

Investigation and Improvement of AI Teaching Ability and Accomplishment of Young College Teachers in the Era of AI

Huaming Zhou¹, Xiaoting Chen²

¹Personal Department, Longyan University, Longyan 364012, Fujian, China

²Logistics Department, Longyan University, Longyan 364012, Fujian, China

ABSTRACT

With the deep integration of AI and higher education, this study focuses on the structural transformation of the digital teaching ability of young teachers in universities and colleges. It is found that AI technology has shown normal penetration in educational practice, and teachers with different generational characteristics and discipline habits form different cognition in the dimension of technology adoption. The research not only reveals the risk of teaching ontology alienation by the instrumental rationality of technology, but also points out the deep contradiction between the lagging of institutional regulations and the dilemma of ethical adjustment. Based on this, this paper innovatively constructs a three-dimensional dynamic model that includes cognitive iteration, scene embedding and value calibration, and emphasizes the collaborative mechanism of cognitive science-driven ability reconstruction and institutional elastic supply, so as to provide an interdisciplinary reference for the transformation of teacher professional development model in the post-human context.

KEYWORDS

era of AI; young college teachers; AI teaching ability; digital transformation of education

In the process of higher education transformation driven by AI technology, the deep penetration of generative tools has triggered the cognitive reconstruction and value evolution in the teaching practice. Focusing on the dialectical tension between “technology empowerment” and “education authenticity”, this research deeply deconstructs the transformation dilemma of young teachers in the intelligent technology iteration cycle through the mixed longitudinal study, which contains the cognitive theory fracture of technology cognition, involves the practical confusion of teaching ethics, and reflects the structural contradiction between institutional regulations and technological innovation. The research innovatively constructs a multi-dimensional coupled teaching ability transition framework, and systematically explains the mutual construction mechanism between intelligent tools and teaching subjects from the theoretical perspective of technology embodiment, and especially the differentiated generation logic of technology transformation effectiveness in the interdisciplinary context.

1 Frequency and Prevalence of AI Used by Young College Teachers in the Era of AI

In the context of the deep integration of AI in higher education, young college teachers shows remarkable characteristics of using AI tools. According to the survey data, nearly 60% of teachers and students have formed the high-frequency use of generative AI tools, and 18% of them use AI technology several times a day, forming a technology-dependent “heavy user” cluster. This phenomenon reflects the penetration of AI technology into teaching and research scenes, and young teachers are reconstructing traditional work processes through automated lesson preparation and intelligent academic analysis. The high frequency application of technology tools not only gives birth to a new teaching model, but also reflects the practical orientation of the group to actively adapt to the intelligent education ecology.

Generative AI tools have achieved near-universal coverage in the university, and the data shows that only 1% of teachers and students have never used such technology. This trend of popularization marks the evolution of AI technology from a fringe aid to a core component of educational infrastructure. Young teachers generally adopt AI tools in multiple scenarios such as curriculum design, scientific research data processing, and personalized guidance for students, and the application scope of these tools breaks through the limitation of a single function to form an intelligent support network covering the whole teaching chain ^[1].

2 The Willingness and Behavior of Young College Teachers to Use AI in the Era of AI

In the process of the deep integration of AI technology in the higher education system, the willingness and behavior pattern of young teachers in colleges and universities to adopt generative AI tools show distinct characteristics of intergenerational differentiation. According to the data, teachers born in the 1990s are the pioneers of technology application with a high frequency usage rate of 68%, followed by those born in the 1980s at 60%, but the active use rate

of teachers born in the 1970s and 1960s drops to 47% and 30% respectively. This age gradient difference reflects the technological cognition gap between digital natives and digital immigrants. In other words, young teachers, as natives in the Internet era, have educational concepts that include the gene of technological integration and are better at integrating AI tools into core links such as curriculum design and scientific research data processing. The older teachers are deeply affected by the traditional teaching paradigm and face the double resistance of cognitive inertia and skill update in the process of technology transformation.

Differences in job functions further shape the application of AI tools. Teaching and research staff are significantly ahead of administrative staff (41%) and teaching assistants (56%) with a usage rate of 72%. This is due to the differences in technical needs of different positions. In other words, teaching and research staff face the transformation of education mode driven by intelligent technology, and need to use AI to achieve core goals such as personalized teaching and academic innovation. Teaching assistants form limited but continuous technical dependence in student management and resource allocation. However, due to the strong standardization of work processes, administrative personnel have relatively limited space for technical intervention^[2].

3 Application Scenario and Purpose of AI for Young College Teachers in the Era of AI

In the process of in-depth reconstruction of education and scientific research paradigm by artificial intelligence technology, the application of generative AI by young teachers in colleges and universities has formed a differentiated scenario matrix. According to the data, 54% of teachers focus on the construction of personalized learning support system with AI tools, and realize the transition from extensive education to precise education through intelligent diagnosis of study and generation of hierarchical teaching schemes. 45% of the groups use AI to complete scientific research and innovation chain links such as intelligent literature review and experimental data visualization, which significantly improved academic productivity. 32% of teachers extend technology to student affair management, and use conversational AI to optimize teacher-student interactions. The adaptability differences between the subject characteristics and the AI technical functions shape a distinct spectrum of use. Agricultural science teachers rank first with an application rate of 82%, followed by natural science teachers (79%), and engineering and technical science teachers (78%). Humanities and social science teachers are significantly the least (63 percent). This gradient distribution reflects the non-equilibrium of education empowered by technology. The field of agronomy, which involves complex needs of ecosystem modeling and big data analysis, naturally fits the prediction and simulation advantages of generative AI. Science and engineering teachers form deep technology dependence in the scenarios of experiment design optimization and algorithm iteration. However the humanities and social sciences have opened up the application space of AI technology in the aspects of text generation and opinion mining, the disciplinary paradigm dominated by qualitative research still restricts the penetration rate of technology^[3].

4 Anxiety and Challenge of Using AI in the Era of AI for Young College Teachers

In the process of the reconstruction of education ecology by AI technology, the group of young teachers in colleges and universities is facing significant anxiety of technology adaptation and ethical challenges. The data show that more than 60% of teachers and students have general anxiety about generative AI tools, of which 19% of teaching assistants are “very anxious” to become the group with the peak stress level and 16% of teachers are deeply anxious. This emotion stems from multiple structural contradictions. The imbalance between the of technology iteration speed and the rhythm of educators’ cognitive update leads to the cognitive conflict between instrumental rationality and the essence of education. The blurred responsibility boundary of teaching assistants (such as AI intervention in student psychological counseling, career planning and other scenarios) leads to a sense of crisis of career value. Teachers worry that technology dependence weakens their teaching innovation ability, and at the same time, they face identity anxiety in the originality recognition of academic achievements. The essence of anxiety is a stress reaction caused by the wavering of educational subjectivity under the impact of intelligent technology, which reflects the deep collision between the traditional educational ethics system and the intelligent technology logic^[4].

5 Support for the Use of AI by Young College Teachers in the Era of AI

5.1 Promote the Ecological Construction of Policy Framework

In the uncharted water of digital transformation of higher education, the dilemma of technology integration of young teachers needs to be alleviated by institutional innovation. Administrative departments for education should cooperate

with science and technology innovation management institutions to jointly establish “intelligent education collaborative innovation center”, which will integrate infrastructure iteration, ethical risk prevention and control, and application scenario incubation into a systematic project. For example, the proportion threshold of the educational AI special budget in the annual scientific research funds of colleges and universities should be established in the form of legislation, and the focus should be on the construction of cognitive computing platforms and the development of teaching behavior analysis matrix. The “White Paper on Application Responsibility of AI in Education” should be developed simultaneously, and a three-layer compliance system including data traceability mechanism, algorithm accountability framework, and human-machine rights and responsibilities should be constructed. In order to break through the bottleneck of the incentive mechanism, it can also explore the inclusion of intelligent teaching design achievements in the high-level teaching award selection system, and implement the confirmation system of intellectual property rights for original AI teaching reform results.

5.2 Establish a laddering Evolution Mechanism of Ability Cultivation

The project of improving teachers’ intelligent accomplishments should follow the spiral development law of “cognitive remodeling - skill transfer - innovation breakthrough”. The cultivation at the basic layer should rely on the principles of cognitive science, design a three-dimensional course matrix including the dimensions of technology philosophy, education adaptation model, tool operation graph, and adopt the OMO hybrid study mode of virtual simulation sand tables and physical laboratories. In the advanced stage, the “Double Mentorship Research Incubation Project” can be implemented, and a joint guidance group composed of educational neuroscience experts and subject intelligent teaching leaders can focus on frontier fields such as subject knowledge map construction and multi-modal learning analysis^[5]. At the level of application innovation, it can establish an educational intelligent technology center to integrate the natural language interaction engine and the machine learning pipeline, and promote the technology digestion and absorption through the “learning by doing” mode driven by real projects.

5.3 Focus on the Intelligent Base Construction of the Scene Landing

The intelligent transformation of college teaching process needs to build a educational technology base with the collaboration of “cloud-edge-end”. Colleges and universities can deploy intelligent lesson preparation system with the self-evolution ability, and integrate the course generative adversarial network (GAN) and the differentiated teaching design algorithm, to realize dynamic optimization of teaching schemes. At the same time, they can develop a low-code development platform for education, and encapsulate computer vision, speech recognition and other technologies into modular component libraries, to support teachers to quickly achieve classroom attention monitoring, academic writing assistance and other scene applications through parameter adjustment. Universities can also set up intelligent education innovation workshops and adopt the industry-university-research collaboration model of “demand crowdsourcing - scheme screening - agile development” to establish a rapid transformation channel from teaching pain points to technical solutions.

5.4 Promote a Coordinated Governance System for Quality Assurance

In order to achieve the quality assurance of intelligent education in colleges and universities, it needs to build a trinitarian governance ecology of “standard-evaluation-improvement”. Colleges and universities can develop educational AI maturity evaluation models and establish a five-level evaluation index system from technology integration, teaching innovation and ethical compliance. At the same time, the intelligent education ability certification system should be implemented, and the three-dimensional evaluation scheme can be designed including multiple assessment scenarios such as virtual teaching and research section observation, technical ethics debate, and teaching algorithm optimization. Universities should set up a university-level think tank composed of educational technologists, cognitive psychologists and data security experts to carry out regular research on technology application risk assessment and teaching paradigm foresight. Colleges and universities should set up the annual report system of intelligent education development quality, and dynamically adjust the priority of technology investment through longitudinal comparison over time and horizontal inter-university benchmarking.

6 Conclusion

In the history of the modernization of education empowered by AI, the education ecology is undergoing a systematic reconstruction of value logic and implementation path. This study reveals that the advanced path of AI teaching ability of

young teachers needs to break through the linear thinking of traditional technical training, and construct a composite accomplishment system with dialectical unity of instrumental rationality and value rationality, and interaction and symbiosis of educational skills and ethical consciousness. It is particularly critical to realize the deep coupling of technology concretization and education essentialization through the multi-dimensional collaborative mechanism of "university - department - teacher", the curriculum iteration system driven by the dynamic knowledge graph, the teaching and research community that disintegrates discipline boundaries, and the virtual and real integration space guided by embodied cognition. Subsequent studies need to focus on the emergence mechanism of human-machine cognitive collaboration in the intelligent teaching field, and construct an ethical framework including the review of algorithm transparency, data justice protection and the definition of responsible subjects, which is not only related to the innovation breakthrough of the practice paradigm of intelligent education, but also is the theoretical cornerstone of building an educational intelligent system with cultural appropriateness and Chinese characteristics.

Funding

This paper is supported by the 2019 General Project of Fujian Province's Education Science "Thirteenth Five Year Plan" titled "Research on the Current Situation and Improvement of Teaching Abilities of Young Teachers in Fujian Province's Applied Undergraduate Universities"(NO. FJJKCG19—292)

About the Author

Huaming Zhou, born in November 1987, male, Han nationality, from Sanming City, Fujian Province. He is a master's student and graduated from Fujian Normal University. He currently works at Longyan University as an associate researcher and is involved in the development of university teaching staff;

Xiaoting Chen, born in June 1989, female, Han nationality, from Zhangzhou City, Fujian Province. She is a master's student and graduated from Fujian Normal University. Currently, she works as an assistant researcher in higher education management at Longyan University.

References

- [1] Zheng Yanzhi, Guan Miao. Research on the Implementation Strategy of Artificial Intelligence Empowering the Construction of University Teaching Staff [J]. Chinese Journal of Multimedia and Network Teaching, 2024, (11): 127-130.
- [2] Zhao Xuan. A Brief Discussion on the Application of Artificial Intelligence in the Teaching and Scientific Research of Young Teachers in Colleges and Universities [J]. Journal of Science and Education, 2023, (24): 14-16.
- [3] Lin Li, Yang Fuguang, Fan Zeyuan. Research on Strategies for Improving Teaching Ability of Young Teachers in Application-oriented Undergraduate Universities under the Background of Artificial Intelligence: A Case Study of Rail Transit Majors [J]. Industry and Science Tribune, 2022, 21(03): 248-249.
- [4] Chen Yanyan. Improvement Path of Professional Ability of Teachers in Applied-oriented Universities in Era of AI [J]. Journal of Longyan University, 2025, 43(01): 109-115.
- [5] Li Ling, Wu Di. Deep Integration of Artificial Intelligence in the Reform of Teaching Methods to Inject Vigorous Vitality into Teaching Innovation [J]. Shanghai Education, 2025, (03): 11-13.