Article

Research on the Design and Practice of Collaborative Education Mechanism between Enterprises and Enterprises in the Whole Chain Empowered by AI

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Abstract: This article focuses on the AI enabled full chain school enterprise collaborative education model. By analyzing the current research status and practical difficulties of universities at home and abroad, it reveals the value logic of this model in reconstructing talent training processes, improving educational visualization efficiency, and supporting intelligent talent supply. We have developed a model for the collaborative education mechanism between schools and enterprises throughout the entire chain under the empowerment of AI. The implementation strategy includes promoting the deep application of AI technology in the entire chain of demand forecasting, teaching process, practical management, and employment services, improving data sharing security mechanisms, smart contract benefit distribution mechanisms, and policy and institutional guarantees, achieving precise integration between education and industry, effectively solving the problem of industry education "chain breakage", and promoting the development of education models to a deeper level.

Keywords: AI empowerment; full chain; school enterprise collaboration

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1. Introduction

With the rapid development of technologies such as artificial intelligence and big data, global industrial upgrading is accelerating, and the demand for high-quality technical and skilled talents is showing dynamic and personalized characteristics. The traditional school enterprise cooperation model, due to information fragmentation and imperfect collaboration mechanisms, leads to a "time gap" and "dimension gap" between talent cultivation and industry demand. The policy documents related to education reform and industry-education integration clearly state the need to promote deep cooperation between schools and enterprises, and use modern information technology to improve the quality of talent cultivation. In this context, exploring the full chain school enterprise collaborative education model empowered by AI has become a key path to solving the problem of industry education "chain breakage" and supporting the intelligent transformation of industries.

2. Review of the Current Situation of Collaborative Education between Schools and Enterprises Empowered by AI

2.1. Current Research Status at Home and Abroad

Foreign countries started early in the field of school enterprise integration, forming mature models such as Germany's "dual system" and Japan's "industry academia official". The research focuses on the mechanisms of enterprise participation, knowledge sharing models, and policy support systems, and constructs a theoretical framework for knowledge flow. In recent years, with the rise of intelligent technologies, there has been

an emphasis on achieving dynamic integration between education and industry through data sharing. The support for school enterprise integration in domestic policies continues to increase, and innovative practices of joint education have emerged in the field of vocational education, but overall it is still in the stage of improvement. In practice, AI technology has been preliminarily applied in course optimization, internship monitoring and other aspects, especially in data-driven demand forecasting, personalized training path design and other areas where there are technical application bottlenecks [1].

2.2. Analysis of the Current Situation of College Practice

2.2.1. Insufficient Motivation for School Enterprise Collaboration

The enthusiasm of enterprises to participate in the integration of industry and education is not high, and there is a phenomenon of "school enthusiasm and enterprise coldness". The cooperation between schools and enterprises is mostly superficial, lacking the internal motivation for deep collaboration. The imbalance in the interests of schools and enterprises, where schools focus on long-term social benefits (talent cultivation) and enterprises focus on short-term economic gains (technological output), has resulted in cooperation being limited to shallow levels such as internships, visits, and lectures. The phenomenon of data silos between schools, enterprises, and governments is prominent, and a gap exists between the school's training environment and the actual working conditions in enterprises.

2.2.2. The Mismatch between Supply and Demand in School Enterprise Collaboration

The "time difference" between education supply and industry demand, as well as the "dimensional difference" between talent ability structure and job skill requirements, makes it difficult for traditional education systems to capture new skill demands [2]. These demands, caused by the iteration of intelligent industry technology, cannot be captured in a timely manner through static research, resulting in a disconnect between talent cultivation direction and the market.

2.2.3. The Lack of Standards for School-Enterprise Collaboration

The traditional talent evaluation mainly based on exam scores, makes it difficult to reflect real job competence. There is also a lack of diversified ability assessments involving enterprises, which hinders the quantification of intelligent skills or data-driven decision-making thinking. Furthermore, the absence of a long-term tracking mechanism for the effectiveness of school-enterprise cooperation prevents the formation of a closed-loop feedback improvement system.

3. The Value Logic of Collaborative Education between Enterprises and Enterprises in the Entire Chain Empowered by AI

Artificial intelligence empowers school enterprise collaborative education with comprehensive, full process, and all staff advantages, and plays an important role in promoting precise matching of talent supply and demand, deep integration of teaching, and construction of training models.

3.1. The Significance of Research on Collaborative Education between Enterprises and Enterprises in the Entire Chain Empowered by AI

3.1.1. Refactoring the Entire Process of Talent Cultivation

Intelligent technology empowers educational innovation and resolves the contradiction between traditional education standardization and industry personalized needs. Traditional talent cultivation is mainly based on a unified curriculum system, which is difficult to match the dynamic needs of enterprises for job skills. By analyzing industry trends

and enterprise job data using intelligent AI technology, the curriculum system can be dynamically optimized to align educational content with industry needs [3].

3.1.2. Enhance the Visualization and Optimization Efficiency of the Educational Process

In the traditional integration of industry and education, the lack of real-time data feedback on the effectiveness of student internships in schools and employee training in enterprises makes it difficult to dynamically adjust collaborative education. Utilizing intelligent AI technology to track students' performance in teaching, internships, and job training in real-time, and generate reports on their ability improvement. Build a closed-loop mechanism for "data collection, analysis, diagnosis, and strategy adjustment" to transform the education process from being "experience-driven" to "data-driven".

3.1.3. Supporting Talent Supply for Intelligent Transformation

Alleviating the time difference between "fast technological iteration" and "lagging talent cultivation". The intelligent technology update significantly shortens the cycle, reduces the problem of graduates' skills being disconnected from the latest industry demands, and solves the issue of "learning application disconnection".

3.2. The Research Value of AI Enabled Full Chain School Enterprise Collaborative Education

3.2.1. Cracking the Problem of Industry Education “Disconnection” and Building a New Paradigm of Closed-Loop Collaboration

The traditional integration of industry and education is disconnected from the "teaching internship employment training" process due to information fragmentation, while the intelligent full chain mechanism achieves seamless connection through data-driven approaches. Achieve precise matching of requirements, closed-loop process management, lifelong capability tracking, and customize talent upgrade plans for enterprises.

3.2.2. D Rive Education Supply Side Reform and Reshape the Intelligent Education Ecosystem

Leveraging the revolution of curriculum and teaching, automatically generating a teaching project library based on real enterprise project libraries (such as building BIM examples), promoting dynamic course generation of "real questions and real actions", analyzing student behavior data through AI, breaking the contradiction between standardized training and personalized needs, and providing personalized learning paths for each student. Simultaneously, a multidimensional evaluation system is formed by learning data, project outcomes, and generating a radar chart of enterprise feedback capabilities.

3.2.3. Empowering Industrial Transformation and Upgrading, Activating the Drive for Deep Participation of Enterprises

Research AI driven 'personalized training system' to provide talent support solutions for enterprise intelligent upgrading [4]. Build an AI collaborative platform between university research teams and enterprise technology departments to achieve closed-loop technological innovation collaboration of "data sharing algorithm optimization efficiency improvement" and solve the problem of insufficient motivation for enterprise participation.

4. Design of a Collaborative Education Mechanism Model for the Entire Chain Empowered by AI

The AI-powered full-chain collaborative education model is based on the theoretical foundation of industry-education integration and full-chain collaboration in the intelligent era. It clarifies the roles of technologies like AI, big data, and the Internet of Things

in various stages of industry-education integration, defining the connotations of "AI empowerment", "school-enterprise collaboration", and "full chain". Construct the core structure of "theme collaboration mechanism - technology empowerment mechanism - policy guarantee mechanism - implementation and application - feedback and optimization", analyze the role positioning and interactive logic of education, industry, and government in the entire chain (Figure 1). The full-chain collaborative education mechanism empowered by AI:

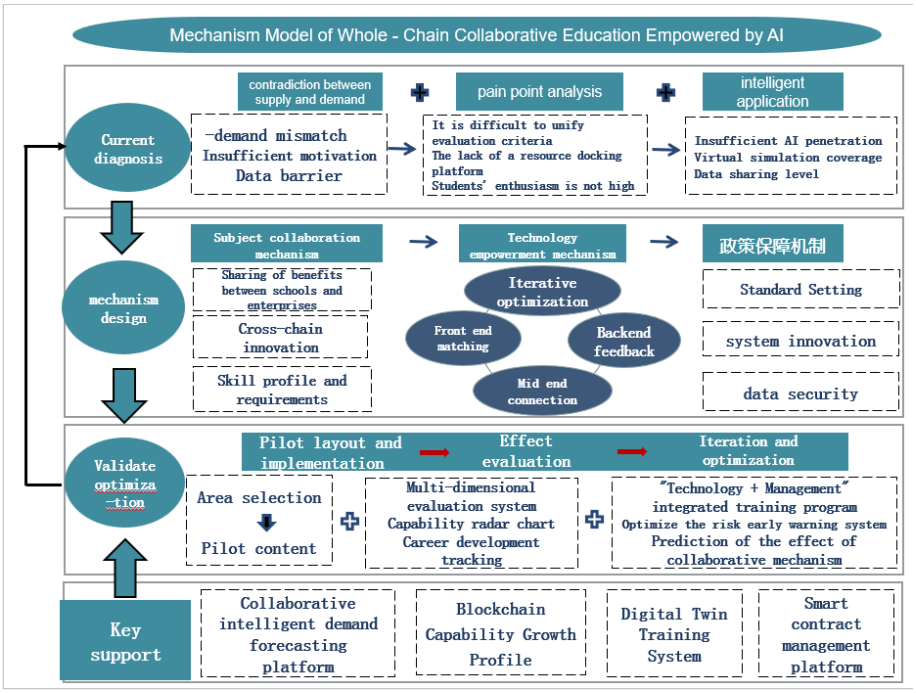

Figure 1. AI Empowered Collaborative Education Mechanism Model for the Entire Chain

4.1. The Current Situation and Problem Diagnosis of AI Empowering Full Chain School Enterprise Collaborative Education

Research on the application of intelligent technology across various stages of the entire chain, including its use in professional settings, course development, and practical teaching in universities. Analyze the collaboration between enterprises and educational institutions in areas like talent recruitment, job training, and technology research and development. Identify the key bottlenecks in full-chain collaboration by examining the dynamic demand for talent in industrial intelligence upgrading ("demand side") and the technological capabilities of the education system ("supply side").

4.2. Mechanism Design for AI Empowering Full Chain Collaboration

The construction of an industry demand monitoring platform that achieves data-driven demand matching, dynamically optimizes demand perception and training programs, forms a real-time tracking data stream of job skill changes, constructs a "job skill demand knowledge graph", develops an intelligent matching system for "skill portrait job demand", and forms an intelligent connection mechanism between employment and job training for personalized learning path recommendation and real-time early warning of internship quality [5].

4.3. The Main Driving Force and Guarantee Mechanism of Full Chain Collaboration

Automatically allocate the benefits of school-enterprise cooperation through smart contracts, creating a mechanism for sharing interests and risks between schools and enterprises. Establish a data security responsibility chain, clarify the compliance obligations

of schools and enterprises in data use, and introduce insurance mechanisms to share cooperation losses caused by uncontrollable technological factors. Develop evaluation indicators for the intelligence level of industry-education integration enterprises, including AI technology application investment, talent cultivation contribution, and data sharing.

4.4. Effect Evaluation and Iterative Optimization of Full Chain Collaboration

Construct a multidimensional evaluation system and mechanism. Establish a closed-loop process for "data collection, analysis, diagnosis, and strategy adjustment." Generate ability radar charts to replace traditional exam scores and optimize the "technology and management" composite training program based on career development data from graduates three years later. Use AI prediction technology to simulate the effects of different collaborative mechanisms, anticipate potential risks, and enable dynamic feedback and iteration of the mechanism.

5. Implementation Strategy of Full Chain Collaborative Education Mechanism Empowered by AI

In the context of the intelligent era, the traditional school enterprise collaborative education model faces many challenges, and the development of artificial intelligence technology provides new possibilities for solving these problems. The implementation strategy of the full chain collaborative education mechanism empowered by AI mainly includes the following three aspects.

5.1. Promote the Deep Application of AI Technology in All Links of the Entire Chain

5.1.1. AI Empowers Demand Forecasting and Professional Development

At the starting point of talent cultivation, AI technology can accurately assess industry demand and optimize professional layouts and curriculum settings by analyzing industry trends and skills requirements. By building an industry big data analysis platform, real-time collection and analysis of talent demand data from various links in the industry chain, including job numbers, skill requirements, etc., provide data support for university major settings and enrollment plans, avoiding a disconnect between major settings and industry demand. Using AI technology to construct a dynamic matching model between majors and industries, analyzing the matching degree between various majors in universities and target industries, and identifying shortcomings and deficiencies in professional construction. Guide teachers to optimize course content based on AI-driven insights, strengthening teaching in weak areas identified through data analysis.

5.1.2. AI Driven Intelligent Teaching Process

In the implementation of teaching, AI technology is used to improve teaching quality and efficiency, achieve personalized teaching and precise guidance. Develop an intelligent teaching assistant system to assist teachers in course design, lesson preparation, teaching, and homework grading and other teaching activities. By utilizing AI's computer vision and natural language processing technology, an intelligent classroom management system is constructed to monitor students' learning status and participation in real time, providing teaching feedback to teachers. Real time transcription of classroom discussion content, generating keyword cloud maps to help teachers grasp students' learning difficulties and interests.

5.1.3. AI Optimized Practical Teaching and Training Management

In the practical teaching process, utilizing AI-driven technology to create a practical training environment that combines reality and virtual simulations, enhancing students' practical and innovative abilities. Build an AI driven virtual simulation training platform

to simulate complex industrial production scenarios, medical surgery scenarios, etc., allowing students to practice repeatedly in a virtual environment and break through the limitations of real training conditions. Using AI algorithms to analyze data, evaluate students' training performance in real-time, and provide personalized guidance and suggestions.

5.1.4. AI Supports Employment Services and Career Development

In the talent placement process, utilizing AI technology to improve the quality of employment services and help students secure precise employment opportunities and ensure sustainable career development. Build an intelligent employment recommendation platform, based on students' ability profiles and the job requirements of enterprises, using AI recommendation algorithms to achieve precise matching between people and positions. The platform can analyze students' course grades, practical training performance, project experience, career interests, and other relevant data, generating personalized employment recommendation reports and screening suitable candidates for enterprises to improve recruitment efficiency. By analyzing industry trends, career advancement paths, and changes in skill requirements, personalized career development plans are created to help students transition smoothly from school to the workplace and support their long-term career growth.

5.2. Improve the Guarantee Mechanism for AI Enabled Collaborative Education throughout the Entire Chain

5.2.1. Building Data Sharing and Security Mechanisms

Establish a cross-disciplinary data-sharing platform, break down data silos, and provide data support for AI to empower full-chain collaborative education. Develop unified data standards and specifications to ensure that data from universities, enterprises, governments, and other parties can be interconnected. At the same time, strengthen data security management, establish a data security responsibility chain, and clarify the compliance obligations of schools and enterprises in data use. Introducing blockchain technology to achieve data traceability and immutability, ensuring the security and credibility of data.

5.2.2. Establish Smart Contracts and Benefit Distribution Mechanisms

Utilizing blockchain-based smart contract technology to establish a fair and transparent mechanism for distributing benefits, thereby enhancing the motivation of schools and enterprises to participate in the collaboration. By using smart contracts to automatically distribute the benefits of school enterprise cooperation, smart contracts can automatically distribute the benefits to universities and enterprises according to a predetermined ratio, enhancing the enthusiasm of enterprises to participate in the integration of industry and education. Establish an AI based collaborative performance evaluation system to quantify the contribution of cooperation between schools and enterprises, providing a basis for benefit distribution. By analyzing data on the quality of talent cultivation and the transformation of scientific research achievements in universities, evaluate their collaborative contributions and ensure fair and reasonable distribution of benefits.

5.2.3. Strengthen Policy Support and Institutional Safeguards

Implement policies and measures to empower the integration of industry and education with AI, and provide policy guarantees for the implementation of the full chain collaborative education mechanism. Increase funding for the application of AI technology in education, supporting universities and enterprises in building AI laboratories, developing intelligent teaching platforms, and other relevant infrastructure. Improve regulations and procedures for the integration of industry and education, clarify the rights and obligations of both schools and enterprises in AI-enabled collaborative education, and standardize collaboration mechanisms and behavior.

5.3. The Practical Path of Promoting AI Empowerment and Full Chain Collaborative Education

5.3.1. Carry Out Pilot Demonstration Projects

Select representative universities, enterprises, and industries to carry out AI empowerment full chain collaborative education pilot projects, exploring replicable and promotable experiences and models. Select several universities and leading enterprises to jointly build an AI industry education integration demonstration base, and create a model of full chain collaborative education from professional construction, curriculum development, practical teaching to employment services. During the pilot process, AI technology was used to monitor and evaluate the entire education process, summarize experiences and lessons in a timely manner, and optimize the education mechanism.

5.3.2. Building a Community of Industry Education Integration

Using AI technology, build a cross-regional and cross-industry education integration community to facilitate resource sharing and collaborative development. Establish an AI industry-education integration alliance involving stakeholders such as universities, enterprises, research institutions, and industry associations. The alliance will formulate common development goals and action plans. Using AI technology to build a community platform that combines online and offline resources, achieving efficient integration and sharing of resources. At the same time, by utilizing AI's intelligent matching function, suitable collaborative projects and partners can be recommended to enhance the operational efficiency of the community.

6. Conclusion

The full-chain school-enterprise collaborative education model empowered by AI is a crucial step toward the integration of industry and education in the intelligent era. By deeply integrating artificial intelligence technology into the entire process of talent cultivation, a dynamic, open, and collaborative education ecosystem has been built, achieving precise integration and two-way empowerment between education and industry. This not only improves the quality of talent cultivation and enterprise competitiveness but also provides solid human resource support for sustainable economic and social progress. In the future, it is necessary to continuously optimize the application scenarios of technology, improve the institutional guarantee system, promote the expansion of this mechanism model to a wider range of fields and deeper levels, and achieve precision, complexity, and sustainable innovation in talent cultivation.

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