will only accelerate the obsolescence of conventional classrooms. Therefore, the core of teaching reform driven by large language models lies not in whether to use such tools, but in how instructors reconstruct teaching objectives, classroom activities, and evaluation systems, and reshape their own professional roles.

## **2. Structural changes in university teaching fields in the era of large language models**

### **(1) Knowledge Supply Shifts from “Static Presentation” to “Dynamic Generation”**

In traditional teaching, knowledge is mainly carried by textbooks, courseware, handouts and teachers' lectures, with a relatively stable knowledge structure and highly pre-designed classroom content. Teachers select, organize and deliver knowledge based on their disciplinary expertise and teaching experience, while students learn within a given content framework. However, the emergence of large language models has shifted knowledge supply from static presentation to dynamic generation. Students no longer rely solely on the single explanatory path provided by teachers, but can obtain multi-dimensional explanations, extended cases, paraphrasing and structured sorting through continuous questioning. Consequently, knowledge in class is no longer merely “content being told”, but rather “an object continuously generated, revised and compared through interaction”.

### **(2) Classroom Interaction Logic Evolves from “Unidirectional Lecturing” to “Diversified Collaboration”**

Large language models have changed not only the knowledge supply but also the structure of classroom interaction. Interaction in traditional classrooms usually revolves around teacher questioning, student responses and teacher feedback, with control largely in the hands of teachers. The frequency and quality of interaction are also constrained by class time, student participation and teachers' energy. Large language models provide a continuously available and fast-responding “dialogic partner”, enabling students to seek instant consultation and self-correction before, during and after class. This means classroom interaction has expanded from the bilateral “teacher–student” relationship to a triadic “teacher–student–model” relationship.

### **(3) Learning Support Mechanism Transitions from “Uniform Provision” to “Differentiated Adaptation”**

University teaching has long faced problems such as significant differences in students' foundations, inconsistent learning paces and difficulties in catering to individual needs in class. To a certain extent, large language models can provide personalized learning support, including layered explanations of concepts, structural advice for writing, and step-by-step feedback on programming or problem-solving processes. Relevant research and policy discussions generally agree that generative AI has obvious potential in personalized support, resource supplementation and learning feedback, yet its effectiveness depends on teachers' instructional design and institutional norms, and should not be simply regarded as a replacement for teachers' work<sup>[3]</sup>.

#### (4) Evaluation Logic Moves from “Outcome Measurement” to “Process Diagnosis”

Large language models have had a direct impact on university evaluation systems. Previously, many assessment tasks, such as assignments, papers and group reports, assumed that students completed work independently and demonstrated learning outcomes through textual presentation. However, with the widespread availability of large language models, it has become increasingly difficult to judge students’ actual learning engagement and competence solely based on finished products. The OECD points out that generative AI presents significant challenges to assignments, examinations and academic integrity, requiring educational governance to strike a balance between encouraging innovative applications and guarding against risks.

### **3. Value logic of teaching method reform in universities driven by large language models**

#### (1) Shifting from Knowledge Imparting to Higher-Order Thinking

Cultivation Tasks, such as lesson preparation, test design, student counseling, feedback provision, and course resource organization for university teachers, are highly complex and time-consuming. Large language models can assist in generating course materials, designing classroom questions, supplementing cases, and drafting assignment feedback, thereby freeing teachers from some repetitive work. This allows them to devote more energy to creative teaching activities, including overall curriculum design, overcoming teaching difficulties, guiding academic norms, fostering students’ thinking, and providing value leadership. It should be emphasized that collaboration rather than replacement should be the basic principle for university teachers to use large language models. Teachers do not outsource teaching to models, but regard models as enhanced teaching productivity tools to make teaching organization more efficient, feedback more timely, and design more refined<sup>[4]</sup>.

#### (2) Shifting from Uniform Teaching to Differentiated and Precise Support

Constrained by large-class teaching, limited class hours, and faculty pressure, traditional university classrooms often adopt a uniform provision model featuring “one pace, one method, and one set of assignments”. While convenient for organization and management, this model can hardly respond to individual differences among students. The introduction of large language models provides new conditions for teachers to implement layered teaching, personalized guidance, and precise feedback. Teachers can use models to analyze students’ common errors, identify learning difficulties, and generate exercises at different levels, so as to deliver more targeted tutoring. In this sense, the reform of teaching methods is not merely a change in classroom forms, but a digital reconstruction of the educational concept of “teaching students in accordance with their aptitude”.

#### (3) Shifting from Experience-Dominated to Evidence-Based Instructional Decision-Making

For a long time, university teachers’ instructional decisions have largely relied on personal experience, classroom intuition, and past teaching practices. Although experience is valuable, experience alone can hardly support high-quality teaching reform amid increasingly complex student learning behaviors, rapidly changing technological environments, and diversified curriculum goals. To a certain extent, large language models and related digital platforms can help teachers obtain more information about the learning process, such as common question types, knowledge comprehension biases, characteristics of assignment feedback, and distribution of discussion hotspots. Teachers can thus adjust teaching content, optimize classroom organization, and improve evaluation methods more rationally, realizing the transformation from “experience-based teaching revision” to “sustained improvement based on learning evidence”.

#### (4) Shifting from Individual Labor to Human-Machine Collaborative Teaching

Innovation tasks, such as lesson preparation, test design, student counseling, feedback provision, and course resource organization for university teachers, are highly complex and time-consuming. Large language models can assist in generating course materials, designing classroom questions, supplementing cases, and drafting assignment feedback, thereby freeing teachers from some repetitive work. This allows them to devote more energy to creative teaching activities, including overall curriculum design, overcoming teaching difficulties, guiding academic norms, fostering students' thinking, and providing value leadership. It should be emphasized that collaboration rather than replacement should be the basic principle for university teachers to use large language models. Teachers do not outsource teaching to models, but regard models as enhanced teaching productivity tools to make teaching organization more efficient, feedback more timely, and design more refined <sup>[5]</sup>.

#### **4. Practical dilemmas in the reform of university teachers' teaching methods**

##### **(1) Coexistence of Expanded Instrumental Rationality and Weakened Teaching Essence**

At present, many universities focus their attention on large language models mainly for instrumental purposes such as “improving efficiency”, “generating resources” and “automated grading”, while paying insufficient attention to their profound impacts on teaching objectives, epistemological views and educational approaches. Consequently, although some teachers have introduced intelligent tools on the surface, the nature of classroom teaching remains unchanged, still centered on knowledge instillation and outcome assessment. In some cases, teachers directly embed model-generated content into teaching without necessary fact-checking, academic review and pedagogical adaptation, resulting in a disconnect between technology application and the improvement of educational quality <sup>[6]</sup>.

##### **(2) Obvious Shortcomings in Teachers' Intelligent Literacy and Teaching Innovation Competence**

Teachers are the key actors in teaching method reform. Without the simultaneous renewal of teachers' competence structures, even the most advanced technologies can hardly be transformed into real classroom changes. The 2025 document of the Ministry of Education on digital empowerment of teacher development clearly proposes formulating standards for teachers' intelligent literacy and a digital competence framework for university teachers, as well as promoting full coverage of digital literacy training. The UNESCO framework for teachers' AI competencies emphasizes that teachers in the AI era need to develop comprehensive abilities across knowledge, skills and values, with 15 specific competencies across five dimensions: human-centered principles, ethical governance, AI fundamentals, AI-enabled pedagogy, and professional learning <sup>[7]</sup>. These developments indicate that teacher capacity building has become an important issue in both global and Chinese educational reform.

##### **(3) Obvious Lag in Curriculum Evaluation and Academic Assessment Mechanisms**

Before the popularization of large language models, many university courses already suffered from evaluation drawbacks such as “emphasizing results over process”, “valuing texts over thinking” and “focusing on summative outcomes over generative development”. The emergence of large language models has further exacerbated these problems. If curriculum assessment still relies heavily on take-home essays, standardized assignments and answer-based tasks that can be quickly generated by models, evaluation results will increasingly fail to reflect students' genuine knowledge mastery, analytical ability and innovative expression. Without proactive reform of the evaluation system, teaching reform will lose its leverage at a critical stage.

##### **(4) Prominent Issues of Data Security, Academic Ethics and Responsibility Boundaries**

Following the integration of large language models into university teaching, issues including data security, privacy protection, algorithmic bias, copyright ownership and academic integrity have become

more prominent. UNESCO clearly stresses in its guidelines that the application of generative AI in education requires attention to privacy, copyright, bias and human subjectivity<sup>[8]</sup>. The OECD also points out that education systems need to address risks such as algorithmic bias, plagiarism, skill degradation, data security and intellectual property rights.

## **5. Practical paths for the reform of university teachers' teaching methods driven by large language models**

### **(1) Reconstructing Teaching Objectives: Shifting from “Teaching Knowledge” to “Promoting Deep Learning”**

The reform of university teachers' teaching methods must begin with the reconstruction of teaching objectives. Faced with improved knowledge accessibility brought by large language models, teachers should no longer focus teaching goals primarily on knowledge memorization and basic comprehension. Instead, emphasis should be placed on cultivating higher-order thinking, problem-solving abilities, interdisciplinary transfer, awareness of academic norms, and value judgment capabilities<sup>[9-11]</sup>. Specifically, curriculum objective design should highlight requirements such as the ability to raise good questions, argue with evidence, critically evaluate model outputs, and produce creative expressions in context. Only when teaching objectives are upgraded will teaching method reform gain intrinsic motivation.

### **(2) Reshaping the Teaching Process: Building a Problem-Driven, Project-Oriented and Inquiry-Cooperative Classroom**

At the classroom organization level, teachers should proactively reduce low-level, repetitive, and conclusion-based lecturing and increase learning activities based on real problems, complex tasks, and open scenarios. Large language models can be used as question generators, thinking comparators, scheme evaluators, and feedback assistants to guide students through the learning cycle: posing questions → accessing resources → verifying information → forming explanations → presenting publicly → reflecting and revising. For specialized courses, project-based learning scenarios can be built around case analysis, engineering tasks, disciplinary controversies, and research design. For general education courses, inquiry-based teaching can be carried out around social issues, ethical dilemmas, and interdisciplinary themes. In this process, teachers act as constructors of cognitive frameworks and organizers of learning processes, rather than mere transmitters of knowledge.

### **(3) Reconstructing the Evaluation System: Establishing Process-Based, Performance-Based and Authentic Evaluation Mechanisms**

In the era of large language models, evaluation reform is crucial to instructional reform. Educators must move beyond the inertia of evaluating only final written outputs and build an evaluation mechanism covering the entire learning process: increase the weighting of process-based performance such as oral presentations and in-class demonstrations; incorporate learning portfolios, version iteration records and other materials to reflect authentic learning trajectories; establish a system of “Artificial Intelligence Usage Statements” to integrate technology use into academic integrity education; and adopt multi-stakeholder evaluation combining teacher assessment and peer review to improve fairness and effectiveness, making evaluation a tool for promoting learning.

### **(4) Repositioning the Teacher's Role: Transforming from Lecturers to Designers, Guides, Diagnosticians and Gatekeepers**

Large language models have not diminished the role of teachers; on the contrary, they have elevated

their importance. University instructors need to complete four role transformations: as learning designers, they design questions and task scenarios around course objectives so that models serve learning; as thinking facilitators, they guide students to critically examine the rationality and limitations of model outputs and cultivate critical thinking; as learning diagnosticians, they identify learning difficulties based on diverse information and provide targeted interventions; as value gatekeepers, they strengthen guidance on academic integrity and ethics to ensure that technological applications serve the fundamental task of fostering virtue through education.

#### (5) Improving the Support System: Building a Collaborative Mechanism for Teacher Development, Platform Governance and Institutional Guarantee

The reform of university teachers' teaching methods cannot rely solely on individual initiatives; it requires systematic support at the institutional level. First, establish a tiered and categorized teacher training system, offering progressive training covering basic AI literacy, prompt engineering, classroom application, and evaluation reform for teachers of different disciplines, ages, and digital foundations. Second, develop a safe, controllable, and education-adapted campus intelligent platform to lower barriers for teachers and strengthen data governance. Third, build a case library of replicable and scalable teaching reforms to transform scattered explorations into organized experience. Fourth, revise teaching evaluation and teacher assessment mechanisms, incorporating the effectiveness of AI-enabled teaching reform into course construction, teaching achievements, and teacher development evaluation. Fifth, formulate norms for AI application in teaching, clarifying rules for data usage, privacy protection, academic integrity, and responsibility boundaries to provide clear institutional expectations for teachers' reform practices <sup>[12-14]</sup>.

## 6. Conclusion

Large language models are pushing university teaching into a new stage of transformation. They have brought about profound changes in the modes of knowledge supply, learning support, and classroom evaluation logic, while also compelling university teachers to rethink the fundamental questions of why to teach, what to teach, how to teach, and how to assess. For university teachers, what truly matters is not whether they will be replaced by technology, but whether they can proactively upgrade their teaching approaches: shifting from knowledge imparting to thinking cultivation, from uniform indoctrination to differentiated support, from experience-dominated practice to evidence-based decision-making, from individual labor to human-machine collaboration, and from outcome measurement to process diagnosis.

Accordingly, the key to the reform of university teachers' teaching methods driven by large language models lies not in simply increasing the frequency of technology use, but in upholding the primacy of education, student development, and teachers' professional growth, and integrating technology into the overall framework of curriculum objectives, teaching processes, learning assessment, and institutional construction. Only in this way can artificial intelligence become an important force for improving the quality and efficiency of university classrooms, promoting teachers' professional development, and enhancing the quality of talent cultivation, rather than undermining the subjectivity of teaching. In the future, universities should continue to deepen exploration in improving teachers' intelligent literacy, governing the ethics of AI application in teaching, reforming curriculum evaluation, and developing typical application scenarios, so as to achieve the coordinated progress of large language models and the high-quality development of higher education.

## Funding

Research Startup Fund of Anhui Polytechnic University (Project No.: S022024053); College Students' Innovation and Entrepreneurship Training Program (Project No.: 202510363108, S202410363338); Research Startup Fund of Anhui Polytechnic University (Project No.: S022023033)

## Disclosure statement

The authors declare no conflict of interest.

## References

- [1] Holmes W, Miao F, 2023, *Guidance for Generative AI in Education and Research*. Unesco Publishing, London.
- [2] Bo NSW, 2025, *OECD Digital Education Outlook 2023: Towards an Effective Education Ecosystem*. Hungarian Educational Research Journal, 15(2): 284–289.
- [3] Gan W, Qi Z, Wu J, et al., 2023, Large Language Models in Education: Vision and Opportunities. 2023 IEEE International Conference on Big Data (BigData), 2023: 4776–4785.
- [4] Harry A, Sayudin S, 2023, Role of AI in Education. *Interdisciplinary Journal and Humanity (INJURITY)*, 2(3): 260–268.
- [5] Zhai X, Chu X, Chai C S, et al., 2021, A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, 2021(1): 8812542.
- [6] Druga S, Otero N, Ko A J, 2022, The Landscape of Teaching Resources for AI Education. *Proceedings of the 27th ACM Conference on Innovation and Technology in Computer Science Education*, 2022: 96–102.
- [7] Holmes W, Tuomi I, 2022, State of the Art and Practice in AI in Education. *European Journal of Education*, 57(4): 542–570.
- [8] Feng X, 2025, Research on the Innovative Logic and Practical Pathways of Educational Reform in the Era of Artificial Intelligence. *Zhongguancun*, 2025(6): 186–188
- [9] Garrett N, Beard N, Fiesler C, 2020, More than “If Time Allows” the Role of Ethics in AI Education. *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society*, 2020: 272–278.
- [10] Yang X, 2019, Accelerated Move for AI Education in China. *ECNU Review of Education*, 2(3): 347–352.
- [11] Liu Q, Sun M, 2025, Research on the Path of Improving College Teachers' Teaching Ability Empowered by Large Models—Taking DeepSeek as an Example. *Journal of Jiyuan Vocational and Technical College*, 24(3): 48–52.
- [12] Lian X, 2025, In-depth Integration Strategies of Generative Artificial Intelligence in Subject Classroom Teaching. *Jilin Education*, (21): 61–63.
- [13] Zhang H, Zheng C, Zhao Y, et al., 2024, Evaluation of Large Language Model-assisted Teaching in Online Learning Scenarios. *Modern Educational Technology*, 34(11): 15–26.
- [14] Gao Y, Li S, 2025, Paths to Improving Higher Vocational College Teachers' Teaching Ability in the Era of Artificial Intelligence. *Modern Vocational Education*, (7): 53–56.

### Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.