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The Impact of Artificial Intelligence Literacy on Teaching Innovation Behaviors among Private University Teachers in Shanghai, China

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Abstract: This study investigates the cohort of private university educators in Shanghai, China, with the objective of elucidating the influence mechanism of artificial intelligence (AI) literacy on teaching innovation behavior. Through a questionnaire survey, 362 valid responses were collected, and statistical analysis methods were employed to assess the current status and variations in teachers' AI literacy and teaching innovation behavior. The findings reveal that the overall levels of AI literacy and teaching innovation behavior among private university educators in Shanghai exceed the median threshold. Notably, significant differences in both AI literacy and teaching innovation behavior were observed across background variables, including gender and teaching experience. Furthermore, AI literacy exerts a significant positive influence on teaching innovation behavior. Drawing from these results, this study proposes targeted recommendations, offering both theoretical reference and practical value for enhancing the AI literacy of private university educators and advancing teaching practice reforms.

Keywords: Artificial intelligence literacy; Teaching innovation behaviors; Private university teachers

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1. Introduction

Since the central government issued the *Opinions on Comprehensively Deepening the Reform of Teacher Workforce Development in the New Era* in 2018, cultivating the innovative capabilities of Chinese teachers has been elevated to a strategic priority. A series of national policies and action plans, such as the Action Plan for Revitalizing Teacher Education and China Education Modernization 2035, explicitly call for building a high-quality, professional, and innovative teaching force to meet the demands of educational development in the new era. Private universities play a vital role in the education system through their flexible operational mechanisms and diverse educational resources, yet their faculty still face significant challenges in engaging in innovative teaching practices.

In the era of digitalization and artificial intelligence, artificial intelligence (AI) technology not only transforms traditional teaching models but also provides new approaches for educational innovation [1]. Educators with high AI literacy can effectively design AI-based project-based learning and inquiry activities, guiding students toward self-directed learning while enhancing critical thinking and innovation capabilities. AI literacy also prompts teachers to redefine their roles, shifting from knowledge disseminators to cultivators of students' innovative abilities.

Based on the resource conservation theory, this study aims to explore the impact of artificial intelligence literacy among faculty members at private universities in Shanghai on their teaching innovation behaviors. It further analyzes the differential effects of background variables such as gender and academic year, providing theoretical support and practical references for enhancing faculty AI literacy and promoting teaching innovation. This research seeks to advance the educational quality of private universities and foster the cultivation of innovative talent.

2. Definition of terms

2.1. Artificial intelligence literacy

Artificial intelligence literacy refers to the knowledge, skills, and ethical awareness that teachers possess in the application, understanding, and evaluation of artificial intelligence technologies [2].

2.2. Teaching innovation practices

Teaching innovation refers to the comprehensive teaching practice in which educators actively and continuously adopt innovative teaching concepts—whether developed by others or themselves—update instructional content, promptly adjust teaching methods and tools, utilize new educational resources and tools, improve assessment methods, and thereby enhance teaching effectiveness [3].

3. Theoretical foundations

The Conservation of Resources Theory (COR), proposed by Hobfoll [4], explains individuals' behavioral responses to stress and challenges. This theory posits that people inherently pursue the acquisition, maintenance, and enhancement of resources, while the loss or threat of resources leads to psychological stress. Resources encompass not only material assets but also psychological, social, and situational factors such as self-efficacy, social support, working conditions, and time/energy. When resources are abundant, individuals are more likely to engage in positive behaviors and invest resources, forming a "gain spiral." Conversely, resource scarcity may trigger a "loss spiral," leading to behavioral withdrawal and diminished creativity.

In educational settings, teachers' artificial intelligence literacy can be regarded as a vital individual resource. It enhances educators' capacity to utilize modern educational technologies, bolsters their teaching autonomy and confidence, and consequently promotes innovative teaching practices. Therefore, grounded in resource conservation theory, this study explores how artificial intelligence literacy influences teaching innovation behaviors among university faculty, providing theoretical support for understanding teachers' innovation decisions under resource constraints.

4. The impact of artificial intelligence literacy on teaching innovation behavior

Teachers' AI literacy directly influences their understanding, application capabilities, and innovative attitudes

toward AI technology in teaching [5]. Educators with higher literacy can more clearly recognize AI's potential in instruction, analyze student learning data, and design personalized, targeted teaching activities [6], thereby enhancing teaching effectiveness and student learning experiences. Furthermore, educators can leverage AI to optimize instructional design and implementation, such as establishing "human-machine collaboration" models to achieve innovative teaching approaches involving knowledge construction, learning diagnostics, and personalized interventions [7].

Artificial intelligence literacy also drives the transformation of teaching evaluation methods, enabling educators to conduct precise assessments based on data, promptly adjust instructional strategies, and enhance teaching quality and efficiency. Simultaneously, it prompts teachers to reexamine their roles, shifting from mere knowledge disseminators to facilitators who guide students' thinking and creativity development. Educators can design AI-based project-based learning activities that guide students in independently exploring and solving real-world problems, thereby cultivating critical thinking and innovation skills. Consequently, AI literacy not only enhances teachers' technical capabilities but also serves as a key driver for pedagogical innovation and educational quality improvement.

5. Conclusion and implications

This study demonstrates that teachers' artificial intelligence literacy significantly promotes their innovative teaching practices. Educators with higher AI literacy exhibit stronger innovative capabilities in instructional design, resource utilization, and assessment, enabling them to better guide students' autonomous learning and cultivate their innovative abilities. AI literacy not only enhances teachers' technical proficiency but also strengthens their pedagogical autonomy and classroom innovation awareness, facilitating their transition from knowledge disseminators to facilitators of student innovation.

Based on the research findings, this study offers the following insights: First, private universities should prioritize enhancing faculty members' AI literacy by integrating AI training into their professional development plans and providing continuous, systematic training and support. Second, educators should fully leverage AI technologies to optimize instructional design and implementation, enhancing classroom innovation and students' comprehensive competencies through data-driven personalized teaching and project-based learning. Finally, institutions should foster supportive environments to encourage faculty experimentation with novel pedagogical approaches, thereby elevating overall educational quality and innovation standards.

Disclosure statement

The authors declare no conflict of interest.

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