

Exploring the Pathways of AI-Empowered Teaching Reform in the Operation and Management of Elderly Care Institutions Course

Shangyuhui Huang¹, Lin Wan¹, Yaoxiang Miao¹, Zhenyou Guo¹, Jingwen Liang^{2*}, Qingxi Zhao^{3*}

¹School of Humanities and Management, Guilin Medical University, Guilin 541199, Guangxi, China

²Maternal and Child Health Hospital of Guangxi Zhuang Autonomous Region, Nanning, Guangxi, China

³Guilin Traditional Chinese Medicine Hospital, Guilin Medical University, Guilin 541199, Guangxi, China

**Authors 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: As global population aging continues to accelerate, elderly care institutions have emerged as core pillars of the socialized elderly care service system. The quality of their operation and management directly affects the well-being of hundreds of millions of older adults. With artificial intelligence (AI), big data, and the Internet of Things driving the smart transformation of elderly care services, the industry faces an increasingly urgent demand for interdisciplinary managerial talents who possess expertise in both elderly care operations and digital technologies. As a cornerstone course in the Elderly Care Service Management major, Operation and Management of Elderly Care Institutions is presented with both opportunities for digital transformation and multiple structural challenges in its teaching reform. Grounded in the policy imperatives of “Healthy China,” active aging, and the integration of AI in education, this study systematically examines the practical dilemmas confronting the undergraduate course across four dimensions: professional identity, curriculum system, faculty development, and teaching resources. It then proposes a comprehensive implementation framework for AI-empowered teaching reform, structured around four strategic pillars—reshaping professional cognition, restructuring the curriculum system, enhancing faculty competencies, and innovating teaching resources. This framework establishes a closed-loop smart teaching ecosystem covering the entire instructional process, including pre-class preparation, in-class instruction, post-class consolidation, evaluation, and management. The findings are expected to provide valuable references for the digital construction and smart teaching reform of related courses in domestic undergraduate institutions, thereby contributing to the high-quality development of China’s elderly care sector.

Keywords: Operation and Management of Elderly Care Institutions; Artificial intelligence; Teaching reform; Virtual simulation; Curriculum development

Online publication: August 31, 2026

1. Introduction

The 15th Five-Year Plan period (2026–2030) marks a critical five-year phase during which China’s population aging is expected to accelerate from a moderate to a severe stage. The population aged 60 and above is projected to increase by nearly 14 million annually on average, with the number of elderly individuals who are advanced in age, living alone, or in empty-nest households continuing to rise steadily. By approximately 2035, China’s elderly population aged 60 and above is expected to exceed 400 million, ushering in a phase of severe aging. Alongside this accelerating demographic shift, elderly care institutions—as core components of the socialized elderly care service system—have a direct impact on the quality of life and social welfare of hundreds of millions of senior citizens. Concurrently, artificial intelligence technologies are reshaping industry-wide talent demand structures and competency standards with unprecedented depth and breadth. The New Generation Artificial Intelligence Development Plan explicitly advocates the deep integration of AI into teaching processes, while the Recommendations for the 15th Five-Year Plan for National Economic and Social Development emphasize the high-quality development of elderly care initiatives during this period. The convergence of macro-level policies in the domains of “elderly care services” and “intelligent education” provides both institutional endorsement and developmental impetus for AI-empowered educational reforms in elderly care-related courses. Nevertheless, a marked misalignment persists between the current talent cultivation system for elderly care service management and industry demands. According to the Ministry of Education’s 2023 Research Report on the Construction of the Elderly Care Service Talent Team, a considerable number of higher education institutions offering elderly care service management programs face a disconnect between their training models and market requirements. Since Shandong Women’s University and Shanghai University of Engineering Science first established undergraduate programs in Elderly Care Service Management in 2020, as of May 2026, 48 undergraduate institutions nationwide have introduced this major, with medical and pharmaceutical universities accounting for approximately half. These programs are housed across various academic units—including management, traditional Chinese medicine, and nursing departments—exhibiting a diversified yet fragmented educational landscape ^[1], which has also exposed structural issues such as ambiguous training objectives, fragmented curricula, and inadequate practical training components. Research indicates that the talents currently produced by higher education demonstrate notable structural gaps in knowledge acquisition, practical skills, and innovative thinking relative to the operational needs of the elderly care industry ^[2].

Existing studies primarily address disciplinary development and talent cultivation models within elderly care service management at a macro level, with limited attention paid to the systematic pathways for embedding AI technologies into specific courses. For a course like Operation and Management of Elderly Care Institutions, which integrates both theoretical foundations and practical applications, there remains a dearth of systematic theoretical exploration and practical investigation into how AI can empower its entire teaching process, which specific pain points it can address, and what implementation framework should be adopted. Against this backdrop, this study focuses on the undergraduate Operation and Management of Elderly Care Institutions course, drawing on the curriculum development experiences of institutions such as Nanjing University of Chinese Medicine, which emphasize the “organic integration of service and management” ^[3]. The study aims to address the core research question: What are the theoretical logic and practical pathways for AI-empowered teaching reform in the Operation and Management of Elderly Care Institutions course? Specifically, this research constructs a systematic framework for AI-empowered teaching

reform across four dimensions—reshaping students’ professional identity, restructuring the curriculum system, enhancing faculty capabilities, and innovating teaching resources—and explores a smart teaching implementation pathway that covers the entire instructional cycle of “pre-class—in-class—post-class—evaluation—management.” The theoretical significance of this study lies in two aspects: first, it shifts the analytical lens of AI educational applications from macro-level program development to micro-level course-specific reforms; second, it establishes a systematic analytical framework of “dilemma diagnosis—technology adaptation—pathway design,” offering a transferable theoretical instrument for analogous curriculum reforms. On the practical front, the proposed reform pathways can be directly applied to curriculum development in elderly care service management programs, serving as a reference for the digital upgrading of related courses in domestic undergraduate institutions.

2. Dilemmas in the teaching of Operation and Management of Elderly Care Institutions

2.1. Low professional identity and misconceptions in career perception

Low professional identity constrains teaching effectiveness. Public and family biases toward elderly care careers are widespread ^[4]. Many students enter via reassignment without career awareness, narrowly equating the field with basic caregiving while overlooking managerial functions ^[5]. Identity declines with grade progression as coursework intensifies and career prospects remain uncertain. Students struggle to connect classroom knowledge to managerial realities.

2.2. Weak interdisciplinary integration and practical training

The course spans management, geriatric medicine, and IT ^[6], yet suffers from content lag, fragmented knowledge, and insufficient practice. Textbooks focus on traditional care, lacking smart health and big-data content. Disciplines are taught in isolation, hindering synthesis for real-world problems. On-campus simulation platforms are absent, and off-campus internships have limited capacity. Value education remains superficial, with “active aging” themes appended rather than integrated.

2.3. Faculty shortages and digital competence gaps

Faculty lack the required theory-practice-digital trifecta. Most hold public health/management degrees without IT training, limiting AI instruction ^[7]. Dual-qualified teachers are scarce—full-time staff lack industry exposure, adjuncts lack pedagogy—and complementarity fails. AI tool proficiency is low, with limited use of simulation, analytics, or intelligent generation ^[8].

2.4. Outdated resources and weak simulation platforms

Resources suffer from slow updates and low intelligence. Case libraries lack smart elderly care content; online platforms lack profiling, recommendations, or Q&A, forcing reliance on limited offline support. High-fidelity simulation facilities are inadequate. Some institutions’ “AI+XR smart training rooms” offer a promising model.

3. Analysis of AI-empowered reform pathways

3.1. Professional cognition reshaping: From stereotype to professional self-awareness

To address career perception biases stemming from information scarcity and limited experiential exposure, this study proposes a VR/AR-based cognitive intervention system. By simulating managerial roles—including institutional directors, operations managers, and financial supervisors—the system provides immersive experiences that correct oversimplified perceptions of elderly care as menial work. Additionally, machine learning algorithms establish a dynamic identity assessment model that identifies critical fluctuation points through behavior tracking and delivers differentiated career information across grade levels. This addresses the documented decline in professional identity as students advance^[9], closing information gaps that fuel upper-year career confusion.

3.2. Curriculum restructuring: Knowledge integration and competency development

In content design, this study recommends natural language processing and big-data analytics to construct an interdisciplinary knowledge graph integrating management, geriatric medicine, and information technology, transforming fragmented content into an organic whole centered on institutional operations. AI-driven systems can dynamically identify outdated textbook content and supplement emerging industry knowledge^[10], mitigating curriculum-industry lags. For practical training, a virtual simulation platform covering full operational processes—from facility establishment to emergency response—is proposed, shifting emphasis from isolated skills to comprehensive decision-making competence. The “AI+BOPPPS” model integrates AI into scenario creation, stakeholder simulation, and personalized feedback, addressing traditional limitations in scenario costs and feedback modalities. For value guidance, generative AI automates ideological case generation, embedding “active aging” and “age-friendly technology” concepts into AI-assisted instruction, avoiding value-education disconnects.

3.3. Faculty enhancement: Human-AI collaboration and academic-industry integration

Four AI-facilitated pathways are explored. AI teaching assistants and virtual collaborative platforms implement “human-AI collaboration” and “academic-industry integration”—the former providing just-in-time interdisciplinary knowledge supplementation; the latter enabling regular online exchanges between faculty and practitioners, with Nanjing University of Chinese Medicine’s dual-mentorship system offering an actionable model. A big-data-based multidimensional competency assessment system is proposed, diagnosing capabilities across theoretical knowledge, practical experience, and technological application, enabling targeted training programs for tiered faculty development.

3.4. Resource innovation: From static repository to intelligent ecosystem

Four pathways transform resources from “static storage” to “smart ecosystem.” A dynamic case generation system, adaptive learning platform, AI+XR smart training room, and “data dashboard” evaluation module form an integrated chain of content generation, on-demand delivery, situational training, and data feedback. The “AI elderly care institution manager” model assigns AI three functions—process guide, policy interpreter, and data analyst—elevating it to a “learning collaborator” with initiative. When students encounter AI-generated unexpected scenarios, deep thinking training occurs; when AI identifies weaknesses from operational trajectories and pushes advanced tasks, learning diagnosis and instructional intervention achieve real-time seamless linkage.

4. Discussion

This study resonates with existing literature across multiple dimensions. In terms of the macro-level direction of integrating AI with elderly care education, the analytical framework established by Cui and Liu ^[11] provides policy and theoretical groundwork, which this study further operationalizes at the specific course level. Regarding virtual simulation applications, Nanjing Hengdian's ^[12] smart training room solution is technically aligned with this study, though the latter places stronger emphasis on the systematic construction of a full-process management chain. In the integration of ideological and political education, Lu ^[13] focuses on the optimization of knowledge systems, whereas this study attempts to leverage generative AI for automated generation and organic embedding of value-education materials. Meanwhile, this study extends the existing literature in several respects. Zuo ^[14] discusses faculty development from a macro-institutional perspective, while this study positions AI teaching assistants as just-in-time tools to address faculty interdisciplinary knowledge gaps. Moreover, whereas most studies stop at the static construction of “teaching resource repositories” ^[15], this study's closed-loop system of “dynamic generation—adaptive delivery—immersive training—data-driven evaluation” seeks to advance teaching resources from static storage toward dynamic circulation. The origins of these differences lie in the distinctive characteristics of the Operation and Management of Elderly Care Institutions course and their specific implications for AI application: the course is strongly practice-oriented and demands a high-fidelity decision-making environment rather than mere knowledge transmission; it is interdisciplinary in nature, requiring AI not only to store knowledge but also to establish interconnections among knowledge domains; and its management scenarios are highly context-dependent, necessitating training systems with adjustable parameters and flexible scenario configurations. These characteristics suggest that there is no universal template for AI-empowered teaching reform, and that customization according to a course's disciplinary logic is essential.

5. Conclusion and prospects

5.1. Research conclusions

This study addresses how AI can empower teaching reform in the undergraduate Operation and Management of Elderly Care Institutions course, yielding three main findings. First, the course faces four interrelated dilemmas: declining professional identity, insufficient interdisciplinary integration and practical training, a shortage of dual-qualified faculty with digital competence, and intelligent resources lagging behind industry transformation. These factors collectively impede talent cultivation quality. Second, AI offers multidimensional empowerment, but its effectiveness hinges on alignment with the course's disciplinary logic. Third, the proposed “four-dimensional linkage” framework—cognitive reshaping, curriculum restructuring, faculty enhancement, and resource innovation—forms a closed-loop smart teaching system covering pre-class, in-class, post-class, evaluation, and management. Theoretically, this study shifts the AI-education lens from macro-program to course-level reform, offering a transferable analytical framework for analogous courses.

5.2. Limitations and future directions

Limitations include: unvalidated reform pathways, insufficient student-centered design, and the absence of AI ethics norms. Future work should conduct cross-institutional comparisons to develop tiered strategies, apply the Technology Acceptance Model for student feedback, and establish an ethical governance framework

addressing data security, algorithmic transparency, and teacher-led instruction—ensuring technology serves education’s fundamental goals.

Acknowledgments

Our appreciation goes to all the researchers who participated in this study. Lin Wan is a co-first author. Jingwen Liang is a co-corresponding author.

Funding

Guangxi Health and Wellness Committee’s Self-funded Scientific Research Project: Research on Nursing Resource Allocation in Guangxi Based on Fairness and Efficiency (Z-A20240363)

Disclosure statement

The authors declare no conflict of interest.

Author contributions

Shangyuhui Huang: Methodology, Software, Validation, Visualization, Writing – review & editing.

Lin Wan: Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Writing – original draft.

Yaoxiang Miao: Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Writing – original draft.

Zhenyou Guo: Conceptualization, Data curation, Formal analysis, Methodology, Software, Validation, Writing – original draft.

Jingwen Liang: Data curation, project administration, and supervision.

Qingxi Zhao: Data curation, project administration, and supervision.

Author roles: Lin Wan and Yaoxiang Miao contributed equally to this work as co-first authors. Jingwen Liang and Qingxi Zhao contributed equally as co-corresponding authors.

References

- [1] Ren X, Zhang S, Yang J, et al., 2025, Professional Identity and Influencing Factors among Elderly Care Service Management Students. *Health Vocational Education*, 43(17): 99–102.
- [2] Zhang Y, Peng Y, 2025, Strategies for Cultivating Talents in Smart Health and Elderly Care Service Management Programs. *Sichuan Labor Security*, (06): 113–114.
- [3] Nanjing University of Chinese Medicine, 2024, Strategic Deployment of Urgently Needed Disciplines to Support the National Strategy for Active Aging, *Xinhua Daily*, August 8, 2024.
- [4] Chen Y, Luo Q, 2025, Employment Intentions of Students in Smart Health and Elderly Care Service Management Programs in Vocational Colleges. *Heilongjiang Science*, 16(05): 11–15.
- [5] Yang Y, Xiang Y, Wang X, et al., 2025, Practice and Exploration of the “Medicine-Nursing-Care-Management”

- Four-in-One Talent Cultivation Model for Elderly Care Service Management. *Industry and Technology Forum*, 24(05): 133–135.
- [6] Wang L, 2025, Design of Practical Teaching Systems and Implementation Safeguards for Elderly Care Service Management Programs. *China Training*, (03): 23–27.
- [7] Lyu M, 2025, Industry Positioning and Talent Cultivation Strategies for Nursing Programs in Elderly Care Services under Industry-Education Integration. *Society and Public Welfare*, (09): 100–103.
- [8] Liu J, 2021, Analysis of Talent Cultivation Pathways for Elderly Care Service Programs in Vocational Colleges under the Background of Artificial Intelligence. *Modern Vocational Education*, (19): 222–223.
- [9] Zhao S, Yang L, 2025, Pathways to Enhancing Professional Identity among Aging-Service Students from a Professionalization Perspective. *Journal of Guangdong Open University*, 34(03): 15–22.
- [10] Yang Y, 2026, Application of the AI+BOPPPS Teaching Model in Operation and Management of Elderly Care Institutions. *Frontiers in Educational Research*, 9(3).
- [11] Cui K, Liu C, 2022, Artificial Intelligence + Elderly Care Services: Development Models and Implementation Pathways. *Chinese Journal of Gerontology*, 42(08): 2037–2044.
- [12] Nanjing Hengdian, n.d., AI+XR Smart Training Room Solution for Operation and Management of Elderly Care Institutions.
- [13] Lu T, 2026, Optimizing the Curriculum System of Private University Elderly Care Service Management Programs from a Supply-Demand Matching Perspective. *Aging Research*, 13(4): 9–17.
- [14] Zuo X, 2025, Optimization of Talent Cultivation Models for Health-Oriented Majors in Vocational Undergraduate Programs under the Smart Aging Context, thesis, Jilin International Studies University.
- [15] Cai X, Chu J, Hou Z, 2024, Exploring Digital Upgrading Models for Smart Health and Elderly Care Service Management Programs in Vocational Education. *Sichuan Labor Security*, (05): 50–51.

Publisher's note

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