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Review Article

Research on the Optimization of the Three-In-One Talent Training Mode of Learning-Research-Application: Based on AI Technology

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Abstract: In the era of rapid AI development, optimizing the integrated talent cultivation model of 'learning, research, and application' to meet the demands of the new era has become a critical issue. This paper uses the business administration major as a case study to explore the application of AI technology in this model. It first examines how AI technology enhances the learning, research, and application processes, including intelligent optimization of the learning process, innovative support for research, and deepening practical applications. The paper then constructs an AI-based talent cultivation model. The study also highlights practical challenges, such as technical integration barriers, difficulties in dynamically adjusting the training model, and the imperfections in multi-party collaboration mechanisms The war puts forward the optimization strategy, that is, deepening technology integration, realizing dynamic adjustment and continuous improvement of training mode, expanding multi-party cooperation, providing theoretical and practical basis for cultivating high-quality talents with innovation ability and practical ability, and promoting the high-quality development of business administration education.

Keywords: AI Technology, "Learning, Research and Application", Talent Training.

0. INTRODUCTION

Amid the digital wave, artificial intelligence (AI) technology is penetrating all sectors of the socio-economy at an unprecedented pace, leading to profound changes in the business management industry [1]. The traditional talent cultivation model can no longer meet the industry's urgent need for composite business management professionals with AI application skills and innovative thinking. In this context, exploring the optimization path of a learning-research-application's integrated talent development model based on AI technology has become a key issue in the reform of business management education.

Taking the business administration major as an example, this field is crucial for cultivating management talent. The quality of talent cultivation directly impacts corporate competitiveness and industry development [2]. In the AI era, business administration professionals must have a solid grasp of management theory and the ability to apply AI technology to solve practical problems. Currently, there are several issues in the training of business administration professionals, such as the insufficient integration of AI technology with the training process, the lack of a dynamic adjustment mechanism in the training model, and the inadequate collaboration between universities, enterprises, and research institutions.

To deeply explore the optimization strategies for the 'learning, research, and application' integrated talent development model based on AI technology. This involves constructing a 'three-dimensional four-stage' alignment model and a 'five-domain six-environment' application scenario expansion system to enhance the seamless integration of AI technology with the training process and broaden its application scenarios. Establish a 'three-source four-loop' feedback optimization mechanism and a 'dual-track three-driven' dynamic update model to achieve continuous adjustment and improvement of the training model. Develop a 'three-dimensional five-link' collaborative innovation mechanism and a 'three-integration three-promotion' cooperation and exchange system to deepen collaboration among various parties. It is hoped that through the implementation of these strategies, it will provide valuable insights for the talent development of business administration and other related fields by

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learning from the benefits, we can cultivate more high-quality and multi-skilled talents who are adaptable to the needs of the development of the times, and promote the innovation, growth and transformation of the business administration industry.

1. The Enabling Mechanism of AI Technology in Learning-Research-Application's Talent Training

1.1 Intelligent Optimization of the Learning Process by AI Technology

From a macro theoretical perspective, the intelligent optimization of AI technology in the learning process of business administration reflects a profound transformation in educational concepts from the traditional "teacher-centered" approach to a "student-centered" one. During the learning process, AI technology, with its powerful data mining and analysis capabilities, can accurately understand the learning characteristics of each student [3]. Based on precise data, personalized learning paths are tailored for students to optimize the allocation of learning resources and avoid the drawbacks of the "one-size-fits-all" model in traditional teaching. In terms of course learning, AI can dynamically adjust the teaching content and difficulty based on students' real-time learning progress and performance. For the complex management theories and case analyses in the field of business administration, AI simulates various business scenarios, allowing students to conduct practical operations and decision-making drills in a virtual environment, thereby deepening their understanding and application of knowledge. AI can also utilize natural language processing technology to achieve intelligent Q&A and tutoring, providing students with timely and accurate assistance, and significantly enhancing learning efficiency and effectiveness.

1.2 Innovation Support of AI Technology in Research

In the research phase of business administration, AI technology provides students with innovative research methods and tools, significantly enhancing the depth and breadth of their studies [4]. Traditional business administration research often relies heavily on extensive data collection and analysis, but the process of data acquisition and processing is frequently cumbersome and prone to errors. The advent of AI technology has made data collection and analysis more efficient and accurate. Through machine learning algorithms, AI can uncover valuable insights and patterns from vast amounts of commercial data, providing robust data support for student research.

AI technology can assist students in conducting literature reviews and constructing knowledge graphs. When faced with a vast amount of academic literature, AI can quickly filter and refine the relevant literature for the research topic, presenting the connections and research threads through knowledge graphs, helping students better understand the latest trends and directions in their field. Additionally, AI can aid students in building models and conducting simulations, providing more scientific and rigorous methods and tools for their research.

1.3AI Technology Promotes the Deep Expansion of Application Practice

For students majoring in business administration, applying their knowledge to real-world business scenarios is crucial for developing the ability to integrate learning, research, and application. The application of AI technology provides a broad platform for students to expand their practical experience [5]. In corporate settings, AI simulates real-world business operations, allowing students to participate in strategic planning, marketing, financial management, and other aspects, thereby enhancing their practical skills and decision-making abilities.

AI technology can also facilitate the deep integration of industry, academia, and research collaboration. Through AI platforms, universities can establish closer ties with businesses, achieving resource sharing and complementary strengths. Students can engage in real-world projects within companies, applying their knowledge and research findings to practical scenarios. They can also gain access to the latest business insights and hands-on experience from these enterprises, thereby enhancing their overall competence and competitiveness.

2. Construction of a Three-In-One Talent Training Model Based on AI Technology

2.1 Deep Study Mode under Integrated Knowledge Architecture

To break down the barriers between traditional disciplines and build an interdisciplinary knowledge network, the business administration major should integrate multiple fields such as economics, management, sociology, and psychology. In terms of curriculum design, multidisciplinary courses like 'Economic Psychology and Marketing' and 'Organizational Management from a Sociological Perspective' should be introduced. These courses help students examine business management issues from various disciplinary perspectives, broaden their thinking, and lay a solid foundation for in-depth research [6].

Driven by problem-oriented approaches, the program introduces real-world business cases and complex problem scenarios to facilitate in-depth study and research. Traditional enterprises undergoing market transformation are selected as case studies, where students must integrate knowledge from strategic management, marketing, financial management, and other areas to analyze the challenges faced by these companies, propose transformation strategies, and conduct feasibility assessments. Throughout this process, students delve into relevant theoretical knowledge, applying it to solve practical problems, thereby achieving a deeper understanding and elevation of their knowledge.

Establish a mentor-student research community, where mentors with rich practical experience and deep academic expertise are assigned to students. Mentors and students form research teams to undertake research projects collaboratively. During the research process, mentors play a guiding role, assisting students in developing research plans, selecting methods, and analyzing results. The community encourages collaboration and communication among students, fostering an environment of mutual learning and inspiration. Through this research community, students continuously enhance their research skills and teamwork abilities through hands-on practice.

2.2 Project Practice Expansion Mode of Industry-University-Research Linkage

In terms of project selection, the approach closely aligns with the actual needs of enterprises and industry trends. Universities and enterprises establish long-term cooperative relationships to gain a deep understanding of the challenges and issues faced by enterprises in their production and operations. Together, they identify practical and targeted projects. In response to the current trend of digital transformation, initiatives such as 'Enterprise Digital Marketing Strategy Planning' and 'Supply Chain Optimization for Intelligent Manufacturing Enterprises' are launched to address real-world problems for enterprises and provide students with exposure to cutting-edge technologies and management concepts in the industry [7].

During the project implementation, a collaborative model involving universities, enterprises, and research institutions is adopted. Universities provide theoretical support and talent development, enterprises offer practical venues and project resources, and research institutions provide technological innovation and professional guidance. Students play a crucial role in the project, participating in the entire process from research to implementation. In the 'Enterprise Digital Marketing Strategy Planning' project, students, guided by university teachers, use marketing theories and data analysis methods to conduct research and analysis on the enterprise's market environment and customer needs. With the cooperation of the enterprise's marketing team, they develop digital marketing strategies, develop digital marketing platforms and tools with technical support from research institutions.

Establish a project evaluation and feedback mechanism. After the project is completed, an evaluation team composed of enterprises, universities, and research institutions will evaluate and accept the project results. The evaluation indicators include the completion quality and economic benefits of the project, as well as the performance and growth of students in the project. Based on the evaluation results, promptly summarize the experiences and lessons learned to provide references and directions for improvement for the implementation of subsequent projects and the cultivation of students.

Students are encouraged to transform the practical results of projects into innovation and entrepreneurship projects. For projects with market potential and innovation value, universities can provide entrepreneurial incubation services and financial support to help students transform the project results into actual products or services, and cultivate students' innovation and entrepreneurship spirit and practical ability [8].

2.3 Comprehensive Quality Improvement Model of Reflective Practice Cycle

The practical component offers students a variety of opportunities, including internships in companies, social practices, and simulated business operations. Through these experiences, students gain valuable insights, identify issues, and gather material for reflection [9]. During their internships, students can gain firsthand experience with corporate management models, understand corporate culture and values, and face real-world challenges such as interpersonal relationship management, coping with work pressure, and decision-making errors.

The reflection phase encourages students to deeply reflect on and analyze the experiences and issues encountered during their practical activities. Through methods such as writing reflective diaries, group discussions, and individual interviews, students are guided to organize their thought processes and behavioral patterns, identifying problems and areas for improvement. In their reflective diaries, students document their thought processes, decision-making, and outcomes when handling specific tasks, analyzing where they excelled and where they need to improve [10].

Based on the reflection results, students should develop an improvement plan and apply it in their next practice. When formulating this plan, they should set clear goals, define measures, and establish timelines, continuously adjusting and refining their approach during the process. Suppose students identify deficiencies in their communication skills during reflection. In that case, they should develop a specific plan to enhance these skills, such as participating in communication training or actively engaging with colleagues and clients, and continuously testing and improving their communication effectiveness in practice.

3. Analysis of Practical Challenges of the "Learning-Research-Application" Three-In-One Talent Training Model Based on AI Technology

3.1 Challenges of Technology Convergence

3.1.1AI Obstacles between Technology and Training

In the process of trinity talent cultivation of "study, research, and application" in the business administration major, there are obvious obstacles in the docking of AI technology and each training link. In terms of teaching links, the traditional curriculum system has strong stability and continuity, and there are natural

difficulties in integrating with AI technology. Most of the existing courses are based on the conventional business administration theory, but the teaching contents, methods, and evaluation system find it difficult to accept the changes brought by AI technology. The case teaching method is a standard method in business administration teaching, but most of the cases lack in-depth analysis of the application of AI. It is difficult for students to understand the role of AI in the actual business scene.

In the realm of scientific research, AI technology demands interdisciplinary knowledge. However, business management students have a relatively narrow knowledge base. They lack a solid foundation in fields closely related to AI, such as mathematics and computer science, making it challenging for them to undertake AI-based research projects independently. Additionally, the allocation of research resources at universities has not adequately addressed the needs of AI technology, such as the lack of advanced computing equipment and specialized AI databases, which restrict students' ability to use AI technology for research exploration.

In the practical training phase, there is a discrepancy between the talent development goals of enterprises and universities. Enterprises prioritize employees who can immediately use AI tools to solve real-world problems, whereas universities, while equipping students with theoretical knowledge, often fall short in practical skills and in integrating AI technology into business management practices. Due to concerns over commercial secrets and data security, enterprises impose numerous restrictions on students' access to and use of their AI systems, hindering students from fully applying their AI knowledge in practice.

3.1.2AI Application Scenario Expansion Constraints

In terms of technology, the complexity and uncertainty of AI technology pose significant barriers. AI algorithms lack interpretability, which limits their application in business management scenarios that require detailed result explanations, such as decision support systems. In strategic decision-making, managers need a clear understanding of the logic and basis behind decisions. However, the 'black box' nature of AI algorithms makes it difficult to use them with confidence.

At the level of educational concept, university teachers do not realize the importance of AI technology in talent training and still adhere to traditional teaching concepts and methods. They are worried that the introduction of AI technology will disrupt the existing teaching order and increase the difficulty of teaching, so they hold a conservative attitude towards the expansion of AI application scenarios.

The lack of industry standards and norms in the market environment results in a lack of unified guidance and constraints for AI applications in business management. The significant differences in how different companies apply AI lead to students struggling to develop a systematic understanding and set of skills during their learning and practical experiences. This also complicates the collaboration between universities and enterprises in AI application education.

3.2 Challenges of the Dynamic Adjustment of Training Mode

3.2.1 The Feedback Mechanism is Not Perfect

The effective feedback mechanism is the key to the dynamic adjustment of the training model, but there are obvious defects in the feedback mechanism of the business administration major in colleges and universities. In terms of student feedback, although the school has set up a variety of feedback channels, such as students' evaluation of teaching, seminars, etc., the channels are often more in form than in content. Students' feedback primarily focuses on superficial problems, such as teachers' teaching attitude and teaching methods, but lacks deep thinking and valuable suggestions on the overall design of the training mode and the rationality of the curriculum system. The school does not deal with the students' feedback in a timely and effective manner, which leads to the students losing their enthusiasm for feedback.

In terms of enterprise feedback, there is a lack of a regular communication mechanism between universities and enterprises. During the recruitment and employment of graduates, companies often find a gap between students' abilities and their needs, but this information is challenging to convey to universities in a timely and accurate manner. Universities usually lack first-hand data from enterprises when adjusting their training models, leading to a disconnect between these models and market demands.

In terms of industry feedback, universities do not conduct in-depth tracking and research on industry development trends. While some universities do pay attention to industry reports and news, they lack forward-looking analysis and judgment of industry trends. The role of industry associations and professional institutions in talent cultivation has not been fully realized, and the collaboration between universities and industry organizations is insufficient, making it difficult for universities to incorporate the latest industry needs and technological applications into their training programs.

3.2.2 Difficulty in Adapting to Changes in Industry Demand

With the rapid development of technology and the continuous changes in the market environment, the demand for talent in the business administration industry is also evolving rapidly. The training mode in colleges and universities has a lag and is challenging to adapt to changes quickly. In terms of course updates, the update cycle of course Settings and teaching contents in colleges

and universities is relatively long, and generally requires going through a cumbersome approval process. This makes it difficult for some emerging AI technologies and management concepts to be integrated into the curriculum system promptly, and there is a time gap between the knowledge students learn and the actual demands of the industry. In terms of the construction of the teaching staff, the knowledge structure and teaching ability of university teachers are also challenging to keep up with the changes in industry demands. Many teachers lack practical working experience in enterprises and have an insufficient understanding of the latest development trends in the industry, thus being unable to integrate the latest AI application cases and practical experience into their teaching. The school's support for teachers' training and development is insufficient, making it difficult to motivate teachers to continuously enhance their capabilities to adapt to the changing demands of the industry.

3.3 Challenges of Multi-Party Collaboration

3.3.1 The Collaborative Innovation Mechanism Is Not Perfect

The integrated approach of 'learning, research, and application' in talent development requires collaborative innovation among universities, enterprises, and research institutions. However, the current collaborative innovation mechanisms among these three parties face numerous challenges. The distribution of benefits is often unreasonable, with universities focusing on academic achievements and talent development, enterprises prioritizing economic benefits and market competitiveness, and research institutions emphasizing scientific breakthroughs and technological innovation. Due to differing interests in cooperative projects, it is not easy to reach a consensus on benefit distribution, which reduces the enthusiasm for collaboration. The issue of intellectual property rights ownership is also a significant barrier to collaborative innovation, particularly in AI technology projects, where defining and attributing intellectual property rights can be quite complex. Colleges and universities, enterprises, and scientific research institutions all hope to obtain more rights and interests in intellectual property. Disputes can easily arise in the process of cooperation, which will affect the smooth progress of collaboration.

3.3.2 The Effect of Tripartite Cooperation and Communication Is Not Good

There are issues of information asymmetry and poor communication in the cooperation and exchange between universities, enterprises, and research institutions. In terms of information transmission, the different information resources and focuses of each party can lead to distortion and omissions during the process. When universities release information on scientific research achievements and talent development, they often fail to adequately consider the actual needs of enterprises and research institutions, resulting in a lack of appeal. Regarding communication channels, although various methods are available, there is a lack of a unified and efficient platform for communication. This often requires multiple channels for communication, increasing both communication and time costs. Due to these communication issues, if the communication is not timely and adequate, misunderstandings and contradictions are likely to arise among the parties in cooperation, which will affect the effectiveness and quality of collaboration.

4. Optimization Strategies for a "Learning, Research, and Application" Integrated Talent Cultivation Model Based on AI Technology

4.1 Optimizing the Depth and Breadth of Technological Integration

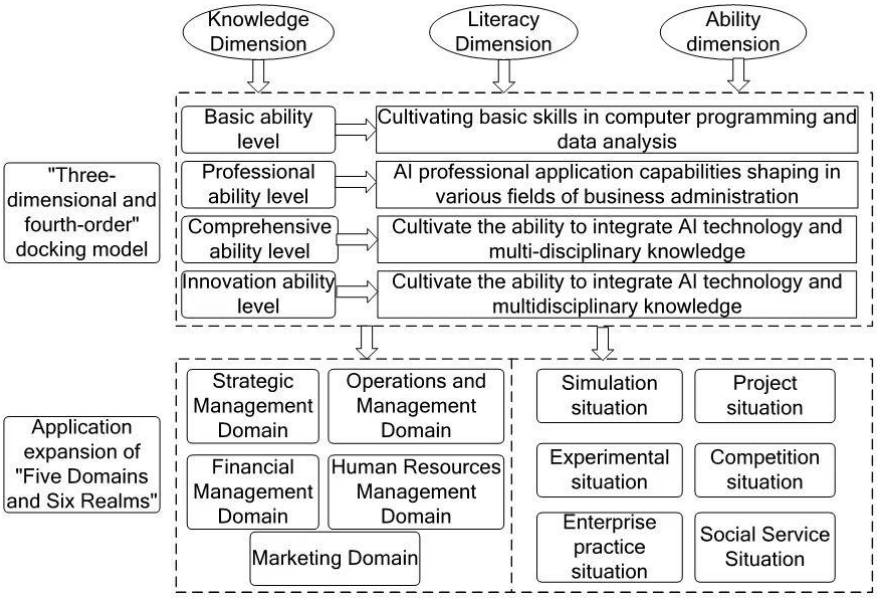

Figure 1: Optimization mechanisms for the depth and breadth of technological integration

4.1.1 Seamless Integration of AI Technology with Training Processes

To achieve deep integration of AI technology with the "learning, research, and application" aspects of business administration, a 'three-dimensional four-stage' alignment model can be constructed. The 'three dimensions' refer to the knowledge dimension, the ability dimension, and the quality dimension. In the knowledge dimension, foundational theories and algorithms of AI are integrated into the curriculum, forming a progressive chain of knowledge. The ability dimension is divided into four stages: basic abilities, professional abilities, comprehensive abilities, and innovative abilities. The basic abilities stage focuses on cultivating students' fundamental skills, such as computer programming and data analysis. The professional abilities stage equips students with specialized application capabilities of AI in various fields of business administration, such as intelligent decision-making and supply chain optimization. The comprehensive abilities stage trains students to integrate AI technology with multidisciplinary knowledge for practical use. The innovative abilities stage encourages students to apply AI technology in innovative commercial practices and research. The quality dimension emphasizes the cultivation of ethical, moral qualities, teamwork qualities, and lifelong learning qualities. Through relevant courses and practical activities, students are made aware of the ethical issues brought about by AI technology and are guided to develop correct values and social responsibility.

4.1.2 Expand the Application Scenarios of AI Technology in Talent Cultivation

Develop an application scenario expansion system for 'Five Domains and Six Scenarios'. The 'Five Domains' include the strategic management domain, operational management domain, financial management domain, human resource management domain, and marketing management domain. In the strategic management domain, AI technology is used for market trend prediction and competitor analysis to help students formulate more forward-looking corporate strategies. In the operational management domain, AI intelligent scheduling systems and logistics optimization algorithms are introduced, allowing students to participate in optimizing corporate operations processes. The 'Six Scenarios' refer to simulation scenarios, experimental scenarios, project scenarios, competition scenarios, enterprise practice scenarios, and social service scenarios. Simulation scenarios use virtual business environment software to allow students to make decision simulations using AI technology. Experimental scenarios involve conducting AI algorithm experiments in laboratories to cultivate students' technical application abilities. Project scenarios have students participate in actual AI projects at schools or enterprises. Competition scenarios encourage students to participate in various AI-related business competitions. Enterprise practice scenarios arrange internships for students at companies, exposing them to real-world AI application scenarios. Social service scenarios guide students to use AI technology to solve social issues, such as community management and public welfare projects.

4.2 Dynamic Adjustment and Continuous Improvement of Training Models

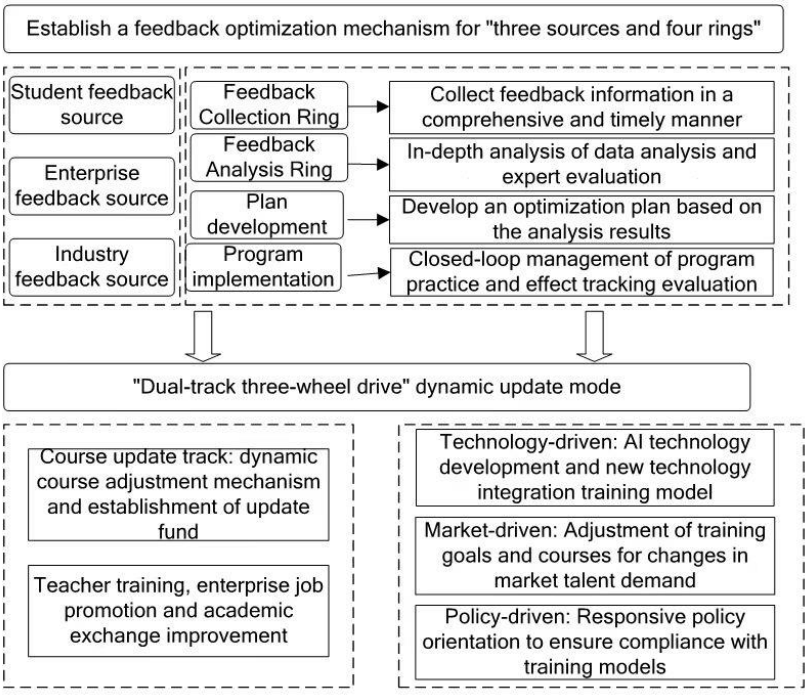

Figure 2: The dynamic adjustment and continuous improvement optimization mechanism of training models

4.2.1 Optimization Process of Cultivation Model Based on Feedback Mechanism

Establish a 'Three Sources Four Loops' feedback optimization mechanism. The 'Three Sources' refer to student feedback sources, enterprise feedback sources, and industry feedback sources. Student feedback is collected through regular questionnaires, seminars, and learning records to understand students' opinions and suggestions on course design, teaching methods, and practical components. Enterprise feedback is obtained via evaluations by corporate mentors and follow-up surveys of graduates to grasp the needs of enterprises regarding students' abilities and knowledge. Industry feedback is gathered through industry reports and expert consultations to understand the latest trends and technological applications in the industry. The 'Four Loops' consist of the feedback collection loop, feedback analysis loop, plan formulation loop, and plan implementation loop. The feedback collection loop ensures comprehensive and timely collection of feedback from all aspects. The feedback analysis loop uses data analysis and expert assessments to deeply analyze the feedback, identifying issues and directions for improvement in the training model. The plan formulation loop develops specific optimization plans based on the analysis results, including adjustments to courses, improvements in teaching methods, and enhancements to practical components. The plan implementation loop puts the optimization plans into practice and tracks and evaluates the implementation outcomes, forming a closed-loop management system.

4.2.2 A Dynamic Updating Training Model That Adapts to Changes in Industry Needs

Adopting a 'Dual-Track Triple-Drive' dynamic update model, the 'dual-track' refers to the curriculum update track and the faculty enhancement track. The curriculum update track establishes a mechanism for dynamic adjustment of courses, updating course content and teaching syllabi in response to changes in industry needs. A curriculum update fund is set up to encourage teachers to carry out curriculum reforms and innovations. The faculty enhancement track improves teachers' professional competence and teaching abilities through methods such as teacher training, corporate internships, and academic exchanges. The 'triple-drive' consists of technology-driven, market-driven, and policy-driven forces. Technology-driven focuses on the latest developments in AI technologies, such as iterations in AI algorithms and applications of big data technology, integrating new technologies into the training model. Market-driven adjustments to training objectives and course settings based on changes in market demand for talent. Policy-driven responses to national and local government policies regarding artificial intelligence and business administration, ensuring that the training model aligns with policy requirements.

4.3 Deepening and Expanding Multi-Party Collaboration

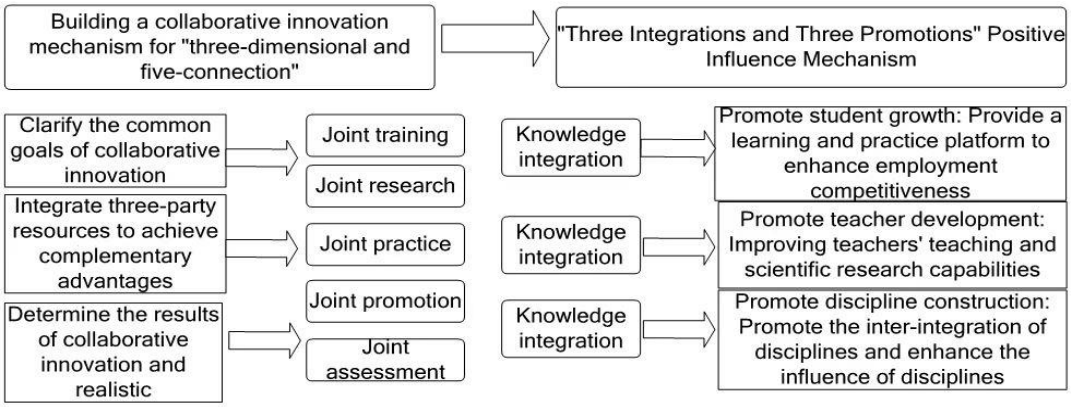

Figure 3: Deepening and expanding optimization of collaborative cooperation among multiple parties

4.3.1 The Collaborative Innovation Mechanism among Universities, Enterprises, and Research Institutions

Establish a 'Three-Dimensional Five-Link' collaborative innovation mechanism. The 'three-dimensional' aspect refers to the dimensions of objectives, resources, and outcomes. The objective dimension clarifies the common goals among the three parties in collaborative innovation, such as cultivating business management talent with AI technology application skills and conducting cutting-edge AI commercial application research. The resource dimension integrates the resources of all three parties, including university human resources, research institutions' technological resources, and corporate practical resources. The outcome dimension determines the forms of collaborative innovation results, such as research papers, patents, and commercial application cases. The 'five links' refer to joint training, joint research, joint practice, joint promotion, and joint evaluation. Joint training involves formulating joint training programs, jointly designing curricula, training plans, and practical components to ensure seamless talent development. Joint research includes cooperative projects based on AI technology, sharing research data and outcomes. Joint practice establishes practice bases,

allowing students to hone their abilities through real projects at enterprises and research institutions. Joint promotion involves applying and promoting the outcomes of collaborative innovation to enhance their social impact and economic benefits. Joint evaluation sets up an assessment mechanism involving all three parties to comprehensively and objectively evaluate the effectiveness of collaborative innovation.

4.3.2 Collaboration and Exchange among the Three Parties Play a Promoting Role in Talent Cultivation

Collaboration and exchange among the three parties have a positive impact on talent development through 'three integrations and three promotions'. The 'three integrations' refer to knowledge integration, ability integration, and cultural integration. Knowledge integration promotes the fusion of theoretical knowledge from universities, practical knowledge from enterprises, and cutting-edge knowledge from research institutions, broadening students' knowledge base. Ability integration cultivates students' comprehensive abilities by organically combining the innovative capabilities of research institutions, the practical abilities of enterprises, and the learning abilities of universities. Cultural integration exposes students to academic culture from universities, business culture from enterprises, and innovative culture from research institutions, fostering their multicultural literacy. The 'three promotions' refer to promoting student growth, promoting teacher development, and promoting discipline construction. Promoting student growth provides more learning opportunities and practical platforms for students, enhancing their overall quality and employability. Promoting teacher development allows teachers to improve their teaching and research capabilities through cooperation with enterprises and research institutions. Conclusion: The research delves deeply into the "learning, research, and application" integrated talent cultivation model based on AI technology, which holds significant theoretical and practical value.

The study clarifies the empowerment mechanisms of AI technology in each stage of talent cultivation—learning, research, and application—and confirms its positive impact on education, research, and practical applications. By constructing integrative knowledge frameworks for research and learning, industry-academia-research collaboration practices, and reflective practice cycles for skill enhancement, it provides feasible paths for innovative talent development. In practice, this model faces challenges such as the integration of technology, dynamic adjustments, and multi-party collaborative cooperation. Issues like the mismatch between AI technology and training stages, limited application scenarios, and incomplete feedback and collaborative innovation mechanisms need urgent solutions. Optimization strategies are proposed to address these challenges, covering aspects such as technology integration, dynamic adjustment of training models, and deepening multi-party collaborative cooperation.

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