

AI-Driven Industry-Education Integration: A Case Study of Teaching Management Practices in Application-Oriented Universities

Shang Feiyan, Gao Qingwen

Wenzhou University of Technology, Wenzhou, China

Abstract: The rapid development of artificial intelligence (AI), particularly generative AI technologies, is reshaping higher education systems and prompting new approaches to industry-education integration in application-oriented universities. While existing studies have discussed the importance of aligning higher education with industry needs, limited attention has been given to how AI can be embedded into teaching management practices to enhance the effectiveness of such integration. This study explores AI-driven industry-education integration through a qualitative case study of teaching management practices in application-oriented universities. Drawing on institutional documents, policy materials, and teaching reform practices, the study examines how teaching management systems facilitate collaboration between universities and industry partners under the influence of AI technologies. The findings indicate that AI contributes to (1) improving coordination efficiency in industry-education collaboration, (2) supporting data-informed decision-making in curriculum and program development, and (3) optimizing teaching reform project management processes. However, challenges remain in terms of system fragmentation, uneven digital capability, and limited cross-sector data sharing. Based on these findings, the study proposes an emerging model of AI-driven integration in which teaching management functions as a central coordinating mechanism linking institutional governance and industry needs. This research provides practical implications for enhancing teaching management systems in application-oriented universities and offers a conceptual basis for understanding the evolving role of AI in industry-education integration.

Keywords: artificial intelligence ; application-oriented universities ; curriculum development; industry-education integration; teaching management.

Received: April 22, 2026

Revised: May 17, 2026

Accepted: May 22, 2026

Published: May 24, 2026

Copyright: © 2026 by the authors. Licensee Axon Academic Publishing Institute, Hong Kong, China. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

1.1 Research Background

The Trend of Artificial Intelligence Reshaping Higher Education. Artificial intelligence technology is permeating every aspect of higher education at an unprecedented pace. From intelligent tutoring systems and automated assessment tools to the application of generative large language models in educational settings, AI technology is profoundly transforming the way knowledge is imparted, the nature of the learning experience, and the paradigms of educational management. In April 2026, the Ministry of Education of the People's Republic of China, along with four other government departments, jointly issued the "Action Plan for 'AI+Education'," explicitly proposing to promote the full integration of AI with all elements of education, ensure its penetration throughout the entire educational process, and achieve comprehensive coverage across all scenarios. The plan aims to establish a collaborative mechanism involving government, industry, academia, research institutions, and financial sectors, with the goal of forming a development framework characterized by the deep integration of AI and education by 2030 [1]. This policy signal indicates that AI-empowered education has evolved from a technical exploration into a core component of China's national education digitization strategy.

The Strategic Mission and Practical Challenges of Industry-Education Integration in Applied Undergraduate Institutions. As a key category within China's higher education system, applied undergraduate institutions bear the core mission of cultivating high-quality, application-oriented talent to support regional economic and social development. Industry-education integration—defined as the deep synergy and resource integration between industry and education—has been established as the fundamental pathway to fulfilling this mission. Since the General Office of the State Council issued the "Several Opinions on Deepening Industry-Education Integration" in 2017, more than ten policy documents have been successively released at the national level, gradually constructing an institutional framework ranging from top-level design to pilot implementation. However, the issuance of policies has not fully translated into deep integration at the practical level. A large body of research indicates that industry-education integration in current applied undergraduate universities still faces widespread structural challenges, such as "integration without depth," "enthusiasm on the part of universities but indifference from enterprises," superficial cooperation content, and ineffective coordination mechanisms [2-4]. The deep-rooted causes of these challenges lie in information asymmetry among diverse stakeholders, difficulties in reconciling conflicting interests, and a lack of regular communication platforms and institutionalized collaboration mechanisms.

Academic administration serves as the pivotal hub for the implementation of industry-education integration. In the process of transforming industry-education integration from macro-level policy to micro-level practice, the internal academic management system of universities plays a pivotal role in bridging the gap between policy and implementation. Typically, the academic affairs office within a university is responsible for coordinating core aspects such as program design, curriculum development, teaching reform projects, practical training arrangements, and quality

monitoring—all of which serve as critical interfaces for translating the concept of industry-education integration into action. However, traditional teaching management models, which are oriented toward administrative tasks, suffer from limitations such as inefficient information flow, narrow decision-making criteria, and insufficient linkage with the industry sector. Consequently, they struggle to effectively support the dynamic responsiveness and precise alignment required for deep industry-education integration.

The Potential of AI-Empowered Teaching Management. The integration of artificial intelligence (AI) technology offers new possibilities for overcoming these limitations. With its powerful capabilities in data processing, pattern recognition, and intelligent matching, AI can theoretically: break down information barriers between universities and enterprises to achieve precise alignment between talent demand and educational supply; assist teaching administrators in making data-driven decisions regarding program adjustments and curriculum optimization; and automate repetitive administrative tasks, freeing up management resources for strategic coordination. Currently, systematic research in the interdisciplinary field of "AI + Educational Administration + Industry-Education Integration" remains limited within the academic community, and in-depth analyses based on real-world institutional case studies are particularly scarce.

1.2 Research Problem

Against this backdrop, this study focuses on the following question: Through what mechanisms is artificial intelligence technology integrated into the teaching management practices of applied undergraduate universities, thereby empowering the deepening of industry-education integration?

Specifically, this study seeks to address three sub-questions:

- (1) In which specific aspects of teaching management does AI technology play an empowering role?
- (2) How has AI empowerment altered the roles and functions of teaching administration departments in industry-education integration?
- (3) What practical challenges and institutional constraints does AI-driven industry-education integration face?

1.3 Significance of the Study

Theoretical Significance. This study introduces the theories of collaborative governance and technology empowerment into the field of teaching management research on industry-education integration, exploring how AI technology, as an "institutional mediator," reshapes information flow and collaboration patterns among diverse stakeholders. The research contributes to enriching the theoretical perspectives of industry-education integration studies and promotes a shift in this field from "policy-advocacy-oriented" research to "mechanism-explanatory" research.

Practical Significance. Taking Wenzhou University of Technology—a typical applied undergraduate institution—as a case study, this research conducts an in-depth analysis of its specific practices in the digital transformation of teaching management under the "AI+" strategy, distilling replicable and scalable experiences and models. The research findings can serve as an operational reference for academic affairs management

departments at similar institutions and provide empirical evidence for education policymakers to refine supporting systems for AI-enabled industry-education integration.

2. Literature Review

2.1 Industry-Education Integration: Concepts, Policies, and Challenges

Conceptual Definition and Evolution of Meaning. Industry-education integration refers to a state of deep integration between the industrial and educational systems, characterized by the sharing of resources, process coordination, and mutual benefit in areas such as talent development, technological research and development, and social services. Compared to traditional "school-enterprise cooperation," industry-education integration emphasizes systematic collaboration among diverse stakeholders, including the government, universities, industries, and enterprises. The scope of cooperation has expanded from simple internships and employment to a full-chain integration encompassing joint program development, joint course offerings, joint faculty training, platform sharing, and shared outcomes [5]. Due to their "application-oriented, regionally service-oriented" institutional positioning, applied undergraduate universities are regarded as the most critical arena for implementing industry-education integration.

The construction and evolution of the policy system. China's industry-education integration policies have evolved from the vocational education sector to the higher education sector, and from departmental policies to a national strategy. Chen Jun and Zhang Yunjun [6] conducted a systematic analysis of 18 national-level industry-education integration policy documents from 2017 to 2023 from the perspective of policy instruments. They found that the policy system exhibits a progressive pattern of "top-level design-pilot implementation-comprehensive deepening," but the structure of policy instruments remains imbalanced—administrative command-type instruments dominate, while economic incentive-type and legal regulatory-type instruments are relatively weak. Yuan Xiaohua and Zhang Miao [7] further point out that policy content generally emphasizes directional advocacy but lacks detailed, categorized guidelines tailored to different regions and types of institutions. This results in excessive discretionary power for local governments and universities during implementation, creating a significant "disconnect" between policy objectives and actual outcomes.

Multiple Causes of Implementation Challenges. Regarding the question of why industry-education integration remains "integrated but not deep," the academic community has reached a consensus on multidimensional causes. From the corporate perspective, Chen Xing [8] notes that the core motivation for corporate participation stems from clear input-output returns, whereas the talent development and technological collaboration involved in industry-education integration often entail long cycles and uncertain returns, creating a fundamental tension with corporate short-term operational logic. From the perspective of higher education institutions, Pan Maoyuan and Zhou Qunying [9] revealed the widespread "organizational inertia" in applied universities. Although these institutions have nominally completed their transition to an applied orientation, their internal governance structures, evaluation systems, and resource allocation logic still follow traditional academic models, making it difficult to effectively align with industry needs. From the perspective of the institutional

environment, Qi Zhan-yong and Wang Shu-qin [4] analyzed the contradiction between institutional supply and demand, pointing out that the root cause of the limited depth of industry-education integration lies in the insufficient supply of effective institutions. The institutional demands of diverse stakeholders for clear delineation of rights and responsibilities and stable returns on investment have not been fully met.

2.2 University Teaching Management: Functions, Systems, and Transformation Pressures

Core Functions of Teaching Management. University teaching management refers to the management activities involving the planning, organization, coordination, control, and evaluation of the entire teaching process. In applied undergraduate universities, the core functions of teaching management typically encompass program establishment and dynamic adjustment, the formulation and revision of talent development plans, curriculum development and textbook management, the organization and management of teaching reform projects, the arrangement of practical teaching and the development of training bases, as well as teaching quality monitoring and evaluation [10]. These functions directly determine the standards and quality of talent cultivation and serve as the critical link in transforming industry-education integration from "agreement text" to "classroom practice."

Limitations of the Traditional Model. The current teaching management model largely emerged during the elitist phase of higher education, with the standardized handling of administrative affairs as its core logic. It exhibits three significant limitations: insufficient information processing capacity—faced with rapidly changing industrial demands and massive volumes of teaching operation data, the traditional manual processing model is inefficient and suffers from delayed feedback; Low level of scientific decision-making: Key decisions such as program adjustments and curriculum design often rely on the experiential judgment of administrators, lacking data support and systematic feedback from the industry; Weak collaborative capabilities: Barriers exist in the flow of information between the Academic Affairs Office, other functional departments, secondary colleges, and external enterprises, making it difficult to support the cross-disciplinary collaboration required for industry-education integration.

Drivers of Digital Transformation. In recent years, with the accelerated advancement of digitalization in higher education, the field of teaching administration is undergoing profound transformation. From the early informatization of academic management systems to the current integration of smart campus platforms, technology is reshaping the operational logic of teaching administration. Existing digital transformation practices have largely focused on the digitization of administrative processes and have not yet truly addressed the core pain points of industry-education integration—namely, how to leverage intelligent technologies to promote in-depth information sharing and collaborative decision-making between universities and enterprises.

2.3 Applications of Artificial Intelligence in Higher Education

Diverse Scenarios of AI-Empowered Education. The application of artificial intelligence in higher education now spans multiple dimensions, including teaching, learning, assessment, and management. In teaching, AI-driven adaptive learning

systems can provide personalized learning pathways based on individual student differences; intelligent tutoring systems offer real-time feedback and Q&A services. In management, AI-assisted applications such as enrollment forecasting, academic early warning systems, and resource scheduling are gradually maturing. A systematic review of AI applications in education by Zawacki-Richter et al. [11] indicates that current research primarily focuses on four major themes: "Modeling and Prediction," "Intelligent Tutoring Systems," "Adaptive Systems and Personalization," and "Assessment and Feedback," while research on how AI supports educational management and governance remains relatively limited.

The Rise of Data-Driven Educational Governance. With the accumulation of educational big data and the maturation of analytical technologies, "data-driven educational governance" is emerging as a new research hotspot. Its core concept is to provide scientific evidence for educational decision-making through the collection, mining, and visualization of data on teaching processes, learning behaviors, and administrative operations. However, current practices in data-driven governance are largely confined to closed-loop data systems within universities and have not yet effectively established connections with industry-side data. Cross-domain data collaboration in industry-education integration scenarios remains a challenge to be addressed [12].

Frontier Explorations in Intelligent Educational Decision-Making. The application of artificial intelligence at the strategic decision-making level represents a cutting-edge direction in the intelligent management of education. Researchers have begun exploring the use of machine learning algorithms to analyze correlations between labor market data, industrial technology trends, and university talent development data, with the aim of supporting the dynamic optimization of program offerings and curriculum content. While this remains highly aligned with the policy objectives of industry-education integration, it is currently still in the proof-of-concept and pilot stages, lacking systematic case studies and mechanism analysis.

2.4 Research Gaps

Based on the above literature review, three significant gaps exist in current research. Studies on industry-education integration primarily focus on macro-policy analysis and the binary relationship between universities and enterprises, with insufficient attention paid to the critical intermediary role of internal teaching administration within universities. As the "on-campus implementers" of industry-education integration policies, the functional positioning, operational mechanisms, and transformation pathways of teaching administration departments have not yet been fully explored.

Research on AI-enabled education has largely concentrated on teaching and learning scenarios, with relatively few discussions on how AI can be embedded into and reshape educational management processes. Particularly in the complex scenarios of industry-education integration involving collaboration among multiple stakeholders, the enabling mechanisms and potential value of AI remain to be thoroughly explored.

Existing research generally lacks in-depth case analyses grounded in real-world institutional practices. While theoretical discussions and policy proposals predominate, empirical studies based on frontline management data are scarce, making it difficult to

address the core question of "how AI specifically transforms teaching management practices in industry-education integration."

This study aims to fill this gap by conducting an in-depth analysis of Wenzhou University of Technology as a representative case, thereby revealing the practical mechanisms and underlying logic of AI-driven teaching management in industry-education integration.

3. Methodology

3.1 Research Design

This study employs a qualitative case study methodology. Case studies are suitable for exploring "how" and "why" research questions, and are particularly well-suited for examining the mechanisms of interaction among multiple factors within complex social phenomena [13]. AI-enabled teaching and management in industry-education integration is a complex process involving multidimensional factors such as technology, organization, and institutional frameworks. Qualitative case studies allow for an in-depth exploration of the context, capturing practical details and underlying mechanisms, thereby addressing the limitations of quantitative research in explaining "processes" and "mechanisms."

3.2 Case Selection

This study selected Wenzhou University of Technology as the case study subject based on the following considerations of representativeness: the representativeness of its institutional positioning. Wenzhou University of Technology is an undergraduate-level applied university approved by the Ministry of Education. Formerly known as Oujiang College of Wenzhou University, it was restructured in 2021 into an independently established public undergraduate institution and officially renamed Wenzhou University of Technology. The university has clearly defined its goal as "building a high-level applied university with distinctive characteristics," making it a typical representative among applied undergraduate institutions.

Exemplarity of Industry-Education Integration Practices. Located in Wenzhou, Zhejiang Province—a region with a thriving private economy—the university leverages local industrial strengths to establish nine modern industry colleges. Among these, the "Baisheng Joint College" and the "Delixi Smart Electrical Industry College" have been designated as provincial-level key industry colleges, forming an industry-education integration framework characterized by "one college, one brand." The university's explorations in this field serve as a model for peer institutions.

Exemplary AI-Empowerment Strategy. Since launching its "AI+" development plan in 2025, the university has inaugurated the Wenzhou Institute of Artificial Intelligence, establishing a multidimensional ecosystem encompassing AI talent cultivation, technological R&D, and industrial services. The university offers a required course titled "Introduction to Artificial Intelligence" and actively explores AI-empowerment pathways in teaching administration, providing rich research material for this study.

Research Accessibility. The researcher (the first author of this paper) serves as Deputy Director of the Teaching and Research Section within the university's Academic Affairs Office. In this capacity, the researcher is directly involved in and responsible for

core administrative tasks such as program development, curriculum design, and teaching reform projects. This role provides an in-depth, participatory understanding of the institutional design, implementation processes, and actual outcomes of AI-enabled teaching management, enabling access to a wealth of firsthand data.

3.3 Data Sources

To enhance the reliability and validity of the study, this research adopts a multi-source data triangulation strategy. Data sources include:

Institutional documents and policy texts. We collected policy documents related to industry-education integration and AI-enabled education at the national level (2017-2026), as well as supporting local policies from Zhejiang Province and Wenzhou City. Additionally, we gathered institutional regulations, development plans, and annual work priorities regarding industry-education integration and teaching management at the university level.

Teaching management practice materials. These include program development plans and supporting documentation, talent cultivation plans and revision records, course development application and acceptance materials, full-process management documents for teaching reform projects, cooperation agreements and management documents for practical teaching bases, as well as teaching quality reports and evaluation materials.

Industry-education integration project archives. These include construction plans and cooperation agreements for industry colleges, records of the course development process jointly undertaken by schools and enterprises, materials on the appointment and evaluation of enterprise mentors, and records of the use of special funds for industry-education integration.

Participatory observation records. These are the researcher's daily observations of AI-enabled teaching management practices based on their work duties, including observation records from scenarios such as discussions on AI platform functional design, special meetings on optimizing academic affairs management processes, and coordination meetings for university-enterprise collaboration.

Supplementary interviews. To enrich the research perspective, the researcher engaged with teaching management personnel from secondary colleges, and representatives from partner enterprises within the workplace to understand their experiences and evaluations of AI-enabled industry-education integration.

3.4 Data Analysis

This study employed thematic analysis to systematically analyze the data, following the steps outlined below.

Data Organization and Coding. The collected materials were categorized and organized. An open-coding strategy was used to annotate textual data segment by segment, extracting key information units related to "AI-enabled," "teaching management," and "industry-education integration."

Theme Extraction. Based on the initial coding, similar codes were aggregated into higher-level themes through continuous comparison and categorization, forming a conceptual understanding of the core dimensions of AI-enabled industry-education

integration in teaching management practices.

Mechanism Construction. Based on the extracted themes, the logical relationships and pathways of action among the various dimensions were analyzed to construct a mechanism model for AI-driven industry-education integration in teaching management.

Triangulation. Data from different sources were cross-referenced to verify the consistency and reliability of the research findings.

4. Case Description

4.1 Institutional Background

Wenzhou University of Technology, located in Wenzhou City, Zhejiang Province, is an applied undergraduate university with a focus on engineering and the coordinated development of multiple disciplines. The university currently has approximately 10,000 full-time students, comprising 10 secondary colleges and offering 36 undergraduate programs across disciplines including engineering, science, management, economics, literature, and arts. The university traces its origins to the Oujiang College of Wenzhou University, established in 2000, and was approved by the Ministry of Education in 2021 to be restructured into an independently established public undergraduate institution.

Since its re-establishment, the university has clearly defined its mission as "building a high-level, application-oriented university with distinctive characteristics." Adhering to the guiding principle of "rooted in Wenzhou, integrated into Wenzhou, and serving Wenzhou," the university closely aligns with regional industrial development needs, forming a disciplinary and program structure characterized by smart manufacturing, the digital economy, cultural creativity, and green and low-carbon development.

In terms of industry-education integration, the university has centered its efforts on the development of modern industry colleges, establishing nine such colleges to date. It has forged deep cooperative relationships with leading regional enterprises such as Baisheng United Group, Delixi Group, Chint Group, and Baoxiniao Group. Among these, the "Baisheng United College," co-funded by Baisheng United Group with 50 million yuan, focuses on cultivating talent for intelligent construction; the "Delixi Intelligent Electrical Industry College" trains professionals in intelligent electrical engineering through order-based classes. Both of these industry colleges have been selected as Zhejiang Provincial Key Modern Industry Colleges.

In terms of AI empowerment, the university launched the "AI+" Development Plan in 2025, clearly outlining the strategic direction of "empowering educational reform with AI and driving deep industry-education integration through AI." The university has officially inaugurated the Wenzhou Artificial Intelligence College, establishing an integrated development model combining "on-campus training, social services, and industry collaboration." It has introduced a required course titled "Introduction to Artificial Intelligence" for all undergraduate students; established specialized "AI+" colleges such as the AI Film and Television Industry College and the AI Creative Industry College; and actively explored the application of AI technology in areas such as academic administration and quality monitoring.

4.2 Teaching Management System

As the core administrative department responsible for academic affairs at Wenzhou University of Technology, the Office of Academic Affairs oversees the university's undergraduate teaching operations and reform efforts through its subordinate divisions, including the Teaching and Research Division, the Academic Affairs Management Division, and the Practical Teaching Division. The Teaching and Research Division is specifically responsible for core functions such as program development, curriculum development, management of teaching reform projects, textbook development, and the preparation of undergraduate teaching quality reports. The university's academic management system exhibits the following characteristics.

Program Development Mechanism. The university has established a program establishment and management mechanism based on "industry demand orientation—expert review—dynamic adjustment." Each secondary college proposes new program applications or program adjustment plans based on thorough research into regional industrial talent needs. These proposals are implemented after review by internal and external experts and deliberation by the university's Teaching Advisory Committee. The university conducts program evaluations every two years and dynamically adjusts programs based on indicators such as enrollment and employment rates, faculty qualifications, and the effectiveness of industry-education integration.

Curriculum Development System. The university implements a three-tier curriculum development system at the "university, provincial, and national" levels, prioritizing support for industry-education integration courses and AI-enabled courses. Curriculum development is managed through a project-based system, involving stages such as application, review, mid-term inspection, and final acceptance. The university encourages joint course development between the university and enterprises, requiring each major to develop at least 2-3 collaborative courses.

Teaching Reform Project Management. The university regularly initiates a number of university-level teaching reform projects and selects the best ones to recommend for provincial and national funding. Project types include comprehensive major reform, curriculum development, textbook development, practical teaching reform, and teaching method innovation. Project management utilizes a digital platform to achieve full-process online management covering application, review, mid-term inspection, and final acceptance.

Quality Assurance System. The university has established a closed-loop teaching quality assurance system centered on the four pillars of "standards-monitoring-evaluation-improvement." It compiles the "Undergraduate Teaching Quality Report" annually, conducts regular program evaluations, course evaluations, and classroom teaching assessments, and incorporates the effectiveness of industry-education integration into the evaluation indicator system.

4.3 Industry-Education Integration Practices

Wenzhou University of Technology's industry-education integration practices are centered on modern industry colleges, forming a diversified model of university-enterprise collaboration.

Co-construction of Industry Colleges. All nine Industry Colleges adopt a multi-stakeholder co-construction model involving "university, government, industry

associations, and enterprises." They operate under a dean-led system overseen by a board of directors, with enterprises deeply involved in formulating talent development plans, developing curricula, conducting practical instruction, and sharing faculty resources. The Industry Colleges operate as independent entities, possessing autonomous authority over personnel hiring, budget allocation, and resource management.

University-Enterprise Collaborative Talent Development. The university and enterprises jointly formulate talent development plans, integrating enterprise-specific competency standards into educational objectives and graduation requirements; jointly develop course resources, with enterprise technical experts participating in course instruction and textbook compilation; establish joint internship and training bases, enabling students to complete practical learning in real production environments; implement a "dual-mentor system," where enterprise mentors and university mentors jointly guide students' academic and career development.

Technology R&D Collaboration. The university encourages faculty to conduct applied research addressing enterprise technical needs, serving enterprise innovation through forms such as industry-sponsored research projects, technical consulting, and joint research initiatives. Some industry-academic colleges have established internal technology R&D centers, where universities and enterprises collaborate on technical breakthroughs and the commercialization of research outcomes.

Exploration of AI-Empowered Initiatives. In recent years, the university has actively explored the application of AI technology in industry-education integration: utilizing AI platforms to assist in analyzing industry talent needs, thereby supporting decisions on program offerings and curriculum adjustments; building intelligent university-enterprise collaboration platforms to enhance information sharing and project matching efficiency; and piloting AI-assisted teaching quality monitoring to conduct intelligent analysis of student practical learning data.

5. Findings

5.1 Fragmented Industry-Education Collaboration: Challenges Before AI Intervention

Prior to the integration of AI systems, the management of industry-education integration at Wenzhou University of Technology faced fragmentation challenges on three levels.

Fragmentation at the Information Level. The flow of information between universities and enterprises relied heavily on personal connections and in-person interactions. On the industry side, there was a lack of systematic mechanisms for collecting, updating, and sharing information regarding talent requirements, technological trends, and job competency standards. On the university side, information regarding talent development plans, course resources, and faculty capabilities was difficult to accurately convey to partner enterprises. This information asymmetry led to enterprises complaining that they "could not recruit candidates who met their requirements," while universities were perplexed about "what kind of talent enterprises actually needed." As a dean of a secondary college remarked during a discussion: "In the past, when we needed to understand corporate hiring needs, we mainly relied on word of mouth from acquaintances and sporadic surveys. The information was scattered and

outdated, making it difficult to support major decisions such as program adjustments."

Fragmentation at the management level. Industry-education integration involves multiple entities, including the Academic Affairs Office, secondary colleges, industry-academic colleges, and partner enterprises, yet there is a lack of a unified management platform and coordination mechanism. Teaching reform projects, curriculum development initiatives, and internship/practical training arrangements are managed by different offices or departments, resulting in disconnected data and fragmented processes. Information regarding corporate participation in the entire talent development process is scattered across management documents at various stages, making it difficult to form a comprehensive overview. A representative from a corporate partner commented: "When collaborating with the university, we sometimes have to discuss courses with the Academic Affairs Office, internships with the Practical Training Office, and faculty with the secondary colleges. We have to repeat the communication at every stage, which is inefficient."

Fragmentation at the evaluation level. The evaluation of industry-education integration outcomes is scattered across different assessment systems—teaching quality evaluations focus on classroom teaching effectiveness, program evaluations emphasize faculty and resource indicators, and project acceptance reviews prioritize the quantity of deliverables. There is a lack of comprehensive evaluation of the multi-dimensional outcomes across the entire process of industry-education integration. It is difficult to quantitatively assess corporate contributions, effectively measure improvements in students' practical skills, or objectively demonstrate the depth and quality of university-industry collaboration.

The essence of these fragmentation challenges is the absence of a central nervous system capable of integrating diverse information, coordinating multi-party actions, and evaluating multi-dimensional outcomes. This is precisely where AI technology can play a pivotal role.

5.2 AI as a Coordination and Decision-Support Tool

In response to the aforementioned challenges, Wenzhou University of Technology has gradually introduced AI technology into its teaching management, initially forming a new model of "AI-assisted coordination and decision-making."

AI-assisted perception and analysis of industry needs. The university has explored the use of AI technology to intelligently collect and analyze data on regional industrial talent demand. By integrating multi-source data—including recruitment data from the labor market, industry research reports, and enterprise survey information—the AI system can identify trends in talent demand across key regional industries and generate talent demand analysis reports categorized by industry and position. During the 2025 program adjustment review, the Academic Affairs Office used AI analysis tools to perform semantic analysis on three years of recruitment data from Wenzhou's two major industries—smart manufacturing and the digital economy. By extracting high-frequency competency requirements and technical keywords, the analysis provided data-driven support for revising the curriculum of programs such as Mechanical Design, Manufacturing, and Automation, as well as Data Science and Big Data Technology. An expert involved in the review commented: "In the past, when we talked about 'aligning

with industry needs,' it was mostly a qualitative judgment; but now, with data-driven insights, we have a more objective basis for determining what to adjust and how to do so."

AI-assisted intelligent matching of courses with industry needs. The university is building a curriculum resource repository for industry-education integration and is experimenting with AI algorithms to intelligently match course content with job competency standards. The system can automatically analyze the alignment between knowledge points and competency objectives in course syllabi and industry job requirements, identify gaps between course content and industry needs, and provide precise guidance for curriculum updates. In the development of courses co-created by schools and enterprises, AI tools can help identify connections between corporate technical case studies and course knowledge points, recommending real-world corporate projects suitable for integration into teaching. A faculty member involved in course development commented: "In the past, when we wanted to incorporate corporate case studies into our courses, we mainly relied on our own judgment to determine what content was appropriate; now that the system provides intelligent recommendations, our efficiency has improved significantly."

AI-assisted optimization of talent development programs. During the formulation and revision of talent development programs, AI systems can track and analyze data on the employment destinations, job distributions, and career development of past graduates. By combining this with forecasts of industry demand trends, they provide references for key decisions such as setting training objectives, constructing curriculum frameworks, and arranging practical training. For example, when revising the 2026 version of the talent development plan, the university used AI tools to analyze employment data from the past three graduating classes. It found that feedback regarding deficiencies in digital skills was particularly concentrated among graduates of certain majors. Based on this, the new plan added relevant course modules such as data analysis and intelligent tool applications.

5.3 Optimization of Teaching Management Processes

The introduction of AI technology has not only enhanced the scientific basis of decision-making but has also significantly optimized the operational efficiency of teaching management:

Digital Management of Teaching Reform Projects. The university upgraded its teaching reform project management platform by integrating AI-assisted features. The system automatically checks the formatting of project proposals and performs plagiarism checks to assist expert reviews. During the implementation phase, the system automatically reminds users of mid-term review and project completion deadlines, and pushes relevant policy documents, reference cases, and outcome templates based on project categories. During the final acceptance phase, the system assists in the preliminary evaluation of project outcomes, identifying their innovation and practical value. Digital management has significantly reduced administrative tasks, allowing managers to devote more energy to strategic coordination and quality control. A colleague from the Academic Affairs Office stated: "In the past, during project application seasons, simply organizing materials and verifying information took a

tremendous amount of time; now that the system automates many repetitive tasks, we can spend more time liaising with enterprises and conducting research at the secondary colleges."

Improved Efficiency in Course Development Evaluation. In course development project management, the AI system automatically collects course operation data (such as enrollment numbers, student course evaluation scores, and learning behavior data) and combines it with expert review opinions to generate a multidimensional profile of course quality. For industry-education integration courses, the system also pays special attention to distinctive indicators such as corporate engagement, the proportion of practical instruction, and improvements in student competencies. This data provides an objective basis for mid-term reviews and final project acceptance, reducing the arbitrariness of subjective judgments.

Optimization of Quality Monitoring Processes. The university is exploring the application of AI technology to monitor teaching quality throughout the entire process. Through sentiment analysis of student evaluation texts, the system can automatically identify the types and severity of issues in teaching, providing teaching supervisors with clues for areas requiring priority attention; through intelligent calculation of course objective attainment, the system can assist teachers in teaching reflection and continuous improvement; through semantic analysis of textual data such as learning logs and internship reports from practical teaching components, the system can assess students' competency development trajectories and identify weak links in practical instruction.

5.4 Emerging AI-Driven Industry-Education Integration Model

Based on the above practical explorations, this study has distilled an emerging model for AI-driven industry-education integration in teaching management. The core logic of this model can be summarized as: AI + Teaching Management + Industry Demand = Dynamic Collaborative Mechanism.

Specifically, this model comprises three interrelated layers. **Data Layer: Aggregation and Integration of Diverse Data.** By aggregating internal university data—such as academic administration, student performance, and quality assurance data—with industry-side data on talent demand, technological trends, and job competency requirements, a data foundation for industry-education integration is established. **Analysis Layer: Intelligent Analysis and Decision Support.** Based on this data foundation, AI technologies such as machine learning and natural language processing are employed to conduct industry demand trend forecasting, talent competency supply-demand matching analysis, curriculum content alignment with job standards, and intelligent evaluation of teaching effectiveness. **Application Layer: Intelligent Reconstruction of Teaching Management Processes.** The results of intelligent analysis are integrated into the entire teaching management process—including program design, curriculum development, project evaluation, and quality monitoring—to achieve a paradigm shift in management: from "experience-driven" to "data-driven," from "passive response" to "proactive adaptation," and from "post-event evaluation" to "process empowerment."

Educational administration departments are no longer merely processors of administrative tasks but have become the "data hub" and "collaboration hub" connecting

industry needs with talent development. AI technology, acting as an "institutional intermediary," effectively reduces information asymmetry and coordination costs between schools and enterprises, shifting industry-education integration from "ad hoc collaboration" reliant on personal relationships to "institutionalized collaboration" based on data platforms.

6. Discussion

6.1 Theoretical Implications: From "Policy-Driven" to "Data and AI-Driven"

This study contributes a new theoretical perspective to research on industry-education integration. Existing studies have largely attributed the driving force behind industry-education integration to policy initiatives, specifically government efforts to promote school-enterprise collaboration through administrative directives and financial incentives [6,7]. This study reveals a new dimension of driving forces: industry-education integration driven by data and AI.

In this new mechanism, AI technology stimulates endogenous cooperation between schools and enterprises by reducing information search costs, improving matching accuracy, and enhancing process transparency. Enterprises have increased their willingness to cooperate because they can more accurately obtain information on talent supply that meets their needs and participate more conveniently in the talent development process; universities have enhanced their capacity for cooperation because they can more scientifically grasp industrial demands and manage collaborative projects more efficiently. To a certain extent, this compensates for the shortcomings of policy incentives, forming a beneficial supplement to policy-driven approaches.

This finding resonates with and expands upon the theory of collaborative governance. The collaborative governance framework proposed by Ansell and Gash [14] emphasizes the critical role of trust-building, commitment, and shared understanding in multi-stakeholder collaboration. This study demonstrates that AI technology can serve as a "trust accelerator," expediting the establishment of trust relationships among diverse stakeholders by providing transparent, objective data and traceable records of collaboration. AI-driven data sharing and process coordination essentially create an "institutionalized trust mechanism," reducing the overreliance of collaborative governance on personal relationships and interpersonal trust.

6.2 Practical Implications: A Pathway for Upgrading Digital Academic Administration

This study provides an actionable reference for the digital transformation of academic administration in applied undergraduate universities.

The leap from informatization to intelligence. Currently, academic affairs management at most universities remains in the "informatization" stage—digitizing paper-based processes to enable data recording and querying. This study indicates that true value creation occurs during the leap from informatization to "intelligence"—utilizing AI technology for in-depth data mining and intelligent analysis, transforming data from "records" into "insights" and moving from "retrospection" toward "prediction."

Taking industry-education integration as a breakthrough point. Academic administration involves numerous operational scenarios, and comprehensive intelligent

transformation faces resource constraints and path dependencies. This study recommends prioritizing "industry-education integration" as the primary scenario for intelligent transformation. The reasons are as follows: information asymmetry is most pronounced in industry-education integration scenarios, where the marginal value of AI empowerment is greatest; industry-education integration involves cross-departmental and cross-organizational collaboration, making the need for intelligent solutions most urgent; and the effectiveness of industry-education integration directly relates to the core mission of applied universities, making the significance of this transformation most pronounced.

Platform-Based and Standardized Development. The prerequisite for AI empowerment is the effective aggregation and standardization of data. Universities should prioritize the development of a unified industry-education integration management platform to consolidate industry-university cooperation data scattered across various departments and colleges, and establish standardized protocols for data collection, storage, and exchange. Platform development should adhere to the principle of "joint university-industry construction" to ensure seamless integration of industry-side data.

6.3 Institutional Implications: Strengthening the Hub Role of Academic Administration

Another key finding of this study is that, under the AI-driven model, the hub role of academic administration is significantly strengthened.

Traditionally, the initiative for industry-education integration was often dispersed among individual schools or even individual faculty members, with the Academic Affairs Office primarily serving an administrative approval role. AI empowerment has transformed this landscape. As data aggregation and intelligent analysis capabilities are centralized within the university-level management platform, the Academic Affairs Office's advantages in information acquisition, trend analysis, and resource allocation have become increasingly prominent. The Academic Affairs Office is transitioning from a "manager" to an "enabler"—by providing data insights and collaboration tools, it helps schools align more precisely with industry needs and manage collaborative projects more efficiently.

This transformation imposes new requirements on the university's internal governance structure. Universities need to affirm and strengthen the Academic Affairs Office's pivotal role at the organizational level, granting it corresponding data management authority and resource allocation powers; they need to establish new collaborative relationships between the Academic Affairs Office, the Information Center, secondary colleges, and industry-academic colleges; and they need to incorporate data governance capabilities into the competency models for academic affairs management personnel, conducting targeted training and capacity-building initiatives.

6.4 Challenges and Limitations: Technology Is Not a Panacea

While acknowledging the value of AI-enabled transformation, this study has also identified several practical challenges.

System Fragmentation. Currently, data silos persist among the university's internal academic affairs, research, human resources, and financial systems. Cross-system data

sharing and integration face obstacles such as inconsistent technical standards and difficulties in coordinating departmental interests. The management of industry-education integration requires the utilization of multi-source data, and system fragmentation severely limits the breadth and depth of AI analysis.

Uneven Digital Capabilities. Significant disparities in digital literacy exist among different schools and among faculty and administrators of varying age groups. Some faculty members have low acceptance of new technologies and are accustomed to traditional work methods; some administrators lack data analysis and application skills, making it difficult for them to effectively utilize AI tools. This capability gap may exacerbate developmental disparities between departments.

Lack of cross-domain data-sharing mechanisms. The ideal scenario for AI-enabled industry-education integration involves the two-way flow and integrated analysis of university and enterprise data. However, enterprises remain cautious about opening their internal data due to concerns over trade secrets and data security; similarly, institutional barriers hinder the open sharing of industrial and employment data held by government departments. The absence of cross-domain data-sharing mechanisms significantly diminishes the effectiveness of AI-enabled initiatives.

Concerns regarding algorithmic governance. As AI is increasingly applied in teaching and administrative decision-making, issues of algorithmic fairness, transparency, and interpretability have become increasingly prominent. AI-assisted decisions regarding program adjustments and course evaluations may harbor algorithmic biases, potentially adversely affecting specific disciplines or groups. Universities need to establish algorithmic governance mechanisms to ensure the fairness, transparency, and accountability of AI applications.

Limitations of the research methodology. As a single-case study, the findings of this research are constrained by the specific context of Wenzhou University of Technology, and their generalizability requires validation through comparative multi-case studies. The research data primarily comes from institutional documents and participant observation, which, while helpful for gaining a deeper understanding of management practices, provide relatively limited direct input from stakeholders, particularly students and industry partners. Future research could supplement this with broader interviews or the addition of questionnaire surveys.

7. Conclusion

Using Wenzhou University of Technology as a case study, this research systematically examines how AI technology can be integrated into the teaching and management practices of applied undergraduate universities and how it can empower the deepening of industry-education integration. The study reached the following main conclusions.

AI technology plays a threefold enabling role in the teaching management of industry-education integration. It enhances the efficiency of university-enterprise collaboration by reducing information asymmetry and communication costs through data sharing and intelligent matching; supports data-driven decision-making by providing scientific basis for program development, curriculum design, and plan optimization; and optimizes management processes by improving the administrative efficiency of teaching reform projects, curriculum development, and quality monitoring

through automation and intelligent systems.

Under the empowerment of AI, educational administration has undergone a role transformation. Educational administration departments have transitioned from administrative task handlers to data hubs and collaboration centers, significantly elevating their strategic status in industry-education integration and providing organizational-level solutions to address the "fragmentation" dilemma in this process.

AI-driven industry-education integration faces three-fold constraints: systemic, capability, and institutional. System fragmentation limits data aggregation and integrated analysis; uneven digital capabilities may lead to new development gaps; and the absence of cross-domain data-sharing mechanisms constrains the depth and breadth of AI empowerment. Technological empowerment does not occur automatically; it requires supporting institutional development and capacity building.

The three-tiered AI-driven model—"data layer-analysis layer-application layer"—distilled in this study provides a conceptual framework for understanding the intrinsic mechanisms of AI-empowered industry-education integration, as well as a reference path for practical exploration by similar universities.

Based on the research findings, this study offers the following recommendations.

For university administrators: The intelligent transformation of teaching management should be incorporated into the core agenda of the institution's digital transformation strategy, with a priority on advancing AI empowerment through industry-education integration scenarios. It is recommended to establish dedicated data governance positions or departments to coordinate the collection, management, and analysis of industry-education integration data. Efforts should be intensified to train administrative staff in digital literacy to narrow the digital capability gap.

For policymakers: It is recommended to issue specialized guidelines and construction standards for AI-enabled industry-education integration to provide directional guidance for university practices. Efforts should be made to establish data-sharing mechanisms among government, universities, and enterprises to promote the integrated application of industrial and educational data while ensuring data security. A special fund for AI-enabled industry-education integration could be established to support universities in developing relevant platforms and pilot projects.

For Partnering Enterprises: It is recommended that, while protecting trade secrets, enterprises moderately open access to de-identified industrial data interfaces to jointly build a data middle platform for industry-education integration with universities. Enterprises can view participation in AI-enabled industry-education integration as a key avenue for fulfilling social responsibility and enhancing their employer brand, while gaining tangible benefits such as optimized talent supply and solutions to technical challenges through collaboration.

AI-driven industry-education integration is a burgeoning field. As technology continues to evolve and applications deepen, the forms and functions of educational management will continue to transform. Applied undergraduate universities should embrace this transformation with an open yet prudent attitude, fully leveraging the benefits of technology to overcome practical challenges while remaining vigilant against new issues that may arise from its application. Ultimately, they should achieve an organic integration of technological empowerment and humanistic care, cultivating

high-quality, application-oriented talent truly suited to the demands of the intelligent era.

References

- [1] Ministry of Education of the People's Republic of China. (2026). Action plan for "Artificial Intelligence + Education".
- [2] Gu, Y. A. (2020). Industry-education integration in application-oriented universities: Strategic significance, logical system, and promotion strategies. *Research in Higher Education of Engineering*, (4), 124–129.
- [3] Liu, X. (2021). Multi-collaborative governance of industry-education integration in application-oriented undergraduate education: Logic, dilemmas, and pathways. *Journal of National Academy of Education Administration*, (6), 54–61.
- [4] Qi, Z. Y., & Wang, S. Q. (2021). How can industry-education integration be deepened? From the perspective of institutional supply and demand. *Journal of National Academy of Education Administration*, (5), 78–85.
- [5] Wang, Z. J., & Liu, Z. M. (2021). Industry-education integration: Connotation, value, and promotion pathways. *Educational Research*, 42(7).
- [6] Chen, J., & Zhang, Y. J. (2023). Policy analysis of industry-education integration in China's higher education from the perspective of policy instruments. *Heilongjiang Researches on Higher Education*, 41(3), 64–71.
- [7] Yuan, X. H., & Zhang, M. (2022). Analysis of the evolution characteristics and development trends of China's industry-education integration policy: Based on 104 policy texts from 2013–2021. *China University Science & Technology*, (10), 40–45.
- [8] Chen, X. (2020). Research on the driving forces of industry-education integration in application-oriented universities. China Social Sciences Press.
- [9] Pan, M. Y., & Zhou, Q. Y. (2019). From industry-university-research cooperation to industry-education integration: The path transformation of application-oriented talent cultivation in Chinese universities. *Journal of Higher Education*, 40(4), 1–6.
- [10] Zhou, E. Y. (2020). Research on talent cultivation models and evaluation systems for high-level application-oriented undergraduate programs. Beijing Institute of Technology Press.
- [11] Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education: Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), Article 39.
- [12] Guo, D. G., & Wang, X. Y. (2022). The dilemma and breakthrough of industry-education integration curriculum construction in application-oriented universities: A case analysis based on the new-generation information technology industry. *Research in Higher Education of Engineering*, (2), 115–121.
- [13] Yin, R. K. (2018). Case study research and applications: Design and methods (6th ed.). Sage Publications.
- [14] Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571.