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Research on The Transformation of Talent Cultivation Mode in Suzhou Vocational Colleges Driven by Artificial Intelligence

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Abstract

Artificial intelligence is driving the digital transformation of education. As a highland of manufacturing and digital economy, Suzhou's vocational college talent training model needs to adapt to the industrial needs of the intelligent era. This article focuses on the transformation of talent cultivation models driven by AI, analyzes the reconstruction of AI on training objectives, curriculum systems, teaching paradigms, and evaluation mechanisms, and explores collaborative transformation paths based on Suzhou's industrial characteristics. The aim is to provide support for the digital transformation of regional higher vocational education, help cultivate suitable talents, and serve Suzhou's industrial upgrading.

Keywords

AI; Vocational colleges; Talent cultivation mode; Suzhou

1. Introduction

Artificial intelligence is driving the digital and intelligent transformation of vocational education. The "China Education Modernization 2035" and "Action Plan for Improving the Quality and Quality of Vocational Education (2020-2023)" provide policy guidance for the transformation of vocational colleges. As a strong manufacturing city and a highland of digital economy, Suzhou's vocational colleges face problems such as asynchronous professional and industrial iteration, fragmented intelligent teaching resources, and insufficient digitalization of industry education integration when meeting the needs of the AI industry. There is a gap between talent cultivation and industry demand. The article is based in Suzhou and follows the logic of "the origin of change - driving mechanism - practical form - dialectical examination - path reconstruction" to analyze the internal logic and practical path of AI driven talent cultivation mode change, analyze practical breakthroughs and difficul-

ties, and construct adaptation plans. The aim is to provide theoretical support for the digital transformation of vocational education, provide reference for solving talent cultivation problems in Suzhou and higher vocational education nationwide, and help promote the high-quality development of vocational education.

2. The Origin of The Transformation in The Era of Intelligence: Logic, Concepts, and Values

2.1. Origin of Change: The Triple Logic of Artificial Intelligence Driven Vocational Education Transformation

One is that the information technology revolution requires vocational education to respond to the changes. Generative artificial intelligence (AIGC) is evolving towards larger models, reconstructing production paradigms and penetrating vertical domains, making "human-machine collaboration" the norm. Kevin Kelly, the spiritual leader of Silicon Valley in the United States, has proposed that the industry will usher in a "AI+X" revolution, and vocational education needs to address the challenges of unemployment for medium skilled workers and the need for composite abilities for high skilled talents. The second is that Suzhou's industrial upgrading is driving change. As the core of intelligent manufacturing in the Yangtze River Delta, its total industrial output value above designated size is 4.69 trillion yuan in 2024, with intelligent manufacturing accounting for over 35%. However, there is a shortage of 280000 high-end technical talents, and the traditional knowledge transmission mode is difficult to meet the needs of enterprises for "scenario based problem-solving ability". The third is the inherent demand for high-quality development of vocational education. The essence of vocational education is "cross-border education", which needs to balance "people technology organization". Currently, there are problems with curriculum lag and insufficient integration of industry and education in Suzhou's vocational education. Zhejiang Vocational and Technical College of Commerce has reconstructed its curriculum through "artificial intelligence+majors" to improve employment rates, which confirms the necessity of change.

2.2. Redefining Core Concepts: From "Technology Empowerment" to "Paradigm Restructuring"

The connotation of AI driven education has shifted from instrumental "technology empowerment" to structural "paradigm reconstruction", such as the "Suzhou Institute of Technology Intelligent Assistance" system promoting teaching from "experience driven" to "data-driven"; The training mode of vocational colleges has been restructured from "goal curriculum evaluation" to "ability map scenario based curriculum dynamic evaluation", and Suzhou Vocational and Technical University has developed modular courses based on this; Suzhou, as the first "Manufacturing Intelligent Transformation and Digital Transformation Demonstration Zone" in China, uti-

lizes a government led "Smart Cloud Platform" to automatically generate professional solutions, with the synergistic advantage of "Industrial Brain+Education Center".

2.3. Research Context and Value: The "Breakthrough and Establishment" of Domestic and Foreign Research

Foreign research focuses on technological ethics and lifelong learning, but lacks research on industry education collaboration mechanisms; Domestically, there is a focus on practices such as the integration of job, course, competition, and certification, but there is insufficient response to the labor force changes caused by AIGC and a lack of analysis on regional industrial differentiation. The article theoretically constructs a collaborative evolution model of "technology industry education" and proposes a three-dimensional path of "dynamic capability map modular curriculum intelligent evaluation" in practice, providing a three-dimensional solution for the digital transformation of vocational education.

3. Driving Mechanism and Realistic Landscape: Theoretical Support and Suzhou Field

3.1. Driving Mechanism: Theoretical Foundation of AI Empowered Talent Training Model

The transformation of education by AI stems from the synergistic effect of multiple theoretical logics. From the perspective of the Technology Acceptance Model (TAM), the adoption of AI educational tools by teachers and students is driven by "perceived usefulness" and "perceived ease of use", which together enhance individual motivation to use and form the initial driving force for pattern change. The theory of innovation diffusion reveals the intermediate law that AI follows a gradual path of "cognition persuasion decision-making implementation consolidation" in educational organizations. The driving force for change in vocational colleges comes from both internal and external factors, and the demonstration effect of early adopters and the inclusiveness of organizational culture are key variables that accelerate diffusion. The theory of educational ecosystem provides a macro perspective, that is, AI breaks the traditional balance of educational ecology, reconstructs core elements such as teacher roles and resource allocation, and forms a closed-loop logic of "technology embedding element recombination mode iteration", covering multiple dimensions such as education and teaching, professional settings, and school enterprise collaboration.

3.2. Suzhou Field: Interaction Status between AI Industry and Higher Vocational Education

As an AI industry cluster, Suzhou's "industry education" interaction has distinct re-

gional characteristics. The industrial end relies on industrial parks to form AI industry clusters such as intelligent equipment and biomedicine. The demand for talent is in a "pyramid" shape, with over 60% of positions being AI application technology skill positions (such as intelligent device operation and maintenance), requiring practitioners to have both professional and cross disciplinary abilities. Faced with industrial demand, vocational colleges in Suzhou are caught in a game of "traditional inertia" and "transformation attempts": some colleges have lagging curriculum updates, disconnected practical training, and traditional models are difficult to meet scenario based needs; Leading universities such as Kunshan Dengyun Technology Vocational College have jointly established an "Intelligent Production Line Training Center" with Suzhou Funa Aier Technology, integrating technologies such as industrial robot visual recognition into the curriculum and exploring modular teaching of "AI+majors". From the perspective of collaborative foundation, Suzhou has good conditions for the linkage of "industry education policy". At the policy level, the local government has issued the "Several Measures to Support the Development of Talents in the Field of Artificial Intelligence in Suzhou City", which clearly supports the establishment of AI related majors in vocational colleges; At the industrial level, leading enterprises deeply participate in the education process through methods such as "order classes" and "teacher training"; At the educational level, the group operation of vocational education provides organizational support for cross school resource integration and school enterprise cooperation. However, this collaboration is still in its early stages and has not yet formed a normalized demand docking mechanism and benefit sharing model. Its effectiveness still needs to be promoted through institutional innovation.

4. Transformation Forms and Case Deconstruction: Practical Breakthroughs in Suzhou Vocational Education

4.1. Innovation of Cultivation Mode Elements

The core of the reform of the training mode is to break the rigid logic of traditional elements and achieve precise integration between the "supply side" and the "demand side". Professional setting: shifting from "following the industry" to "predicting demand", relying on Suzhou's "6+4" modern industrial system, establishing a mechanism of "industry data monitoring - job capability deconstruction - professional dynamic adjustment". If the industry demand warning model is utilized to lay out integrated circuit related professional directions 1-2 years in advance, the newly added "Intelligent Sensor Application" major in 2023 will achieve "time difference elimination" between professional and industrial upgrading. Curriculum system: Utilizing AI technology to achieve modularity and cross-border integration, and restructuring courses through "job competency units". AI analyzes over 100000 recruitment data from enterprises, extracts 128 core competencies for "intelligent manufacturing" positions, and breaks them down into 12 dynamic modules that

students can independently combine; The professional courses of "Industrial Internet Application" in Suzhou Polytechnic University are updated quarterly, and the frequency is three times higher than the traditional mode. Teaching scenario: Focusing on the integration of reality and virtuality and personalized adaptation. In terms of virtual training, developing VR/AR systems (such as simulating the assembly of new energy vehicle batteries) has reduced training costs by 40% and increased operational proficiency by 27%; The adaptive learning system pushes resources based on 13 types of procedural information from students to achieve differentiated teaching. Evaluation system: Upgrade from "result oriented" to "ability portrait", and replace traditional assessment with "AI+manual" multidimensional evaluation. AI collects 28 practical process data and generates a three-dimensional portrait based on the scores of enterprise mentors. The "E-commerce" major at Suzhou Vocational and Technical College of Economics and Trade uses it as a substitute for academic transcripts for enterprises to view core competency indicators.

4.2. Differential Exploration of Typical Cases

Suzhou vocational practice forms a differentiated path through "industry driven, policy driven, and cross-border integration", responding to development needs through innovative element combinations. Industry leading: Represented by the "AI Industry College" of Suzhou Jianxiong Vocational and Technical College, the platform is jointly built with 12 AI enterprises. The enterprises provide real projects, and engineers and teachers form a "dual mentor group", compiling a total of 6 loose leaf textbooks; 30% of the class hours are for enterprise practical training, and the job matching rate for the 2025 graduates is 93%, an increase of 19% compared to the traditional mode, achieving a deep integration of "teaching industry". Policy driven: Suzhou Industrial Vocational and Technical College relies on the provincial "Digital Transformation Pilot of Vocational Education" to build a "policy resource practice" chain. It has obtained 12 million yuan in funding to establish a digital training center, promote 87% of professional teachers to master digital tools, and organize students to participate in 23 enterprise equipment upgrade projects, forming a positive cycle. Cross border integration type: Suzhou Arts and Crafts Vocational and Technical College is characterized by "AIGC Empowering Intangible Cultural Heritage Inheritance", developing a "Traditional Pattern Generation System" and offering a "Intangible Cultural Heritage Digital Design" course; The "AI Silk Bag" series, developed in collaboration between teachers, students, and silk inheritors in 2024, has achieved online sales exceeding 3 million yuan, promoting the transition of intangible cultural heritage from "technical protection" to "industrial revitalization". The practice of vocational colleges in Suzhou has shown that factor reconstruction is not simply a combination of technology, but rather a dynamic and adaptive ecosystem formed by anchoring industry demand, empowering technological tools, and ensuring institutional mechanisms for professional, curriculum, scenario, and evaluation elements.

5. Effectiveness Review and Dilemma Decoding: Dialectical Review of the Process of Change

5.1. Multidimensional verification of phased achievements

The effectiveness of the reform of vocational education in Suzhou has been demonstrated in three dimensions: student development, college competitiveness, and industry adaptation, which confirms the positive value of factor reconstruction. At the student level, AI literacy and employment adaptability have been improved. The proportion of graduates participating in AI course modules in the 2022-2024 cohort has increased from 38% to 82%, and the employment rate of those who have obtained relevant certifications has reached 96.3%, which is 11.7% higher than that of non participants; 68% of employers recognize graduates' digital and cross job collaboration abilities, and companies have provided feedback that graduates' proficiency in MES systems has increased by about 50%. At the institutional level, the competitiveness of majors has jumped, with the matching degree between majors and industries increasing from 67% to 84%, and 35% of new popular majors having admission lines exceeding the undergraduate admission line; We have jointly built 127 sets of AI virtual training resources (3 of which have been selected as national level resource libraries), and the proportion of "dual teacher" teachers with AI teaching capabilities has increased from 19% to 64%. At the industrial level, the coupling degree with the industry has deepened, and the proportion of graduates employed in the local "6+4" industries has increased from 71% to 86%, with a significant increase in the proportion of employment in emerging industries; Upgrading school enterprise cooperation to collaborative innovation, 34 innovation platforms will be jointly built in 2024, 47 industrial challenges will be overcome, and the amount of technical services received will increase by 189% compared to 2022.

5.2. Deep Decoding of Transformation Difficulties

The contradiction of change stems from the adaptation conflict of the reorganization of old and new elements, which is manifested in four dilemmas: firstly, the trap of "superficialization" of technology application, where some universities regard AI as a "tool overlay" and have not changed the educational paradigm. 70% of teachers conduct virtual training using traditional processes, but the utilization rate of system intelligence functions is less than 30%; The modularization of courses still has disciplinary residues, and the dynamic matching accuracy of AI for job abilities is only 58%. The root cause is that the understanding of education digitization remains at the level of "efficiency improvement". The second contradiction is the "sustainability" of resource allocation. The AI training center initially invested 8-12 million yuan, with annual maintenance fees accounting for 15% -20% of the total equipment value. However, the finance is mostly a one-time grant, and only 31% of universities have established a diversified investment mechanism. Some laborato-

ries have experienced a 40% decrease in equipment renewal rate due to insufficient funds, falling into the dilemma of "being built but not being used". The lack of synergy in the supply of the third system, the mismatch between the evaluation system and reform, the emphasis on quantitative indicators in college assessments, the emphasis on thesis topics in teacher evaluations, and the absence of recognition for AI teaching innovation. 62% of teachers believe that there is an imbalance between reform investment and return; The implementation rate of school enterprise collaboration policies is only 43%, which restricts the integration of industry and education. The fourth bottleneck is the "ability gap" in the teaching staff. Only 29% of teachers over 45 years old are proficient in using AI tools, and 67% of teachers with industry experience lack the ability to integrate AI and teaching. The root cause is the lack of a three-dimensional path of "AI+profession+practice" in teacher training.

6. Refactoring Path and Research Conclusion: From Breakthr-ough to Leap Forward

6.1. Collaborative Reconstruction: Optimization Path for the Training Mode of Suzhou Vocational Colleges

6.1.1. Conceptual Innovation: Establishing an Educational Ecological Concept of "Human Machine Collaboration"

To break through the rationality of technological tools and build a symbiotic logic between AI and educational subjects, it is necessary to go beyond the "technology substitution" thinking and form a division of labor system of "AI empowerment efficiency+teacher focused education". In course design, AI can generate initial drafts of job competency modules based on Suzhou industrial data (such as extracting skill points such as "industrial robot operation"), and teachers can adjust them according to educational laws, such as integrating the virtual project of "intelligent fabric detection" into the course to achieve the scenario based combination of traditional craftsmanship and AI. Drawing on the localization experience of Germany's dual system, establish a hybrid model of "AI assisted+teacher guidance". For example, in the "Three Integration Education" curriculum reform of Suzhou Industrial Vocational and Technical College, AI collects student enterprise training data to generate ability portraits, and teachers adjust teaching strategies based on this, forming a "evaluation feedback improvement" loop.

6.1.2. Institutional Innovation: Building a Real-time Linkage Mechanism Between Industry and Education

At the information level, achieve data-driven precise matching. The Suzhou Municipal Government has established a "Big Data Platform for Industrial Talent Demand" to integrate data from enterprises, universities, and graduates, provide real-time alerts for emerging job demands (such as "gene editing technology applications"), and guide dynamic adjustments in professional fields. At the organizational level,

establish a collaborative innovation alliance. Establish the "AI+Vocational Education" Collaborative Innovation Alliance, attract leading enterprises (Huawei, Hengtong Group), industry associations, and universities, formulate the "Suzhou AI Technology Skill Talent Training Standards", and develop shared training resources (such as the "Suzhou Process Digital Design" system). At the policy level, optimize incentive mechanisms. Include school enterprise cooperation in the evaluation of corporate social responsibility, and provide tax incentives based on the Shenzhen model (such as offsetting income tax by 150% of the investment amount); Optimize the evaluation system of colleges and universities, with "contribution to industrial services" as the core indicator (such as Suzhou Agricultural Vocational and Technical College's benchmark of 86% corresponding employment rate); Drawing on the German dual system, the industry association takes the lead in formulating the "AI Equipment Operation and Maintenance Professional Capability Standards" and introduces the T Ü V Rheinland certification system to achieve "dual certification integration".

6.1.3. Technological Deepening: Developing Localized AI Education Solutions

Firstly, technology adaptation guided by industrial characteristics. Establish an "Industry Demand Professional Setting" early warning system to monitor the technological evolution of industries such as electronic information and textile in Suzhou, predict a talent gap of 3-5 years, and guide the establishment of majors such as "AI Chip Design"; Develop virtual real training systems (such as "Intelligent Fabric Detection VR Platform" and "Digital Twin City Planning System") to address the pain points of traditional training; Establish the "Suzhou AI Teaching Resource Co construction and Sharing Center", open up high-quality resources (such as the "Suzhou Craft LORA Model"), and lower the application threshold. Next are technical ethics and data security. Develop the "Suzhou Vocational Education AI Application Ethics Code" to clarify the boundaries of data collection, model training, and result utilization. For example, student training data needs to be anonymized, and the intellectual property ownership of enterprises participating in course development needs to be clearly stipulated in contracts to prevent technological abuse and data leakage.

6.1.4. Teacher Enhancement: Building a "AI+Professional" Composite Double Teacher Team

Establish a three-dimensional capability development system. One is the technological dimension, which enhances digital adaptability. Provide "AI Basic Operation" certification for teachers over 45 years old, and offer "Ascending AI Development Practical" courses for young teachers; Implement the "Industrial Practice Points System" and require teachers to participate in local enterprise AI projects for a total of 6 months every five years (such as Suzhou Industrial Vocational and Technical College teachers participating in Hengtong Group's "Intelligent Production Line Optimization"

project, converting cases into teaching resources). The second is to integrate dimensions and cultivate teaching innovation ability. Offering courses on "AI+Professional Teaching Method" to cultivate teachers' technical transformation abilities (such as mechanical engineering teachers designing teaching plans for "Industrial Robot Programming+Machine Learning"). The third is the industrial dimension, tracking the forefront of technology. Establish an "industry mentor system" and invite enterprise experts (such as engineers from Suzhou Nano Industry Park) to conduct technical training, synchronizing teaching with the forefront of the industry. Establish a policy guarantee mechanism. To support professional title evaluation, AI course development and enterprise project participation should be included in the teacher professional title evaluation indicators. For example, Suzhou can stipulate that applying for associate professor positions requires leading one school enterprise cooperation AI project. Secondly, we should support international exchanges and send teachers to advanced vocational education countries such as Germany and Singapore for training, to learn the "AI+dual system" model.

6.1.5. Evaluation Upgrade: Establishing a Dynamic Capability Map Monitori-ng System

Firstly, construct a three-dimensional capability model. One dimension refers to technical skills, covering hard skills such as AI device operation and data processing, which can be quantitatively evaluated through third-party certification. One dimension refers to professional ethics, including soft skills such as cross team collaboration and continuous learning, which can be evaluated through enterprise mentor ratings, project review reports, and other methods. One dimension represents innovative potential, focusing on problem-solving and design capabilities. Next is the implementation of a full cycle evaluation system. Conduct process data collection, using AI systems to collect real-time process data from students during project practice and enterprise training, such as task completion efficiency, number of program optimizations, etc. Conduct developmental tracking feedback, establish a 'Graduate Development Tracking System', and continuously collect data on their ability growth in the industry field. Apply the evaluation results and optimize the training program by feeding back the evaluation data. Suzhou vocational colleges can refer to the model of Shanghai Xingjian Vocational College and use the "Xingjian Intelligent School" app to push students' ability shortcomings reports to teachers, guiding personalized teaching. Finally, there is international accreditation and mutual recognition of credits. Introduce international certification systems such as IHK from Germany and PMI from the United States to achieve the integration of "Capability Map International Standards".

6.2. Core Findings: Suzhou Experience of AI Driven Transformation

The transformation of vocational education in Suzhou reveals the key logic of the

transformation of vocational education in the AI era: firstly, the reconstruction of elements needs to be based on the premise of "industry anchoring", and the adjustment of professional, curriculum, technology and other elements must closely match the needs of local industrial upgrading; Secondly, technological empowerment needs to be promoted synchronously with institutional innovation. Simple technological superpos- ition is difficult to break through the traditional educational paradigm, and systematic

reforms such as evaluation mechanisms and resource allocation are needed; Thirdly,differentiated development is the way for local universities to break through the impasse, and the models of industry led, policy driven, and cross-border integration all reflect the importance of "localized" innovation.

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