

Research on Innovation and Practice of Digital-Intelligent International Economic and Trade Talent Cultivation

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Abstract: The deep integration of the digital economy and the Fourth Scientific and Technological Revolution has accelerated the digital and intelligent evolution of international trade forms, and application-oriented digital-intelligent trade talents have become the core factor supporting high-quality industrial development. Against the background of emerging liberal arts construction, this paper systematically interprets the theoretical connotation and logical mechanism of digital-intelligent trade talent cultivation, sorts out domestic and foreign relevant research progress and practical experience, and analyzes structural contradictions existing in talent cultivation from the dimensions of supply-demand matching, resource supply, and mechanism coordination. This research proposes constructing a new talent cultivation paradigm empowered by digital intelligence, featuring “four-party coordination among universities, government, industry, and enterprises as well as four integrations of industry-education, science-education, innovation-education, and competition-education.” Implementation paths are designed from dimensions including ideological and political education system, curriculum system reform, dual-qualified faculty construction, industry-university-research platform establishment and evaluation feedback mechanism, and the feasibility of the model is verified combined with typical cases. The research results can provide theoretical references and practical schemes for the transformation of international trade majors and the construction of emerging liberal arts in local universities.

Keywords: Digital-intelligent trade; Talent cultivation; Four-Coordination and Four-Integration; Countermeasures and suggestions

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1. Research background and significance

1.1. Research background

The Report to the 20th National Congress of the Communist Party of China calls for advancing the digitalization of education. The *Outline for the Construction of a Powerful Country in Education (2024–2035)* proposes implementing the national digital education strategy and taking the construction of emerging liberal arts and

AI-enabled educational transformation as key tasks. Under the new round of scientific and technological revolution, digital technologies have reshaped international trade business forms and spawned a large number of new posts, resulting in strong market demand for interdisciplinary talents with both international trade theories and digital application capabilities. The traditional training model focusing on theoretical lectures can hardly adapt to industrial changes, so innovating the digital-intelligent training model of economic and trade talents has become an urgent task for universities in constructing emerging liberal arts. Facing the development of the digital economy, deepening curriculum reform, optimizing major layout, and talent cultivation systems have become core topics of higher education reform.

At the industrial level, digital trade has become a new engine for international trade development and a new competition track for all countries. The *Opinions on Promoting the Reform and Innovative Development of Digital Trade* issued by the General Office of the CPC Central Committee and the General Office of the State Council clearly put forward strengthening the cultivation of digital trade talents. Local regulations such as the Jiangsu Provincial Regulations on Promoting the Digital Economy also regard the construction of digital talent teams as key support. According to statistics from the Ministry of Commerce, the scale of China's digitally deliverable service trade reached 3.1 trillion yuan in 2024, with a year-on-year increase of 8.7%, and the proportion of digital trade in service trade rose to 48.2%. The expansion of the industrial market generates strong demand for professional talent. However, the talent cultivation system of international economy and trade majors in most universities still relies on traditional paths, and the integration of digital intelligent technologies and professional education is insufficient, leading to structural mismatch between talent supply and market demand.

1.2. Research significance

Theoretically, based on digital economy theory, grounded theory, modern industrial theory, and niche theory, this study clarifies the theoretical connotation of cultivating application-oriented digital-intelligent trade talents under the background of emerging liberal arts, analyzes internal logic and practical paths, and enriches the theoretical system of educational digitalization and emerging liberal arts construction. This research constructs a theoretical framework of the "four-coordination and four-integration" cultivation model and expands the application boundary of industry-education integration theory in the field of digital-intelligent trade, providing new perspectives for interdisciplinary research.

Practically, targeting existing difficulties in digital-intelligent trade talent cultivation, this study puts forward feasible model construction schemes to guide the transformation of international trade majors in local universities. Relying on diversified cultivation mechanisms and comprehensive evaluation systems, the imbalance between supply and demand and weak coordination can be resolved to improve the industrial adaptability of talents. Relevant countermeasures can also provide references for competent authorities to formulate policies, improve regional digital talent supply, and boost high-quality development of Jiangsu Province and the Yangtze River Delta.

2. Domestic and foreign literature review

2.1. Research on connotation and construction path of emerging liberal arts

The construction of emerging liberal arts is an innovative strategy of higher education adapted to scientific and technological revolution and industrial transformation, with its core goal of promoting the deep integration

of traditional liberal arts and modern technologies. Li ^[1] divided its connotation into three dimensions: interdisciplinary integration, talent cultivation, and disciplinary research scope, and emphasizes interdisciplinary innovation and humanistic literacy cultivation covering economics, management, literature, and other disciplines. The Declaration on the Construction of Emerging Liberal Arts proposes relying on information technology to promote high-quality development of liberal arts and cultivate interdisciplinary application-oriented talents. Wu ^[2] pointed out that emerging liberal arts are not a simple superposition of technologies, but a systematic reform of educational concepts and cultivation systems. Hu and Huang ^[3] divided interdisciplinary integration into two levels: internal integration of humanities and social sciences, and cross-integration between social sciences and science and engineering technologies, so as to reshape the liberal arts education paradigm. In terms of digital-intelligent integration paths, scholars generally warn against the misunderstanding of instrumentalizing technologies. Tang and Li ^[4] proposed that the interdisciplinary construction of international trade majors cannot regard digital technologies as simple teaching tools; organic interdisciplinary integration shall be realized, and all-round transformation of cultivation objectives, curriculum systems, and evaluation mechanisms shall be completed relying on digital-intelligent technologies.

2.2. Research on digital-intelligent trade talent cultivation model

The cultivation of application-oriented digital-intelligent trade talents is driven by big data, artificial intelligence, and cloud computing, focusing on interdisciplinary integration and international vision to cultivate interdisciplinary talents equipped with both international trade theories and digital skills. OECD proposed that universities shall update competency frameworks for the digital economy and shape core literacies, including data literacy and cross-cultural communication. Aoun advocated focusing on cultivating critical and innovative thinking as well as social abilities that cannot be replaced by artificial intelligence. Domestic scholars stress that emerging liberal arts construction shall adhere to liberal arts fundamentals. Wang pointed out that digital-intelligent empowerment cannot eliminate the humanistic value of liberal arts. He and Jin ^[5] advocate guiding talent cultivation with Chinese values and unifying technical rationality and value rationality. In terms of teaching reform, many scholars propose promoting digital transformation of international trade majors, building intelligent teaching scenarios, optimizing teaching resources with digital-intelligent technologies, and carrying out personalized teaching to teach students in accordance with their aptitude.

2.3. Digital-intelligent talent cultivation practices of foreign universities

Developed countries started early in digital-intelligent talent cultivation and have built an integrated system covering policies, infrastructure, curricula, and university-enterprise coordination. The United States, Europe, and Australia have issued top-level plans for digital education, while Japan and the United States continuously improve campus digital infrastructure. In curriculum construction, integration of digital technologies and international trade is emphasized: Massachusetts Institute of Technology sets digital-intelligent supply chain programs, National University of Singapore offers special modules of artificial intelligence trade, and Ehime University of Japan develops trade data analysis directions and jointly develops practical projects with enterprises ^[6]. In the field of industry-education integration, Germany's Duales Ausbildungssystem is widely referenced. Universities in Europe and America generally implement enterprise internships and practical training based on real industrial scenarios to strengthen students' practical abilities ^[7].

2.4. Research on pain points and countermeasures of talent cultivation

At present, prominent contradictions exist in digital-intelligent trade talent cultivation: the cultivation system lags behind industrial development with insufficient matching between supply and demand; disciplinary barriers hinder the cultivation of interdisciplinary talents; there is a shortage of dual-qualified teachers, and divergences in evaluation and cognition as well as interest gaps between universities and enterprises restrict in-depth industry-education integration. Academic circles advocate diversified collaborative governance, relying on governments to build industry-university-research platforms, systematically optimize education systems, and construct multi-win cooperation mechanisms. Although existing studies have formed a basic consensus, they still have deficiencies: a lack of systematic theoretical frameworks from the perspective of emerging liberal arts, insufficient analysis of coordination mechanisms, and few localized cultivation models adapted to regional development ^[8]. Based on existing achievements, this study explains the theoretical connotation of digital-intelligent trade talent cultivation, constructs the “four-coordination and four-integration” education model, improves implementation paths and policy systems, and fills relevant research gaps.

3. Current situation and existing problems of digital-intelligent trade talent cultivation in China

3.1. Development status

In recent years, with the rapid development of the digital economy and continuous advancement of emerging liberal arts construction, phased progress has been made in digital-intelligent trade talent cultivation of domestic universities. According to statistics from the Ministry of Education, by the end of 2024, more than 320 universities nationwide had added digital trade and cross-border e-commerce directions to the International Economy and Trade major, accounting for about 65% of all universities offering this major. As a major province in the digital economy, Jiangsu Province has 47 undergraduate universities offering the International Economy and Trade major, among which nearly 80% have launched digital-intelligent transformation reforms and formed a batch of regionally distinctive talent cultivation practices.

In terms of curriculum and teaching environment construction, digital transformation is accelerating. On the basis of core courses such as Traditional International Trade Theory and International Trade Practice, most universities have added digital-intelligent courses including Digital Trade, Digital Economy Theory and Practice, Cross-border E-commerce, Big Data Marketing, Python Data Analysis, Blockchain and Supply Chain Finance, greatly lifting the technical content of curriculum systems. In textbook construction, a number of 14th Five-Year Plan textbooks focus on digital trade, integrating the latest industrial cases and technical applications to provide basic support for teaching ^[9].

Breakthroughs have been made in practical teaching platform construction. National Industry-Education Integration Community of Digital Trade and provincial modern industrial colleges have been established successfully. Universities cooperate with leading enterprises such as Alibaba International and Amazon Global Selling to build training bases, introduce real business scenarios and project resources, and continuously improve the scenario-based and authentic practical training for students. In terms of discipline competitions, events including the National University Cross-border E-commerce Innovation and Entrepreneurship Competition and the National University International Trade Digital Skills Competition have expanded in scale, becoming important carriers to test talent cultivation quality. Nevertheless, overall, digital-intelligent trade talent cultivation is still in the initial exploration stage, with obvious gaps compared with industrial demands.

The 2024 Digital Trade Talent Employment Report released by Zhaopin shows that the talent gap in the digital trade sector exceeds 2.5 million, among which interdisciplinary talents mastering both trade business and digital technologies account for 68% of the total gap, resulting in a prominent structural contradiction between supply and demand. There is a large gap between university cultivation quality and industrial post requirements, and the compliance rate of graduates' digital-intelligent skills is less than 40%, meaning supply-side reform of talents has a long way to go.

3.2. Analysis of typical cases

As a national and provincial first-class major construction site, Sanjiang University has built an application-oriented digital-intelligent trade education model. The university constructs a curriculum system of “Trade + Digital Technology + Innovation and Entrepreneurship,” adds distinctive digital-intelligent courses, builds digital training platforms, and introduces real cross-border e-commerce resources for practical teaching. It jointly builds digital trade industrial colleges with many leading enterprises and implements order-based training. Enterprise tutors account for more than 35% of practical courses. The graduate employment rate remains above 97%. Meanwhile, the university improves the integration mechanism of competitions and teaching. Students have won more than 80 awards in various discipline competitions in the past three years, and multiple student entrepreneurial teams have been incubated successfully. The Micro-Master Program of Digital-Intelligent Supply Chain of Massachusetts Institute of Technology serves as an international high-quality example. Its core advantage lies in the deep integration of technology and business. The curriculum covers technical modules such as big data and machine learning, and project training is carried out relying on real commercial data. A hybrid online-offline teaching mode is adopted, and consulting committees are formed in linkage with global leading enterprises to dynamically optimize curriculum systems. Graduation projects are oriented to real enterprise problems to realize precise matching between talent cultivation and industrial demands ^[10].

3.3. Main existing problems

3.3.1. Macro level

The ideological and political education system is imperfect, with a structural mismatch between talent supply and demand. Universities need to refine implementation mechanisms for fostering virtue through education; professional instruction and ideological-political education operate in isolation, and the synergistic effect of curriculum-based ideological-political education cannot be fully leveraged. Talent training prioritizes digital skill teaching while neglecting value guidance such as national identity and professional ethics, making it hard to integrate knowledge imparting and value cultivation. Meanwhile, the misalignment between talent supply and market demand is prominent: some universities define competency standards for digital intelligent trade talents ambiguously with unclear training orientations, producing versatile yet unrefined students lacking core competitiveness; long curriculum update cycles fail to keep pace with rapid iterations of digital technologies; homogeneous training models across universities lack differentiated planning and cannot meet multi-level staffing demands along the digital trade industrial chain.

3.3.2. Meso level

Insufficient teaching resource supply alongside lagging development of faculty teams and evaluation systems.

There are marked shortages of interdisciplinary digital intelligent teaching resources. Most digital-related courses are simply added separately instead of being deeply integrated with core international trade curricula; local universities face constraints in funding and technology that slow the construction of virtual simulation training platforms; most existing textbooks only digitize conventional content, and high-quality textbooks tailored for digital-intelligent integration are scarce. There is a severe shortage of compound dual-qualified dual-competent teachers. Digital intelligent trade requires instructors to possess solid theoretical foundations, digital technical expertise, and industrial experience, yet most full-time university teachers lack frontline industry work experience and have weak digital application capabilities; management systems for part-time enterprise instructors remain immature. Surveys indicate that merely 18.7% of international trade faculty at local universities in Jiangsu can independently deliver data analytics courses, and less than 25% have enterprise secondment experience. Conventional evaluation frameworks overemphasize theoretical memorization with low industry participation, lacking feedback loops for continuous improvement and failing to properly assess students' practical and innovative competencies.

3.3.3. Mechanism level

Shallow integration of industry-education-research-innovation alongside prominent multi-party collaboration barriers. Most university-enterprise partnerships stay superficial at internship placements and guest lectures, hindering deep collaborations such as co-developed talent training programs and joint curriculum construction. Universities prioritize educational outcomes while enterprises pursue short-term economic gains; mature benefit-sharing and risk-sharing mechanisms are absent, leading to the widespread “enthusiastic universities, indifferent enterprises” phenomenon. Barriers block research-education integration as teaching and research remain disconnected, cutting off pathways for translating cutting-edge research outputs into teaching materials and limiting student access to high-level research opportunities. Integration between entrepreneurship education and competition-based teaching is inadequate: innovation and entrepreneurship education runs separately from major training systems; academic competitions are poorly aligned with regular coursework, with prevalent utilitarian participation, no mechanisms for translating competition achievements, and untapped educational potential of advancing teaching and learning through contests.

4. Innovative paths for the cultivation of digital-intelligent economic and trade talents

4.1. Ideological and political guidance: Constructing an all-round education system

This study constructs an all-round ideological and political education system featuring “three levels and four integrations and four classrooms” to implement the fundamental task of fostering virtue through education and solve the core orientation problem of talent cultivation. Equal emphasis is placed on four dimensions: ideology and politics, knowledge, ability, and literacy. The system is promoted at three levels: at the top level, a curriculum ideological and political working mechanism coordinated by the Party Committee and multiple departments is established to integrate ideological and political elements into the whole talent cultivation process; at the curriculum level, the ideological and political connotation of digital-intelligent trade majors is deeply explored, contents such as national sentiments and professional ethics are integrated, and demonstration courses and teaching teams of ideological and political education are built; at the practical level, various social practices and enterprise internships are relied on to consolidate education effects. Meanwhile, ideological and

political objectives, contents, methods, and evaluation are deeply integrated with professional education. Value cultivation is carried out combined with Chinese practices of digital trade. The first, second, third, and fourth classrooms are linked to integrate offline teaching practice and online new media ideological and political positions and form a three-dimensional education pattern.

4.2. Model innovation: Building a new talent cultivation paradigm of Four-Coordination and Four-Integration

A four-party coordination education mechanism of universities, government, industry, and enterprises is constructed to break the limitations of single-school operation. University-government cooperation links local functional departments, optimizes talent cultivation schemes relying on policy resources, and jointly builds industrial research platforms to serve regional development. University-enterprise cooperation implements the “Five Coordination” mechanism (co-construction of classrooms, co-training of teachers, co-compilation of textbooks, sharing of training bases, co-cultivation of talents), introduces enterprise standards and industrial tutors, and enables enterprises to participate in the whole talent cultivation process. University-industry cooperation links industry associations to align industrial standards and vocational certifications, and expand student development platforms via competitions and forums. University-university cooperation connects domestic and foreign universities to share high-quality resources, carry out joint training, and broaden students’ international vision. On this basis, a digital-intelligent empowered paradigm of four integrations (industry-education, science-education, innovation-education and competition-education) is implemented. Industry-education integration relies on real industrial projects and modern industrial colleges to realize a seamless connection between education and industrial demands. Science-education integration promotes feeding teaching with scientific research achievements and encourages students to participate in scientific research projects to cultivate innovative capabilities. Innovation-education integration constructs a progressive curriculum system for innovation and entrepreneurship and relies on incubation platforms to support students’ entrepreneurial practices. Competition-education integration establishes a linkage mechanism between competitions and teaching, builds multi-level competition systems to realize promoting teaching and learning via competitions.

4.3. Mechanism construction: Building diversified talent cultivation paths

Focus on optimizing the whole-chain mechanism of talent cultivation and build an all-round guarantee system. First, construct a digital-intelligent teaching resource system and develop a four-stage progressive curriculum structure. Promote the digital transformation of professional courses, add special digital technology courses, jointly develop characteristic textbooks and virtual simulation resources with universities and enterprises, build intelligent teaching environments, and realize personalized targeted teaching. Second, build diversified practical platforms, jointly build provincial industry-education integration platforms and enterprise industrial colleges, and carry out order-based training. Expand international exchange channels, introduce high-quality international educational resources, and build on-campus innovation and entrepreneurship incubation platforms to create an atmosphere for innovation and entrepreneurship education. Third, cultivate digital-intelligent dual-qualified teaching teams. Adopt the strategy of introduction plus training, implement two-way secondment between universities and enterprises, and provide special training to improve teachers’ digital capabilities and industrial experience. Improve the employment and management mechanism of enterprise tutors and optimize the teacher assessment and incentive system. Fourth, strengthen teaching with scientific research. Deepen

scientific innovation in the field of digital trade, promote the transformation of research results into teaching resources, and rely on research projects to cultivate students' innovation and competition capabilities, forming a virtuous cycle of teaching, research, innovation, and competitions.

4.4. Closed-loop evaluation: Constructing comprehensive evaluation systems and feedback mechanisms

A multi-agent and full closed-loop talent cultivation quality evaluation system is constructed, including 3 first-level indicators of objective achievement, cultivation process, and cultivation effect, as well as 23 detailed second-level indicators. The single internal university evaluation model is broken down, and multi-evaluation subjects, including governments, industries, enterprises, and third-party institutions, are introduced to comprehensively assess students' post-competency, professional adaptability, and development potential. A two-way internal and external feedback mechanism is established. A dynamic basis for education improvement is collected, relying on in-school teaching evaluation and follow-up research of graduates. A closed-loop optimization process of "problem identification–analysis–improvement–verification" is built, and evaluation results are linked to professional resource allocation to realize continuous improvement of talent cultivation quality.

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Disclosure statement

The authors declare no conflict of interest.

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