From Research to Curriculum: Implementing an Integrated Model for Finance and Management Programs in Chinese Vocational Colleges

Di Xiang[1]*, Rui Gao[2]

[1] School of Finance and Management, Shanghai Technical Institute of Electronics and Information, Shanghai, China
[2] Hengdian College of Film & Television, Jinhua, Zhejiang, China

Abstract: As cutting-edge technologies such as big data and artificial intelligence continue to reshape the financial industry, higher vocational colleges are facing increasing demands for educational innovation in finance and management programs. This paper focuses on optimizing the pathways for integrating research outcomes into finance education under the big data era. It systematically outlines the construction process of an integrated mechanism encompassing "research outcomes — curriculum system — practical teaching — faculty development." Through curriculum development, project-based training, experimental platform building, and faculty capacity enhancement, initial practices demonstrate that this mechanism effectively promotes curriculum innovation and enhances students' practical competencies. Drawing on case analyses and feedback data, the paper discusses the strengths, limitations, and international applicability of this approach, and concludes with recommendations for strengthening university-industry collaboration and building interdisciplinary teams. This study provides practical insights for China and the global vocational education community in achieving deep integration of research and teaching during digital transformation.

***Keywords*:** big data; research-driven teaching; financial services and management; vocational colleges; curriculum innovation; industry-education integration

1. Introduction

In recent years, advanced digital technologies such as big data and artificial intelligence have profoundly transformed the global financial landscape and reshaped the skill sets required of industry professionals. According to UNESCO (2022), digital transformation is driving the financial sector from a traditional "experience-driven" paradigm toward "data-driven" and "intelligent decision-making" models[1], raising new requirements for vocational finance curricula and teaching approaches. Meanwhile, effectively aligning vocational education with the demands of emerging industries has become a shared priority in both international academic and policy circles. The latest report by the OECD (2023) highlights the need for countries to accelerate the advancement of "research-driven teaching" and deep industry-education integration, aiming to build innovative vocational education systems for the future[2].

In China, policies such as "industry-education integration, research-education synergy, and university-enterprise cooperation" have been explicitly incorporated into national education strategies [3](Ministry of Education of the People's Republic of China, 2022), becoming key drivers for teaching reform in higher vocational colleges. Taking finance and management as an example, the rapid rise of fintech, intelligent investment advisory, and blockchain-based payment solutions has significantly increased industry demand for highly skilled and versatile technical professionals [4](Xie et al., 2022). However, there remain structural disconnects between professional teaching and industry practice in many colleges, including outdated curricula, limited conversion of research outcomes into teaching resources, and insufficient faculty adaptation to new technologies.

Against the backdrop of pervasive big data and intelligent finance, systematically rethinking and innovating the pathways for integrating research outcomes into finance and management education not only addresses the changing talent needs of the digital economy era but also holds important implications for improving the quality of vocational education and facilitating international exchange of best practices.

2. Related Work

Research-driven teaching has become a focal point in international higher education in recent years. Developed countries in Europe and North America attach great importance to deeply integrating cutting-edge academic research with undergraduate and vocational education. The UK Quality Assurance Agency for Higher Education (QAA, 2018) stipulates that universities should establish integrated curricula connecting research[5], teaching, and practice, encouraging faculty to

bring the latest research findings and industry cases into the classroom, thus enhancing students' innovation and practical abilities[6] (Healey & Jenkins, 2009). In the United States, some applied technology universities and community colleges implement project-based learning (PBL) and scenario-based simulation training, guiding students to participate in faculty research projects and authentic industry cases to strengthen the linkage between theory and practice[7] (Brew, 2012).

In China, research-driven teaching has increasingly become a key direction in vocational education reform in recent years. Leveraging initiatives such as the "Double High-level Plan", the development of emerging engineering and new liberal arts, and multi-level industry-education integration policies, vocational colleges have actively explored transforming faculty research projects into teaching cases, laboratory training, and innovation and entrepreneurship curricula [8](Shi et al., 2023). For finance-related programs, some institutions have established "financial big data labs" and "fintech simulation platforms" to embed research project outcomes throughout the teaching process, significantly enhancing students' hands-on skills in fintech applications and data analysis tools[9] (Chen et al., 2025). Many colleges are also actively promoting university-industry collaboration and co-building research-training bases, forming an innovative mechanism that integrates research, teaching, and enterprise involvement.

Nevertheless, compared to the mature industry-academia-research collaboration systems in Europe and North America, vocational colleges in China still face several challenges. For example, the integration of research outcomes into curricula often takes the form of case studies or technical demonstrations, lacking deep project-based practice and apprenticeship training based on real enterprise scenarios[10] (Zhang et al., 2023). In addition, mechanisms for linking faculty research and enterprise R&D are not yet fully developed, and supporting policies for intellectual property, data resources, and performance incentives need improvement (OECD, 2023). By comparison, European and American vocational institutions place greater emphasis on cross-disciplinary collaboration, co-creation between faculty and students, and deep industry participation, focusing on cultivating students' problem-solving abilities and entrepreneurial spirit, while Chinese institutions tend to focus more on enhancing curriculum relevance and enriching teaching resources.

Overall, research-driven teaching has become an important trend in international vocational education development. Its effective implementation relies on supportive policies, faculty capability enhancement, industry-education collaboration, and curriculum innovation. Looking ahead, how to further deepen the application and conversion efficiency of research outcomes in vocational finance education in China deserves ongoing attention and study.

3. Methods / Implementation Pathways

To effectively integrate research outcomes into the finance and management education of vocational colleges in the era of big data, this study proposes an integrated transformation mechanism encompassing four dimensions: "research outcomes—curriculum system—practical teaching—faculty development." This mechanism not only emphasizes the identification and conversion of research achievements but also focuses on dynamic linkage and continuous feedback among all links, thereby achieving multi-stakeholder participation, full-process coverage, and an iterative innovation loop in teaching. The main pathways are as follows (see Table 1 and Figure 1):

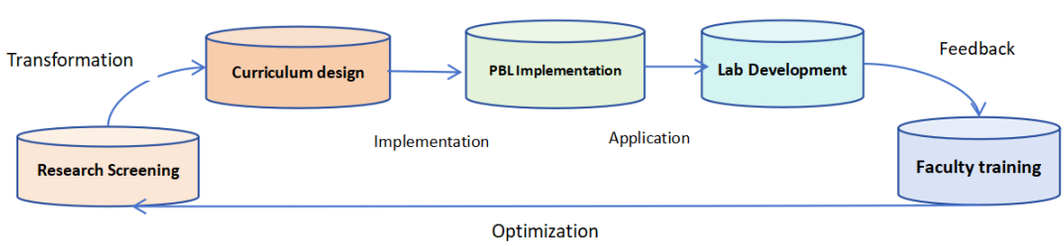

Figure 1. Flowchart of the Integrated Implementation Pathway

3.1 Systematic Transformation of Research Outcomes into Curriculum Content.

Leveraging deep collaboration between the university and industry partners in fintech, a dynamic database of research outcomes is established, covering areas such as big data, artificial intelligence, and blockchain. Each semester, the teaching and research team collaborates with industry mentors to select the latest research papers, patents, and application cases, and classifies and adapts the content according to talent development goals. The fundamental modules focus on conceptual explanations and algorithmic mechanisms, the advanced modules emphasize tool use and data processing, and the innovation application modules target cutting-edge scenarios and integrated case studies. For example, in the "Financial Data Analysis" course, the entire process of big data modeling in real credit risk control projects is introduced. Data and models from

faculty-led or industry research projects are directly transformed into classroom experiments or case analyses, enhancing both the timeliness and real-world relevance of the course content.

3.2 Research-Driven Project-Based and Case-Based Teaching.

By fully utilizing the resource advantages of teachers' involvement in enterprise or social research projects, real data, authentic business scenarios, and decision-making processes are incorporated into the classroom. A progressive set of practical tasks is designed, ranging from simple data organization and visualization to complex modeling, optimization, and results interpretation. For example, student teams are organized around themes such as "Simulated Bank Risk Control" and "Inclusive Finance Data Insights," completing data collection, cleaning, modeling, evaluation, and application in phases — with a focus on teamwork and innovation capability development. Students are encouraged to independently review the latest research findings and, using tools such as Python, R, and Tableau, integrate theoretical knowledge with real business problems, thereby achieving effective linkage among teaching, research, and industry. Senior students may also participate in faculty-led external projects or industry-commissioned assignments, further improving project management and cross-disciplinary communication skills.

3.3 Practice Platform and Laboratory Capacity Building.

Efforts are increased to expand and open up both on-campus and off-campus experimental environments and training bases, promoting the transformation of research outcomes into system platforms that support large-scale teaching and simulation. Using virtual simulation technologies, a cloud-based financial big data training platform is constructed, covering multiple modules such as risk control, credit, wealth management, and compliance. Students can simulate tasks such as banking operations, loan approval, and intelligent investment online. The platform integrates proprietary algorithm models, data sets, and industry-standard processes developed by the research team, enabling multidimensional online-offline interaction and adaptive learning paths. Some laboratories are co-built with leading enterprises, where students benefit from site visits, enterprise lectures, and practical internships, thereby deepening their understanding of fintech workplaces and professional experience.

3.4 Dual-Track Faculty Capability Enhancement.

A comprehensive faculty development system is established around the theme of "research-driven teaching." Multiple annual workshops and training sessions focus on research translation, case development, and curriculum innovation, featuring experts from leading domestic and international universities and industry. Through joint university-enterprise placements and collaborative projects, faculty are encouraged to "go out" to broaden perspectives and introduce new resources, while also inviting experts "in" for high-level lectures and hands-on guidance. Internally, a project accountability system and results-sharing mechanism are implemented, strengthening collaboration and feedback among teachers in data collection, platform construction, and case development. Faculty research outputs are incorporated into teaching performance evaluations, and the improvement of faculty capacity is dynamically tracked, fostering a high-quality teaching team empowered by both teaching and research.

Table 1. Summary Table of the Integrated Implementation Pathway

Stage	Key Initiatives	Objectives & Outcomes
Research Outcome Review	Regularly select big data, AI projects/papers	Screen 5–10 high-value items for conversion
Curriculum Development	Embed into theoretical, practical, and elective modules	Develop/update 2–3 research-based courses annually
Project/Case Design	Prototype real research data and business scenarios	Build a case library, design 2–3 simulation projects
Practice Platform Build	Construct online-offline integrated fintech labs	Cover more than 80% of students in the program
Faculty Development	Training, team building, enterprise placement, academic salons	Increase faculty capability by 20% annually

4. Case Study / Results

To comprehensively assess the effectiveness of the above integrated mechanism, this study tracks and analyzes a pilot curriculum reform in the Finance Services and Management program at a vocational college during the 2023–2024 academic year. The teaching and research team identified five provincial-level or higher research project outcomes, two authorized patents, and three industry application cases in the field of "financial big data risk control and intelligent lending," and incorporated these into a curriculum system featuring Big Data Risk Control Practice, Financial Data Mining, and Intelligent Wealth Management Case Analysis, systematically integrating the latest faculty research.

During implementation, the course team adopted a blended approach of "theory instruction + practical case operation + project-based learning." Students were grouped to participate in a simulated "credit risk scoring" project based on real university-industry collaborative data, completing the full cycle of data collection, cleaning, variable construction, algorithmic modeling, model validation, visualization, and results reporting. Through hands-on activities, students not only improved their proficiency with big data tools (such as Python, SQL, Tableau), but also learned to apply research models to real-world business analysis and decision support.

Stage assessments and learning feedback demonstrated significant curriculum innovation outcomes:

(1) Increased Learning Interest and Autonomy: Nearly 80% of students reported that, after systematic training, they were able to proactively consult industry reports and academic literature, with a marked increase in interest in big data analytics and fintech. Many students voluntarily participated in innovation and entrepreneurship projects or discipline competitions, with some teams winning provincial awards.

(2) Significant Improvement in Professional Skills: In the financial industry simulation skills test (including model building, data analysis, and results interpretation), students in the pilot class outperformed traditional classes by an average of 12.5%, and demonstrated stronger tool proficiency and logical reasoning when solving practical business problems.

(3) Enhanced Industry-Education Integration and Employability: With joint university-enterprise mentorship, enterprise mentors participated deeply in project design and evaluation. Students gained experience in data literacy, teamwork, and problem-solving within real business contexts. Some outstanding students were offered internships and preferential hiring by enterprises as a result of their strong performance in practical projects.

(4) Faculty Team Capacity and Resource Iteration: The project promoted interdisciplinary collaboration among teachers, with the course case library and training datasets being dynamically updated—forming a continuous cycle of "project–curriculum–experiment–feedback–innovation." Faculty achieved new breakthroughs in course development and teaching methods, effectively enhancing their ability to translate research outcomes and drive curriculum innovation.

Overall, the integrated transformation mechanism has achieved an organic fusion of research outcomes with curriculum development, practical teaching, and faculty capacity building, greatly enhancing finance students' innovation awareness, practical ability, and professional competence. The results provide valuable insights and practical pathways for vocational colleges to deepen industry-education integration and advance educational digitalization.

5. Discussion

The integrated transformation mechanism of "research outcomes — curriculum system — practical teaching — faculty development" proposed and implemented in this study offers a systematic solution and practical model for the educational reform of finance and management programs in vocational colleges under the era of big data. Theoretically, this mechanism addresses the global trend in modern vocational education toward dynamic curriculum updates, practice-oriented learning, and the cultivation of innovation and entrepreneurship. It embodies the interactive logic of "research advancing teaching and teaching reinforcing research," which is strongly aligned with the principles advocated by international organizations such as OECD (2023) and UNESCO (2022) regarding research-driven vocational education and the development of innovative talent. This approach provides both a theoretical foundation and methodological innovation for Chinese vocational colleges to benchmark and upgrade their talent cultivation models internationally.

From a practical perspective, pilot implementation demonstrates that the mechanism not only facilitates the efficient translation of faculty research outcomes into classroom teaching but also drives the ongoing iteration of the curriculum system and the deep innovation of project-based learning models. Students are able to experience the entire process—from data collection and modeling to results presentation—within authentic data environments and real business scenarios, which significantly enhances their technical proficiency, teamwork, and capacity for creative problem-solving. At the same time, faculty members benefit from continuous upskilling in project development, platform construction, and case-based teaching, fostering a collaborative culture and strengthening university-industry linkages. The participation of enterprise mentors further narrows the gap between classroom and industry, improving the alignment between talent training and market demand.

Nevertheless, several challenges have emerged during the mechanism's promotion and deepening. Firstly, the depth and breadth of university-industry collaboration remain limited. Due to issues such as data compliance and information security on the enterprise side, some research outcomes are difficult to achieve true end-to-end, scenario-based application, resulting in certain course content remaining at the level of case demonstration and simulation. Secondly, the integration capacity of faculty across "teaching–research–industry" still requires strengthening. Some teachers lag behind top international institutions in terms of big data processing, model algorithm development, and business acumen, with limited interdisciplinary backgrounds and enterprise experience. In addition, issues related to intellectual property management,

shared data resources, and project performance evaluation within teams have yet to be fully resolved, impacting ongoing optimization and sustainable outcomes.

Importantly, this mechanism shows strong generalizability and replicability, especially for fields such as finance, accounting, and information technology, where technical expertise and real-world practice are closely intertwined. Successful implementation and scaling depend on three key factors: (1) the flexibility and supportiveness of institutional governance; (2) the openness and accessibility of regional industry resources; and (3) the alignment of local policies with industry standards. There is also much to learn from the mature industry-academia-research platforms in Europe and North America; continued innovation in systems and resource integration, with multi-stakeholder, multi-level, and multi-pathway collaboration, will be essential to creating a new paradigm for talent development in Chinese vocational education that is both distinctive and internationally competitive.

In summary, this mechanism not only provides a practical model for innovation in vocational finance education in the age of big data but also offers a scalable and sustainable pathway for the systemic transformation, digital upgrade, and internationalization of China's vocational education sector.

6. Conclusion and Future Work

This study systematically proposed and implemented an integrated mechanism for research-driven teaching in finance and management education at vocational colleges in the era of big data. The mechanism has been shown to significantly enhance curriculum innovation, practical teaching effectiveness, and faculty capacity. As a result, it offers a "China experience" that is valuable for vocational education systems worldwide as they confront the challenges of digitalization and intelligent transformation.

For international vocational education, promoting the deep integration of research outcomes into professional curricula not only helps improve students' comprehensive abilities for the future, but also lays the foundation for university-industry collaborative innovation and deep industry-education integration. The practical results of this study are highly consistent with mainstream international concepts of vocational education, especially in providing concrete guidance on project-based teaching, blended team building, and the development of practice-oriented platforms.

Suggestions for future research include: (1) Deepening university-industry collaboration to explore seamless integration between research outcomes and real business scenarios; (2) Strengthening interdisciplinary team building to enhance faculty capability across the entire chain of teaching, research, and industry engagement; (3) Conducting longitudinal and comparative studies across regions and institutions to accumulate richer data and case samples; and (4) Focusing on issues such as data privacy, evaluation mechanisms for research outcomes, and intellectual property protection, thereby providing both theoretical and practical support for high-quality development and international cooperation in vocational education.

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