Education Reform and Development, 2026, Volume 8, Issue 2
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Research on the Innovative Mode and Optimization Path of Deep Integration of Artificial Intelligence Technology and Graduate Education Management Service in Finance and Economics Universities

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Abstract: As the new wave of technological revolution and industrial transformation progresses, artificial intelligence is reconfiguring higher education paradigms, rendering the modernization of graduate education management services a crucial contemporary challenge. This study centers on finance and economics universities, delving into the inherent logic, challenges, and development prospects of integrating AI into graduate education management services. Research reveals that these institutions currently encounter challenges such as data silos and inflexible processes, for which AI presents potential solutions. The paper formulates a "trinity" integrated innovation model consisting of four core modules, propelling the shift of graduate education management services from being experience - based to data - driven, from standardized to personalized, and from passive response to proactive service. Moreover, systematic optimization approaches are put forward to offer theoretical and practical guidance for the intelligent transformation of finance and economics universities, promoting reforms in the cultivation of high - level financial professionals.

Keywords: Artificial intelligence; Graduate education; Educational management; Finance and economics universities

Online publication: March 31, 2026

1. Definition of core concepts

As a strategic technology driving technological and industrial transformation, artificial intelligence (AI) continues to evolve in both scope and essence. In this study, "AI technology" is defined as a technological cluster encompassing core technologies like machine learning, along with related theories and methodologies. When

integrated into graduate education management services, its core capabilities as an "empowering technology" are emphasized, including robust data processing and analysis, precise pattern recognition and matching, as well as intelligent decision support and automation [1]. This paper examines the comprehensive technological forces that permeate the entire process of graduate education management services and drive transformative changes.

This study defines "graduate education management services in finance and economics institutions" as a dynamic process where higher education organizations in these fields systematically plan, organize, coordinate, support, and evaluate graduate activities throughout their entire lifecycle, to cultivate high-level finance and economics professionals. The concept is characterized by three key features: first, it operates within a specific domain focused on finance and economics; second, it is holistic, spanning the entire graduate training chain; third, it pursues dual objectives: ensuring both the quality of talent cultivation and meeting the individualized needs of graduate students [2].

2. Research and practice status

2.1. Research status

Currently, scholars generally believe that the rapid development of AI technology has provided new tools and methods for educational management. For example, Liu (2021) pointed out that the application of big data technology in graduate education management can effectively solve problems such as poor information transmission and disconnection between class management and tutor management [3]. Chen (2023), from the perspective of the evolution of educational management concepts and models, emphasized that in the era of artificial intelligence, educational management should be student-centered, focus on personalized development, and use artificial intelligence technology to improve the efficiency of educational resource utilization [4]. Gao (2023) pointed out that the application of artificial intelligence in university education management, including intelligent teaching support, personalized education, and intelligent teaching evaluation, has brought many innovations to educational management [5]. Wang et al. (2024) pointed out that new-generation digital technologies such as the Internet, big data, and artificial intelligence can be used to build the GROM management theory around the three core management elements of people, objects, and knowledge, so as to enhance the scientificity, accuracy, and performance of graduate education management decisions [6]. Liu et al. (2024) pointed out that business graduate education should improve students' digital literacy and innovation capabilities through diversified curriculum design, integration of industry and education, and construction of teaching staff [7]. In addition, Chen et al. (2025) proposed that in the context of the construction of new liberal arts, the reform of AI technology empowering the training model of postgraduates in business administration should be explored based on the idea of "discipline chain - talent chain - industry chain", to cultivate a team of postgraduates and tutors with high AI quotient [8]. These studies provide a theoretical basis and practical reference for the development of this research, but most of them discuss the application of artificial intelligence in general educational management scenarios, lacking in-depth research on the data characteristics and the particularity of business processes in the graduate education management services of finance and economics universities, which makes it difficult to meet the needs of high-quality development of graduate education in finance and economics universities. In summary, existing research has laid the groundwork for this study, yet certain limitations remain. Firstly, the research scope exhibits overgeneralization, overlooking the diversity among universities and lacking studies specifically targeting finance and economics institutions. Secondly, the research perspectives are fragmented, lacking systematic innovative models. Thirdly, the depth of research is limited, with insufficient

exploration of the intrinsic mechanisms of integration and optimization pathways. These aspects represent the key areas for breakthrough in this study.

2.2. Practice status

In practical implementation, top-tier universities worldwide have actively engaged in AI-powered educational management services. Internationally, Carnegie Mellon University's AI prediction models, MIT's personalized training programs, and Imperial College London's optimized paper review processes have provided valuable references for finance graduate education. Domestically, "Double First-Class" institutions like Tsinghua University, Peking University, and Harbin Institute of Technology have made proactive attempts. The intelligent education ecosystem developed by Harbin Institute of Technology offers reference value for constructing specialized modules in finance disciplines. However, current practices exhibit imbalances in breadth and depth, with successful cases predominantly concentrated in a few elite comprehensive or STEM-focused universities. For finance-focused institutions, the integration of AI with graduate education management services remains in its infancy, lacking mature case studies. Firstly, the systematic nature of practical applications is insufficient. Existing implementations often involve "single-point breakthroughs" without system integration or data sharing, failing to establish comprehensive intelligent management systems that span the entire lifecycle. Data silos remain a significant challenge. Secondly, there is inadequate alignment between practical applications and disciplinary characteristics. Most intelligent systems are generic, lacking customization for institutional academic features and talent development goals, posing challenges for integrating external knowledge.

The research and practice at home and abroad provide experience and enlightenment, but there are some deficiencies, such as a lack of a theoretical model and a practical scheme for finance and economics universities, integration of the whole process, and integration of the characteristics of the subject.

3. Model construction

Building upon the preceding analysis, we develop a "Data Intelligence-Driven Empowerment Model for the Full Lifecycle of Graduate Finance Education." This model positions "data intelligence" as the core driver, with the graduate's entire lifecycle as the main thread, to achieve precise, personalized, and forward-looking empowerment [9]. The functional design of the core business modules comprises the following four components.

3.1. Intelligent enrollment and precision selection module

The intelligent admissions module employs AI technology to conduct scientific and comprehensive evaluations of applicant quality. Its core functions include: First, assessing applicants' multidimensional capabilities by analyzing textual materials through natural language processing, and constructing a potential prediction model based on undergraduate core course performance to identify high-potential candidates. Second, performing intelligent matching analysis by aligning applicant profiles with institutional mentor resources, research directions, and industry talent demands, thereby providing data-driven support for admissions decisions—for instance, matching students applying for financial engineering programs with quantitative investment research mentors.

3.2. Dynamic cultivation and personalized guidance module

The financial sector experiences rapid shifts in knowledge and industry demands, making traditional training

programs increasingly inadequate. Dynamic training modules provide graduate students with personalized learning and career development pathways. Their core functions include: (1) Customized learning path recommendations: Using financial knowledge graphs, the system generates tailored course selections, literature suggestions, and academic activity recommendations based on individual student profiles—for example, recommending risk management courses and resources to students interested in this field. (2) Intelligent mentorship matching: During enrollment, the system establishes precise two-way connections between students and advisors, monitors mentorship relationships throughout the program, issues early warnings, and provides academic analysis reports to advisors. (3) Interdisciplinary innovation cultivation: By analyzing knowledge graph correlations, the system recommends cross-disciplinary courses, projects, or advisors to nurture versatile and innovative talents [10].

3.3. Smart degree and quality monitoring module

Quality control in academic theses is central to graduate education management. The Smart Degree Module employs AI technology to achieve intelligent management and dynamic quality monitoring throughout the degree conferral process. Its core functions include: First, evaluating the innovation and feasibility of thesis topics. During the proposal stage, semantic analysis of literature databases and industry research reports assesses students' topic selection for its originality, research value, academic relevance, and feasibility, avoiding low-level repetitive studies. Second, providing intelligent assistance and risk alerts during thesis writing, including literature management, academic compliance checks, and logical structure analysis. It also monitors risks such as thesis progress, research direction, and academic misconduct, notifying supervisors and administrators for intervention. Third, intelligently recommending thesis review experts by matching the most suitable specialists through knowledge graphs, enhancing the professionalism and fairness of the review process [11].

3.4. Precision employment and career development module

This module is designed to help graduate students secure high-quality employment by providing comprehensive career development support. Its key features include: (1) Dynamic career path planning: Tailoring career trajectories based on students' interests, competencies, and industry trends, while recommending internship opportunities, training programs, and certification exams. (2) Precision job-person matching with AI-driven recommendations: By analyzing job requirements and students' career profiles, the system matches suitable positions to enhance employment efficiency [12]. (3) Intelligent alumni mentorship: Connecting students with alumni mentors to provide industry insights and job-seeking guidance.

4. Optimization path of deep integration

4.1. Strengthen top-level design to establish a collaborative governance paradigm

Elevate intelligent transformation to the core strategic level of schools, dismantle departmental silos, and foster synergy. On one hand, school leadership must define clear visions, objectives, and roadmaps, establish dedicated task forces, break down barriers of vested interests and data access, revise management regulations, redefine departmental responsibilities, and implement incentive and evaluation mechanisms for data sharing. On the other hand, cultivate an organizational culture that embraces change and encourages innovation, enhancing staff awareness of AI technologies through diverse channels [13].

4.2. Enhancing data governance to build a new foundation for intelligent decision-making

Data serves as the "fuel" for AI applications. Universities face challenges such as inconsistent data standards, making data governance a fundamental task. First, establish a unified data standardization system to standardize data across the entire lifecycle of graduate education. Second, develop an integrated data platform to consolidate and standardize data assets, thereby improving development efficiency and quality. Third, implement robust data security and privacy protection mechanisms to safeguard the information of faculty and students.

4.3. Focusing on technology empowerment to build a new intelligent ecosystem for human-machine collaboration

Technology application is the key to deep integration, guided by the principles of "demand-oriented, urgent needs first, and continuous iteration." On one hand, we should strengthen independent R&D and absorption of core technology platforms, collaborate with universities and tech enterprises to develop specialized algorithm models, and encourage on-campus teams to cultivate interdisciplinary talents. On the other hand, we should establish a human-machine collaborative working model, freeing managers and mentors from tedious tasks to focus on educational work [14].

4.4. Strengthening ethical frameworks and establishing people-centered value orientation

Technological advancements pose ethical challenges, necessitating the establishment of robust ethical standards and review mechanisms. First, implement algorithm transparency and explainability review mechanisms to ensure fairness and impartiality in decisions affecting students' vital interests. Second, safeguard students' right to information and choice by clearly disclosing data usage scope and purposes, empowering them to autonomously manage their data. Additionally, continuous monitoring of technology's impact on educational equity is crucial. AI applications may exacerbate the digital divide, allowing resource-rich students to disproportionately benefit from personalized services. Therefore, when designing intelligent service systems, priority should be given to supporting disadvantaged groups through technology-enabled academic guidance, resource allocation, and developmental opportunities, thereby promoting educational equity [15].

In summary, the four optimization pathways—top-level design guidance, data governance foundation, technology-enabled human-machine collaboration, and ethical norms safeguarding—form a mutually reinforcing system that drives the deep integration of artificial intelligence with graduate education management services in finance and economics universities. This long-term and complex process requires university administrators to demonstrate determination, maintain continuous investment, and adopt an open mindset. By progressively modernizing graduate education management services, they can effectively support the cultivation of high-caliber financial professionals.

5. Conclusion and prospects

Amid the wave of artificial intelligence, higher education—particularly graduate education—is undergoing profound transformations. This paper examines finance and economics universities, exploring the theoretical rationale, practical challenges, innovative models, and optimization pathways for the deep integration of AI with graduate education management services. The core conclusion is that this integration, driven by data intelligence, represents a paradigm shift in educational management services.

The core theoretical contribution of this study is the "Data Intelligence-Driven Empowerment Model for the

Full Lifecycle of Graduate Education in Finance and Economics." This model provides comprehensive solutions for finance and economics universities, covering the entire educational process, integrating multi-source data, and incorporating the distinctive features of financial disciplines. Through a three-tier architecture, it emphasizes the role of data intelligence engines and designs four key business modules. This framework not only offers a blueprint for the intelligent transformation of finance and economics universities but also serves as a reference for other institutions.

To facilitate the effective implementation of the model, an optimization pathway has been proposed, comprising "strengthening top-level design, deepening data governance, focusing on technological empowerment, and improving ethical standards," with emphasis on the coordinated advancement of these four elements. This provides university administrators with a strategic framework. However, the deep integration of artificial intelligence with graduate education management services in finance and economics universities still faces research gaps and practical challenges. Key areas include: (1) the effective and secure integration of emerging technologies (e.g., generative AI) into core graduate training processes; (2) establishing a scientific evaluation system for integration outcomes; (3) addressing the transformation and empowerment of faculty roles; and (4) improving cross-institutional, cross-regional, and cross-border data sharing mechanisms for graduate education. These measures will help build an open and collaborative ecosystem for cultivating finance and economics professionals, representing a crucial direction for future development.

In conclusion, artificial intelligence unlocks boundless potential for modernizing graduate education management in finance and economics universities. To seize this opportunity, we must combine the courage and wisdom to embrace the future with the clarity and prudence to confront challenges. Only by upholding the fundamental principle of "moral education and talent cultivation," centering on "student development," adopting "human-machine collaboration" as the approach, and adhering to the ethical standard of "promoting virtue," can we enhance the quality of graduate education and nurture more outstanding talents for the nation.

Disclosure statement

The authors declare no conflict of interest.

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